

**National Association of Business, Economics and
Technology**

Proceedings

**42nd Annual Meeting
November 7th and 8th, 2019**

Days Inn, State College, PA 16801

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National Association of Business, Economics and Technology

NABET 2019 CONFERENCE PROCEEDINGS

Editors' Page

Throughout the 42-year history of the NABET/APUBEF Conference, we have striven to compile and publish the authors' papers which were presented at each of the respective conferences. Since 2013, the Proceedings has been upgraded to peer-reviewed status. Throughout the history of the NABET/APUBEF Proceedings, we have benefited from the services performed by an exceptional group of reviewers and editors.

For the 2019 Conference Proceedings, several attendees at the conference volunteered to participate in the review process. From these volunteers, we selected four individuals to participate in the peer-review process. Each of these reviewers worked diligently and selflessly in the arduous task of meticulously reviewing the various scholarly works that are presented in this Proceedings publication.

The editors acknowledge the dedication, hard work and the excellent result in which the reviewers' efforts resulted. The reviewers of the 2019 NABET Peer-Reviewed Conference Proceedings are:

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National Association of Business, Economics and Technology

NABET 2019 CONFERENCE PROCEEDINGS

INTRODUCTION

The National Association of Business, Economics and Technology is in its forty-second year of existence. It was formerly known as APUBEF, the Association of Pennsylvania University Business and Economics Faculty. It was founded by a group of economics and business professors from the fourteen state universities comprising the Pennsylvania System of Higher Education. Their goal was to provide a platform for sharing and encouraging scholarly work among the business faculty of the fourteen state universities. As a result of their efforts, the organization has grown and has sponsored an academic conference each year for the past 42 years.

Since 2006 NABET was regional in scope and has become national in scope for the 42nd Annual Meeting and beyond. At the 42nd Annual Meeting the scholarly work of authors from fourteen states, and the countries of Portugal, Spain and Sweden representing 80 colleges and universities were presented.

At NABET, we encourage conference presenters to complete their papers and submit them for publication for this Peer-Reviewed Proceedings publication. Of the 130 papers, workshops and discussion panels presented at the 42nd Annual Meeting, the following pages contain those papers that were completed by the authors and submitted to the Proceedings editors. Each paper has gone through a thorough review/edit process. Also, this Proceedings publication includes *The Official Conference Program* of the 42nd Annual Meeting which presents the abstracts of each paper that was presented at the conference.

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MITIGATING DATA SECURITY THROUGH EMPLOYEE POLICY

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ABSTRACT

This critical incident describes the data breaches that occurred at Equifax in 2017. The data breaches involved the personal information of over 145 million Americans. This is the first time in which name, address, birthdate, and social security number were all stolen at the same time (Primoff & Kess, 2017). In the first instance, improper password usage, in conjunction with password policy insubordination led to the vulnerability. Subsequently, employee failure to update a security “patch” led to the further exposure. The data breach exposed the public to the risk of identity theft in the form of account fraud and/or improper account usage. The organization’s leaders failed to take responsibility for the issue, placing blame on a single employee during public Senate hearings. As a result of this incident, the company suffered significant reputational harm, continued regulatory scrutiny, in addition to monetary penalties which are still to be determined. The reader is tasked with addressing this problem from the perspective of employment and data security policy.

INTRODUCTION

Upon taking over as CEO of Equifax in 2005, Richard Smith referred to the staff as one of “stagnating talent” with a “culture of tenure” (Riley, Robertson, & Sharpe, 2017, p. 27). This sentiment foreshadowed the approach he and his colleagues would take upon experiencing the largest data breach in history. Equifax was one of three nationwide credit bureaus charged with tracking the financial history of U.S. based consumers; including data on loans, credit cards, child support, late/missed payments, etc. (O’Brien, 2017). In 2017, Equifax suffered two separate data breaches, one of which was the most extensive data security breach to date, which allowed hackers to access the names, addresses, birth dates, social security numbers and driver’s license numbers of over 145 million Americans (Primoff & Kess, 2017). Furthermore, this was the first time in history that a data breach allowed a hacker access to all of these data fields at once, which made this security breach different from, and potentially more harmful than, all previous security breaches (Primoff & Kess, 2017). These four data fields are the primary form of authentication for many commercial and other uses, therefore this breach created a level of risk to those affected unlike previous breaches (Lemos, 2017).

The breach was caused by a software vulnerability identified and addressed by the issuance of a patch by the software company in March of 2017. Equifax did not install the patch until July 2017, which permitted the security weakness to be exploited for five months (Knudson, 2018). The response to this security breach by Equifax damaged the company’s reputation as well. Equifax failed to disclose the breach to the public for six weeks after it was initially discovered, and during that six-week period, two high ranking employees within Equifax sold off large shares of stock. Subsequently, they were charged with insider trading (Fleishman, 2018).

Equifax was left with many more questions than answers after this data breach. They would need to determine how the breach occurred and why it took so long for the breach to be addressed internally. In addition, they would need to win back public confidence by taking steps to increase data security and reduce the likelihood of such incidents in the future.

COMPANY HISTORY AND BACKGROUND

Founded in the 19th century, Equifax began as a retail credit card company. Over time, they morphed into a repository for personal information related to credit history and financial data (Riley et al., 2017). A consumer reporting agency is defined as “a person or entity that assembles or evaluates consumer credit information or other consumer information for the purpose of furnishing consumer reports to others” (U.S. Government Accountability Office, 2018). Equifax was based in Atlanta, Georgia and, as of 2019, employed approximately 10,000 individuals worldwide (“Company Overview”, 2019). Information stored within Equifax’s databases is widely used by credit companies, employers, and other institutions to evaluate an individual’s financial solvency. Over time, Equifax evolved from a traditional credit agency to a company engaged in data analytics, fraud detection, and consultancy (Riley et al., 2017). Given the large amount of data maintained by Equifax, the company is subjected to federal laws on data security and disclosure. As such, many were surprised to learn that not only was Equifax vulnerable to a significant data security

breach, but they also failed to disclose that breach to the public and to employees within a reasonable time period (Fox-Brewster, 2018).

EMPLOYMENT POLICY

According to Riley et al. (2017), Equifax employees used to joke that the company was “just one hack away from bankruptcy” (p. 26). This particular insight highlighted the complex nature of employment policy at Equifax. When management learned of the available patch to fix the vulnerability within the Apache software system, action was not immediately taken to repair the issue (Knudson, 2018). Additionally, communication within the company failed to alert employees of the problem, consequences, and corrective action needed once the hackers received access to customer information (Fox-Brewster, 2018). In October 2017 Congressional hearings, former CEO Richard F. Smith indicated that the breach was caused by one employee’s failure to pay attention to, and implement, necessary security measures as a result of a known security vulnerability (Siegel-Bernard & Cowley, 2017)

DATA SECURITY

In recent years, the U.S. government acknowledged the impact and cost of identity theft through the passing of numerous laws, including The Identity Theft and Assumption Deterrence Act (making identity theft a federal crime) and the Fair and Accurate Credit Transactions Act of 2003 (amending the Fair Credit Reporting Act of 1970) (Linnhoff & Langenderfer, 2004). Specifically, the Gramm-Leach-Bliley Act required that financial institutions, including Equifax, develop, implement and maintain a comprehensive information security program to keep customer information secure and confidential (U.S. Government Accountability Office, 2017). While Equifax maintained a documented data protection plan in accordance with government standards, the plan was unsuccessful in preventing or timely detecting the intrusion due to implementation weaknesses in the plan. As discussed earlier, Equifax was notified of a potential software vulnerability prior to the data breach (Knudson, 2018). Pursuant to the security plan in place at Equifax, this notification was distributed to database administrators via email, however, the email list was not up to date, causing the individual who was responsible for this system to not receive the notification (U.S. Government Accountability Office, 2017). Furthermore, Equifax maintained detective software which would scan its network for suspicious activity. However, the certificate on this software expired for 10 months at the time of the data breach, rendering the software incapable of detecting the abnormal system traffic (U.S. Government Accountability Office, 2017).

OUTCOMES

Since the data breach, Equifax leaders reported that significant measures were implemented to improve data security, including the admittance of a new board member who specializes in data security and significant monetary investments in data infrastructure (Equifax Inc., 2018). Furthermore, Equifax claimed to enhance its disclosure controls, to ensure that necessary information regarding suspected data breaches is directed to the proper individuals in a timely manner (Equifax Inc., 2018).

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Dr. Joshua Chicarelli joined California University of Pennsylvania in the fall of 2016 as a full-time associate professor of accounting in the Business and Economics Department. Prior to joining California University, he taught at Waynesburg University and operated his own certified public accountant practice out of Morgantown, W.V. Dr. Chicarelli's dissertation focused on income tax avoidance and corporate valuation and his research interests include forensic accounting, income tax administration and corporate governance.

EXAMINING THE POTENTIAL IMPACT OF UPCOMING LEASE ACCOUNTING CHANGES IN AN INTERMEDIATE ACCOUNTING COURSE

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ABSTRACT

Often times, the typical accounting curriculum requires such a large focus on providing technical knowledge that it can become challenging to devote precious time towards developing other important skills, such as examining how various accounting rules actually impact a company's financial statements. Recently, the accounting rules for lease transactions has changed significantly, and this paper provides an overview of an assignment used in an Intermediate Accounting course to engage students in learning about the overall impact. This assignment has the benefit of taking very little time away from lecture.

INTRODUCTION

By its very nature, accounting courses tend to be filled with technical knowledge, and the intermediate series of accounting is not immune. It is not uncommon for intermediate accounting to be spread across two or even three semesters in an undergraduate accounting program. Because of the volume of material to be covered in these courses, it can be challenging to give students the opportunity to go beyond technical knowledge and see real-world application.

However, the American Institute of CPAs (the AICPA) strongly encourages educators to incorporate more than just knowledge in their curricula (AICPA 2019). To this end, this paper will discuss an assignment incorporated in an intermediate accounting course that takes advantage of a recent and significant change in accounting rules. Students will learn about the change, review financial statements of companies expected to be strongly affected by the change, recalculate the financial information following the new rules, perform a financial statement analysis, and offer some opinions as to what they found in the company's footnotes.

This assignment has the advantages of not taking much time away from the lecture material, being relatively easy to assign and grade, lets students work through a real-world company and example, encourages critical thinking, and can add value despite being a relatively short assignment.

The remainder of this paper will briefly discuss the expected change in accounting rules for leases, provide a brief overview of the assignment, followed by some of the core competencies mentioned by the AICPA that this assignment will address, and then provide an in-depth walkthrough of the assignment itself.

CHANGE IN ACCOUNTING FOR LEASES

Traditionally, accounting for lessees who entered into long-term rental contracts to use assets were required to perform a series of tests to determine if the lease contract was to be considered a capital or an operating lease. Generally, a lease was capital if it was deemed to have features similar to an installment purchase of the asset (e.g., getting to keep the asset after the rental period was over, being able to purchase the asset at a price significantly lower than its expected value at the end of the lease contract, using the asset for at least 75% of its economic life, or the present value of the rental payments was at least 90% of the asset's underlying value). If the lease was capital, that required including the rented item as an asset on the lessee's balance sheet, and the present value of expected future payments as a liability on the lessee's balance sheet. In contrast, an operating lease did not need to be placed on the lessee's balance sheet.

As can probably be surmised, many companies who heavily relied on lease contracts preferred to not have capital leases, in order to avoid placing large lease liabilities on the balance sheet. To do so, lessees and lessors could work together to develop lease arrangements that followed the accounting rules and avoided the lease being treated as capital.

This could be problematic. While not considered fraud, it could provide a misleading snapshot of the company. Therefore, the Financial Accounting Standards Board, in 2016 issued a new standard that changed the accounting rules. These new rules will effectively require lessees to report the present value of all long-term lease contracts as lease liabilities on their balance sheets. Some of the reasons cited include that new standard:

- 1) "...provides users with more relevant information on and a more faithful representation of leasing arrangements for both lessees and lessors than previous [accounting rules]" (ASU 2016-02, BC7),
- 2) Improve understanding and comparability of lessees' financial commitments regardless of the manner they choose to finance the assets used in their business (ASU 2016-02, BC8).

These new accounting rules are required to be incorporated by companies for fiscal years after December 15, 2018, and calendar year end public entities are required to adopt the new standard on January 1, 2019.

According to the Intermediate Accounting textbook by Kieso, Weygandt, and Warfield (2016), this change is going to significantly impact many companies. This text summarizes some findings in this area: "This accounting change will have a significant impact on many companies' balance sheets. According to one study, companies listed on major stock exchanges are estimated to have over \$3.3 trillion of leasing commitments, of which more than 85 percent do not appear on the listed companies' balance sheets. Companies with large off-balance-sheet operating leases will be most affected" (Chapter 21A).

The intermediate accounting course typically includes a chapter on leases. Therefore, incorporating discussion and assignment in this topic is very timely and useful for students.

OVERVIEW OF THE ASSIGNMENT

For this assignment, students are assigned a company that tends to have a significant number of leases that under the old accounting rules were operating leases (and therefore not required to be capitalized on the balance sheet).

They will access that company's most recent financial statements that still follow the old accounting rules, and use those statements to calculate a number of financial ratios that are traditionally used to gauge the relative health of a company.

Then, they need to go through the footnotes of the annual report, and find the information on operating leases. Even under the old accounting rules, companies are required to disclose the expected series of payments for operating leases for the next 5 years individually, and then an estimate of payments to be made more than 5 years away.

Using this information, they will perform a what-if calculation—specifically, determining the present value of these future operating lease payments. Once they calculate this amount, they will then "capitalize" these operating leases, by increasing total assets and total liabilities by this amount. In effect, this should result in what the company's financial statements will look like if they were required to follow the new accounting rules today.

Then they recalculate the financial ratios after incorporating this change, and answer questions with respect to their findings. They look through the footnotes to see what their company has included with respect to discussing the upcoming change in lease rules. For example, have they specifically stated when the new rules will be adopted? How? Have they provided any estimates of the overall impact to the financial statements?

The assignment ends with some critical thinking questions:

- 1) Comment on the overall change in the financial statements or ratios after incorporating this change;
- 2) Do you agree with what the company did in its most recent annual report? Would you have done more? Less? Why?
- 3) Now assume you are the company's CFO, and your company was required to capitalize all operating leases as of the end of the year you examined. How would you address this in the annual report? What would you specifically say to investors or creditors?

CONCLUSION

The intermediate accounting courses tend to be already filled with complicated material, and it can be challenging to go beyond the technical knowledge. However, the incorporation of this assignment does not take much time away from lecture material and should not take much time to complete. It allows students to draw on their previous knowledge—specifically leases and ratio analyses—as well as apply critical thinking. Finally, the timeliness of this topic gives them some real exposure to a major topic that is currently very relevant to the accounting world.

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APPENDIX: THE ASSIGNMENT

Lease Assignment

Instructions: Your group will be randomly assigned a company. You are to go to that company's website and find its annual report and answer a series of questions.

This assignment will be split into two parts. You will turn in the first part and receive feedback before continuing to the second part. Your answers will be either correct or incorrect—no partial credit is going to be given.

Grading will not be the same as an exam—this is not set up so that every question is worth a preset number of points. Instead, every group will start with the maximum possible points and receive penalties for each mistake. Therefore, it is possible to receive a score of zero, even if some portions of this assignment were done correctly.

It should be easy to read and understand how you arrived at your calculations. Everything should be clearly labelled.

For all answers expressed as a ratio or a percent, round to 3 decimal points.

For any ratios that require you to use an average (current cash debt coverage, asset turnover, profitability, and cash debt coverage), instead of calculating an average, use the year's ending balance instead.

If net sales is not given, use total revenues. If the company shows both net income attributable to noncontrolling interests and net income attributable to the parent, use the total net income number.

For any questions that ask you to provide a page reference in the annual report, use the page shown on the annual report itself. This is not necessarily the same number as a downloadable word document or PDF file.

Part 1

1. Ratios. Calculate the following for your company. Clearly label your calculations. A complete answer should be something like: "Current Assets 2,000,000 / Current Liabilities 4,000,000 = 0.500".
 - a. Current Ratio.
 - b. Current Cash Debt Coverage.
 - c. Asset Turnover.
 - d. Return on Assets.
 - e. Debt to Assets.
 - f. Cash Debt Coverage.
2. If all of the company's operating leases were required to be reclassified as capital at the end of the fiscal year you are examining, what would be the total capitalized amount?

To help answer this question, everyone will make the following assumptions.

- The appropriate interest rate is 6%.
- All operating leases will need be reclassified as capital, and as of the end of the fiscal period you are examining, these leases have 10 years' worth of future payments expected.
- That means the first payment is due in less than 1 year (i.e., year 0). The second payment is due in more than 1 year but less than 2 (i.e., year 1). The third is due in more than 2 years but less than 3 (i.e., year 2), etc. The final payment is due in more than 9 years but less than 10 (i.e., year 9).

To answer this question, you will need to do the following:

- Find the footnote for your company that discusses leases. Companies are required to disclose for their operating leases the amount expected to be paid within 1 year, 2, 3, 4, 5, and then one lump sum for after 5 years.
- You will need to do 10 single sum present value calculations.
 - The amount paid within 1 year would have an n of 0, because it will be paid in less than 1 year.
 - The amount paid in more than 1 year but within 2 years would have an n of 1.

- The amount paid in more than 2 years but within 3 years would have an n of 2.
- And so on, up to the amount paid in more than 4 years but within 5 years would have an n of 4.
- When you get to the amount to be paid after 5 years, you will be given one lump sum total. For the purposes of this assignment, assume that lump sum will be paid evenly over the subsequent 5 years. That means you should take this sum, divide by 5, and then perform 5 present value calculations with n values of 5, 6, 7, 8, and 9.

Calculate the present value of these expected operating lease payments. Clearly show and label all your work.

As you work, when you divide the lump sum by 5 and when you calculate the single sum present values, round your answer to 2 decimal places. When you add up your total, round to the nearest whole dollar.

Use this calculation to answer the questions below.

If this amount were to be capitalized, determine the following:

- a. The new total liabilities for the company.
- b. The percent increase in total liabilities, between what they actually reported and what they would now report if leases were to be capitalized.
- c. The new current liabilities for the company (the reported current liabilities should be increased by the capitalized amount to be paid within one year).
- d. The percent increase in current liabilities, between what they actually reported and what they would now report if leases were to be capitalized.
- e. The new total assets.
- f. The percent increase in total assets, between what they actually reported and what they would now report if leases were to be capitalized.

This is the end of part 1. You must turn it in for it to be reviewed and graded so that you can use the answers for part 2.

Part 2

3. Using the appropriate numbers, recalculate ratios for this company, as well as the percent change in the ratios. Don't forget to express the percent change as a percent. Show and label your work.
 - a. Current Ratio.
 - b. Current Cash Debt Coverage.
 - c. Asset Turnover.
 - d. Return on Assets.
 - e. Debt to Assets.
 - f. Cash Debt Coverage.

The remainder of this assignment is open-ended. Your answers should be clearly written, easy to read and understand, and should not include any cutting and pasting from the annual report.

It is not required that everyone in the group have the same answer to the questions below. In fact, if for any of the answers there are differing opinions, please share everyone's view.

4. Comment on the overall change in the financial statements or ratios after incorporating this change. You don't need to repeat what you found with magnitude or percent changes. What are your thoughts on what happened? Is this going to be a good change? Bad? Both? There's no right or wrong answer, I just want to know what your reactions are.
5. Provide a brief overview of what your company has done with respect to addressing the upcoming change in lease rules? Have they discussed them at all? Have they stated when they are going to adopt them and how? Have they provided any estimates of the overall impact? Provide page references for your answers.

6. With respect to the previous question, do you agree with what the company did? Would you have done more? Less? Why?
7. Now assume that you are the company's CFO, and that your company was required to capitalize all operating leases as of the end of the fiscal year you examined. That means the balance sheet amounts and ratios you calculated earlier was what your company now shows. How would you address this in the annual report? What would you specifically say to investors or creditors? You'll want to do more than just say which numbers increased, they can figure that out for themselves. How would you discuss it? How would you soften the blow?

Please note that I am only asking what you would do, you do not actually have to do it to answer this question.

INFLUENCE OF COGNITIVE AND EMOTIONAL ADVERTISEMENTS ON BIOSPHERE RESERVE IMAGE AND VISITATION INTENTION FOR YOUTH

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ABSTRACT

This paper reports the results of a study of the role of North Vidzeme biosphere reserve (Latvia) image, pleasure and arousal in building young visitors' intention to visit biosphere reserve (target audience 15-25 years old youth). An online survey was conducted for data collection. A quantitative approach was employed to analyze the data. Findings showed that most of all respondents agreed that visiting biosphere reserves relieves stress, helps to socialize and escape from daily routine as well as they would visit more often protected areas if they would see their friends visiting them. Youth 15-19 were more excited, joyful and astonished about visiting biosphere reserve, but youth 20-25 were more neutral about it. Both groups agreed both groups agreed that there was a lack of advertisements and visibility of area.

INTRODUCTION

Although worldwide the number of reserves and national parks are growing, it is needed to pay attention to young people as important target group, particularly in the future. Do they visit and revisit nature-protected areas and do they pay special attention to them, as well – what motivates to visit these areas – are questions that comes in focus in latest researches (Njagi, et.al., 2017; Falgoust, 2017; Cetinkaya, 2018; Druvaskalne, Livina 2019).

Focusing on functional and emotional advertisements on image and visitation intension to the protected areas are very important. It is an opportunity to get know what is the commercial value that derives from consumer perception of the brand name (biosphere reserves, State Parks, National Parks), rather than from the product or service itself. Knowing the real facts, it is possible to work on target audience to increase biosphere reserve attractiveness and visitation and revisit intensions, because it is one of the key factors for business survival in biosphere reserves (Pratminingsih, Rudatin, Rimenta, 2014).

Although brand image and destination image, is not new and has been recognized as important concept in marketing, very often three sub-concepts or brand benefits, namely functional, emotional and experiential image is forgotten and not clearly defined impacts to consumer behavior in this field. Functional image/benefits is mostly connected advantages of product or service, and often connected with basic motivations, for example, physiological and safety needs, as well a desire to avoid problems. Experiential benefits related to what it feels to use the product or service; satisfying experiential needs such as sensory pleasure, variety, and cognitive stimulation. Symbolic benefit is connected to extrinsic advantages of product or service consumption, mostly related to underlying needs for social approval or personal expression and outer directed self-esteem (Keller, 1993; Pratminingsih, Rudatin, Rimenta, 2014; Artuger, Cetinsoz, 2017; Han, et.al., 2018).

Other key factor in place branding success is consumer's emotions, specifically, pleasure and arousal. It has been proved that there is positive relationship between brand images, consumer's emotions satisfaction, and revisit (repurchase) intention (Han, et.al., 2018). Arousal and pleasure has been defined as two most important (key concepts) emotions. Pleasure described by using connotations such as excitement, relaxation, love, and tranquility at one end and cruelty, humiliation, disinterest, and boredom at the other end. Arousal described by using four adjectives having ascending order of level of feelings: active, alert, attentive, and excited (Han, et.al., 2018). Emotional and experiential values are more strongly influencing consumer behavior and motivation, revisitation intension than other variables (Lee, et.al., 2011; Delgado-Ballester, Sabote, 2015; Prayag, et.al., 2017).

Artuger & Cetinsoz (2017) in their research has compiled worldwide research improvements that destination image has huge impact on revisit intension, as well as motivation (Pratminingsih, Rudatin, Rimenta, 2014; Artuger, Cetinsoz, 2017).

The youth as a target group was selected deliberately, as the results of studies on intergenerational differences are increasingly apparent, as well as workers in nature parks and tourism industry indicate that different approaches are needed for different generations. We share our intergenerational characters with the Mannheim theory, that generation

is a group of individuals who experience the same significant events within a given period of time. The unifying factors of generation can be split into three groups: 1) values, attitude, actions and consumption; 2) politics, literature, fashion, technologies; 3) year of birth, personality formation time (Klauss 2018). There are differences between breakdown of generations in different regions of the world, and researchers divide generations slightly differently by argue of influencing factors. In our study, we will analyze the findings of the research on young people by dividing two generations: generation Y from 1982-2000 and generation Z from 2000-2012. The characteristics and comparisons of generations highlight the main trends (Rubene, 2019).

The Y generation, or millennials, is a technology-driven and a success-oriented generation. Requires recognition in all walks of life, is socially active, has a high self-esteem and self-confidence, is able to combine work and private life, often changes jobs. The Z generation, or iGen, is a generation that has grown up and is constantly connected - online, living through the virtual world. Featuring the motto: "Live here and now!", so they are very happy to share personal adventures and life events on social media.

PURPOSE

The purpose of this study is to explore of North Vidzeme Biosphere Reserve image (functional, symbolic and experiential) pleasure and arousal in building youth intention to visit and to discover the moderating impact of functional/cognitive and emotional advertisements.

METHODOLOGY

Validated measurement items were employed from the studies (Heesup et al. 2018). All measurement items were evaluated with a five-point scale (strongly disagree (1) – strongly agree (5)). All eight constructs were measured with multiple items. Notably, five items for functional image, three items for symbolic image and four items for experiential image were used. Three items for both pleasure and arousal were utilized. To evaluate functional/cognitive and emotional ads, four items were used. Lastly, revisit intention was assessed with three items. The questionnaire was pre-tested with hospitality and tourism academics, after finalized with experts' review. After all, Hypothesis were risen:

- H1: Functional image positively and significantly affects pleasure.
- H2: Symbolic image positively and significantly affects pleasure.
- H3: Experiential image positively and significantly affects pleasure.
- H4: Functional image positively and significantly affects arousal.
- H5: Symbolic image positively and significantly affects arousal.
- H6: Experiential image positively and significantly affects arousal.
- H7: Pleasure positively and significantly affects brand satisfaction.
- H8: Arousal positively and significantly affects brand satisfaction.
- H9: Brand satisfaction positively and significantly affects revisit intention.
- H10: Functional/cognitive ads have a significant moderating impact on the relationships among each dimension of North Vidzeme biosphere reserve image, pleasure, arousal, brand satisfaction, and visitation intention.
- H11: Emotional ads have a significant moderating impact on the relationships among each dimension of North Vidzeme biosphere reserve image, pleasure, arousal, brand satisfaction, and repurchase intention.

Online tool was chosen to reach a wider amount of youth and collect their opinion about North Vidzeme Biosphere Reserve. The invitation to participate in the study, filling out an online survey, so sent to schools with a cover letter, was announced in the UNESCO National Commission of Latvia's organized teacher training seminar and social media as Facebook and Instagram. Survey data were collected between May and August 2019 in Latvia.

North Vidzeme Biosphere reserve was chosen as a study area, because it is the only biosphere reserve in Latvia, covering the 7% of all territory of Latvia. The first researches were done on understanding sustainability issues and brand of the biosphere reserve among population in 2007 and repeatedly in 2018 (Druvaskalne, Livina 2019). The reserve was established in 1997 and already on December 15, 1997, recognized as a protected territory of international importance in the framework of the UNESCO program Man and Biosphere. The internationally recognized UNESCO chair on Biosphere and Man is established in the only university in this region in 2019.

We collected a total 317 completed survey questionnaires. Among these, incomplete questionnaires and extreme outliers were eliminated. The remaining 295 valid responses were used to analyze the data by SPSS software.

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USING DIGITAL TECHNOLOGIES IN MUSIC INDUSTRY EDUCATION

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ABSTRACT

Music Industry is a relatively new bachelor degree offered only by a few institutions. However, it is gaining momentum, attracting an increased number of students. The development of digital technologies significantly changed the way music is produced and listened to, as well as how musical events are organized, artists are promoted, and marketing and ticket sales are performed. Thus, the Music Industry students have to be acquainted with the digital technologies and the opportunities they offer, and be able to use them in their future career. As in every emerging discipline, a challenge in the Music Industry program is the lack of textbooks and other educational materials. In addition, digital technologies develop so rapidly that it is impractical to write a traditional textbook. In this paper, we discuss the digital technologies that are included in the Music Industry program at SUNY Fredonia and what kind of related projects are assigned to our students. We hope that the information will be useful not only to Music Industry educators, but also to educators in other disciplines willing to make their students aware of the latest trends in digital technology applications.

INTRODUCTION

Music Industry (sometimes referred to as Music Business) is a relatively new discipline offered by higher education institutions at the baccalaureate level. Students seeking this degree come from a wide variety of backgrounds, with a wide variety of intentions as to how they will employ their degree. For example, among these students will be found: musicians; music producers; those seeking to run a venue; prospective artist managers; live sound engineers; event promoters; publicists; copywriters; journalists; booking agents; social media managers; and those seeking to own or work for a record label.

Music Industry is a relatively rare program, offered to date by only a few universities. For example, in one of the largest university systems in the United States – the State University of New York (SUNY) with 64 campuses – there are only two campuses that offer it at baccalaureate level – SUNY Fredonia and SUNY Oneonta.

This paper considers some of the most important digital technologies currently employed in Music Industry education, with recommendations for inclusion in various Music Industry courses, and the provision of real-life experience to enhance the students' Music Industry education. We believe that the paper would be useful for educators and administrators in Music Industry from different perspectives:

- From the curricular point of view, it provides information on the topics to include and in what courses.
- From the standpoint of the administration, it gives ideas about the skills the instructors should have, which could be used for job descriptions or interviews, as well as for providing professional development opportunities to the current instructors.
- From the IT perspective, it describes the necessary software and hardware, which has to be provided for this program.

The article is structured as follows: in the next section we consider the change in the Music Industry in the digital era. Then we describe in detail the types of digital technologies – marketing and publicity, music recording, composition and performance, data analytics, decision making and machine learning, and event and facility management – and the courses in which they could be studied. Finally, we conclude with a discussion of plans for future work.

MUSIC INDUSTRY CHANGES IN THE DIGITAL ERA

The human brain is wired to enjoy the patterns of music, so a musical beat is something we will always seek out (Matacic, 2016). It used to be that record labels would go out and find new talent. Now it is more likely that an artist will be discovered by the public through digital technology such as *YouTube* or *SoundCloud*, or even from friends on *Facebook* or *Twitter* (IFPI, 2018). In other words, through the use of digital technologies, the Music Industry is changing from a model dependent upon record labels to a model brimming with entrepreneurial opportunities.

Digital streaming services, such as *Spotify*, *Tidal*, and *Apple Music* are becoming the norm for music listening. As internet and cellular data speeds have increased, more and more people are buying subscriptions for music streaming instead of digitally or physically purchasing music (Hernandez, 2018). Spotify now permits independent artists to directly upload music to its streaming service. Recent studies have shown that as the music streaming industry grows, resultant revenue is beginning to offset the displacement of download revenue and has also resulted in a decrease in music piracy (Jenke, 2018). Studies have also shown that unknown artists who release and promote their music independently benefit from exposure provided by streaming that reaches a wider audience than they would otherwise reach on their own, further allowing them to capitalize on live performance income (IFPI, 2018).

Now, musicians have the freedom to experiment with alternative and novel marketing methods, such as free distribution of their music, while relying on alternate avenues to generate revenue such as merchandise and live performances (Lee, 2015). The development of digital technologies has not only significantly changed the ways music is listened to, it has changed everything from the way music is produced to how musical events are organized, artists are promoted, and marketing and ticket sales are accomplished. It is in this overall context that Music Industry students must be exposed to rapidly developing digital technologies.

In the sequel, we describe the types of digital technologies and the courses in which they could be studied.

MARKETING AND PUBLICITY

Marketing and publicity are very important parts of the music industry. In the recent past these activities were accomplished through posters, newspaper advertisements, reviews of concerts/artists, publication of the monthly program of concert halls, mailing campaigns, and similar activities. Nowadays, marketing in the music industry, as well as marketing in general, is carried out mostly through digital technologies - although the offline marketing should not be underestimated. Thus, the students have to be acquainted with the tools and methods for digital marketing, advertisement and promotion. More specifically, the following elements should be included in the curriculum.

Developing of Web Sites, Blogs, Podcasts, and Vlogs

Universities rarely offer dedicated courses on website development, except in some computer science courses where the emphasis is on the programming aspect (client side or server side), not on the design or on the specifics of the content of the web site. This is because web development is an interdisciplinary subject including elements from computer science, arts and the craft of writing which either has to be team-taught or offered by a professional web developer. At the same time, the amount of digital content increases exponentially, and consuming it has become an intrinsic part of our daily life (Fitzpatrick, n.d.). Thus, it becomes important to be able to express oneself efficiently in the digital world.

The emphasis of this topic must be on the business model that will bring revenue, on the content development, design, artistry, and creative ideas for original and engaging visuals using psychological approaches. The students should also learn the technical details and basic terminology of creating a web site, such as reducing the size of its memory preserving the content quality, choosing appropriate keywords using *Google Keyword Planner* (ads.google.com/home/tools/keyword-planner) or trending hashtags using the tools *Twitonomy* (twitonomy.com) or *Hashtagify.me* (hashtagify.me), optimizing it for the search engines, creating organic content and others. They have to also learn how to shoot and edit a quality video and how to record music. There are many systems for video editing that could be used. First, the video sharing platforms such as YouTube usually have some simple video editors. They may also provide free content, such as background music. For more advanced video-editing we recommend some free software such as the currently available *Blender* (blender.org) or *DaVinci Resolve* (www.blackmagicdesign.com/products/davinciresolve). Both run on the major desktop operating systems *Windows*, *Mac*, and *Linux*. *Blender* provides the audio mixing, syncing, and scrubbing, as well as various effect, speed control, several layers and filters. It is also a very powerful tool for creating animation. *DaVinci Resolve* is one of the most advanced free video-editing systems. According to its creators, “it is the world’s only solution that combines professional 8K editing, color correction, visual effects and audio post production all in one software tool” (Black Magic Design, n.d.). The challenge is that both systems require some training as the initial learning curve is very steep.

Managing Marketing Campaigns and Enhancing Social Media Marketing

From traditional marketing campaigns, to e-mail marketing, to social media marketing, the students have to learn how to design brochures, to edit pictures, and appropriately utilize color combinations and fonts. While the best-known picture editing software is *Photoshop* (www.adobe.com/Photoshop), it is not free and not all schools can afford it. Fortunately, it has a free equivalent *GIMP - the GNU Image Manipulation Program* (www.gimp.org), which has similar functions and a similar interface like Photoshop, and runs on the major operating systems, but is open source and is constantly enhanced by the community. While *GIMP* allows for flyer and brochure creation, *Canva* (www.canva.com) is a more specialized option in this regard. It also provides a base of templates and pictures to choose from for various occasions. The final project can be output in various formats.

Preparing Sales Management Dashboards

Music Industry undergraduate programs usually include one or two mandatory courses in accounting. These courses, however, are general and while some software use – such as *MS Excel* – is encouraged, more specialized tools for music industry are rarely provided. On the other hand, the Music Industry discipline deals with sales, and sales dashboards are essential for monitoring and reporting. While *Excel* allows the use of dashboards, this topic is not usually covered in the *Excel* university courses. Thus, we propose that, after taking a general course in accounting and a general course in *MS Excel* and *Access*, students also get acquainted with the sales dashboards, so that they will be able to choose among various metrics, connect with the data source, and become able to visualize the data in real time.

Courses in Which the Material is Taught

It is difficult for Music Industry faculty to offer all technology-related courses. Some of the courses that Music Industry students take may be general courses on *Excel*, *Web Programming*, or *Accounting* offered by Computer Science, Communication, or Business faculty during the freshman and sophomore years. After that, we recommend that the above-mentioned specialized technology-enhanced topics be covered by Music Industry faculty in courses like *Digital Marketing for Music Industry*, *Promotions for Music Industry*, *Concert Sales*, *Music Industry Podcasting*, and *Music Industry Video Production*, with instructors who should have specialized knowledge bridging technology and music industry concerns.

MUSIC RECORDING, COMPOSITION AND PERFORMANCE

Music professionals employ several software systems for music synthesis, sampling and mixing. Some of them have graphic interfaces for simplified music editing. Others display virtual instruments on which to play music using a keyboard. Yet, a third very advanced group is used for the automatic composition of music and even for professional concerts with animated characters singing music. Below we briefly describe some systems that could be used.

Audacity (www.audacityteam.org) is the most popular system for audio editing. It comes with a set of built-in functions and is easy to use. The system is free-of-charge and runs on all major operating systems, which makes it appropriate for classroom use. Although it may not have the capacity for professional audio production, it is appropriate for students.

Guitarix (guitarix.org) is a virtual guitar amplifier, which comes with 25 built-in modules for various effects. The system is free and open sourced, which means that it could be modified. It runs under Linux only, which may not be the operating system Music Industry students are used to. Similarly, *Hydrogen* (hydrogen-music.org) provides a virtual drum studio, allowing the composition and editing of beats. It is also free and runs under Linux.

The system *AudioSauna* (www.audiosauna.com) is a virtual music studio with a built-in synthesizer, which does not need to be installed on the user's computer, as it runs in the browser. It conveniently provides a graphical user interface, and its use is very intuitive. The company *AIVA Technologies* (www.aiva.ai) goes a step further, providing software that automatically composes music using the methods of artificial intelligence. Compositions could be from a selected genre or could be "influenced" by an existing score in a sense that it would have a similar emotional impact.

Finally, *Vocaloid* (www.vocaloid.com/en) is professional voice synthesizer software with a number of attached packages, some of which are for creating singing characters. It is very popular in Japan and is used for commercial

concerts. While we do not think it is appropriate to use this technology in the classroom, we recommend demonstrating the products that are created so that the students have ideas about the directions of the technology used in music industry.

Courses in Which the Material is Taught

While ideally it would be good to have a dedicated course on *Technology in Music Composition*, we understand the challenges: the scope is very specific and lies between music and technology. It is a challenge securing instructors proficient in all types of software systems. Moreover, the computer technology currently develops at such a fast pace that the instructor has to constantly update the material.

Hence, we recommend a course which deals more generally with the trends in the music industry, in part covering the technology. An upper-level seminar course entitled *Contemporary Issues in Music and the Marketplace* was developed at Fredonia. Within its framework, technological trends and the related legal and ethical issues are considered. Another possible avenue for getting the students exposed to the technology systems in composition is a course on *Live Sound*, where the students may have projects requiring the use of software systems.

DATA ANALYTICS, DECISION MAKING AND MACHINE LEARNING

With the development of information and communication technologies, it became feasible to gather large volumes of data in every field. When applying various methods for analysis of this data, it is possible to extract meaningful insights and spot trends, and thus make predictions about future behavior and facilitate decision making (Coe et al., n.d.). In the music industry, data analysis helps with finding the new rising star, predicting the streaming preferences for each particular consumer, optimizing the profit of ticket sales, and minimizing expenses.

There exist several software tools to help with data analysis for professionals. The most popular ones are the system *Hadoop* (hadoop.apache.org) and the language *R* (www.r-project.org). However, they are meant for computer science professionals and therefore are not appropriate for Music Industry students who have artistic rather than quantitative propensities.

Another type of tool is offered in statistics courses which, apart from the theoretical background, often provide training in *SAS* (sas.com), *SPSS* (www.ibm.com/analytics/spss-statistics-software), *Mathlab* and other statistical packages, which offer free or low-cost academic versions. These courses are designed for students in mathematics, computer science, and engineering and are not specialized for Music Industry students.

Also, some general data analysis software exists for users who have no technical background. The system *Knime* (knime.org) is a free, open source platform for data analytics, reporting and visualization. It provides an intuitive graphical interface through which the user indicates the operations that have to be performed on the data, selecting from a menu and placing nodes on the screen; the nodes correspond to data processing functions. *Knime* provides very powerful software, allowing the methods of machine learning and data mining to be employed.

Courses in Which the Material is Taught

Ideally, there would be a course on *Statistical Methods for Music Industry*, which would cover practical problems for Music Industry with the use of some of the above software. Again, the challenge is that the instructor must be proficient in both – knowledge of the music industry and statistics, and it is difficult to find faculty fitting such a profile. It is feasible, however, to offer courses to all business majors that emphasize the material on the practical side rather than on the theoretical side, as the statistics courses are traditionally taught to the students in the sciences.

In a similar way, it would be appropriate to offer a course on *Software Tools* tailored to the needs of business students, in such a way that they learn how to represent their data and the methods to use to analyze it. At the upper-level, courses on *Digital Marketing*, *Contemporary Issues*, and *Touring* may have seminars on some of the topics of data analysis or projects requiring the applications of some of the systems described above.

EVENT AND FACILITY MANAGEMENT

Event and facility management require not only the human-related managerial skills, such as excellent communication, decision-making, problem-solving, delegation, and time management, but also first place technical skills (Corporate Finance Institute, n.d.). Hence, it is critical to prepare students for this kind of activities. Different software systems that facilitate scheduling and management of concerts, festivals, concert halls, and sales, including the tracking revenue and expenses could be used in this process. A typical system possesses some or all of the following features:

- Performance planning
- Artist Management
- Ticket Sales
- Contract Management
- Credential Management
- Staff Scheduling
- Transportation Management
- Vendor Management
- Volunteer Management
- Customer relationship management
- Mass e-mailing
- Program, artist and concert hall schedules development, and others.

Eventbrite (www.eventbrite.com) is the most popular ticketing solution. As a web site that gets millions of hits, it also promotes the events and allows searching them. *Weemss* (weemss.com) is an all-in-one online event management system. It can be used to handle registrations and check-in, to offer reserved seating, sell concert tickets, and mass e-mailing. *Pike13* is “mobile client management software [that] handles the details of check-in and attendance tracking, billing and recurring payments, staff payroll, reporting and more” (Save time, know more, n.d., para. 1).

Courses in Which the Material is Taught

Distinct from the other computer systems that were discussed previously, it is not necessary to have a course that teaches this software. The systems often change and the best approach is to have some practical experience with some of them as well as to learn what features the systems offer and how to use them.

An idea about how to work with such systems could be to include the information in courses like *Concert Touring* and *Student Record Label*. As the scheduling systems are designed to handle larger events, it would be appropriate to use them in a group project for the organization of a real-life music industry event.

MUSIC INDUSTRY, TECHNOLOGY, AND OTHER DISCIPLINES

As it was discussed above, Music Industry emerged as an interdisciplinary field and is involving educators with various backgrounds. On the other hand, the multiplicity of the music-industry-related topics discussed in the previous sections and the technological aspects, in particular, could inspire the students from other disciplines to get interested in Music Industry. In fact, projects bringing together students with different backgrounds allow the formation of multidisciplinary teams for collaborative work (Kanev & Kimura, 2011; Barneva et al., 2017), view their existing knowledge from a different perspective, and easily connect the new information with the background they already have (Wicklein & Schell, 1995). Possible avenues are listed below:

- Students in computer science could be asked to develop software for playing music. This way, they would learn about music theory, notation and composition, and the software could be used by music industry students for various applications.
- Students in music could be involved in the organization of musical events and use the respective technology for planning and promotion.
- Students in accounting could do research about the tax reliefs startup music companies could use and provide respective spreadsheets.
- Students in communications could use publishing or web development software to create promotional materials for music events.

The authors have extensive experience in interdisciplinary projects involving technology and music industry, which could be used as more specific illustrations. For example, in one of our previous works (Mirenkov et al., 2009), we have studied the employment of music therapy for controlled transition between different emotional states. The reported work was confined to the employment of pieces of classical music performances but could certainly be extended to other types of music. In particular, we are considering a software system for automated creation of musical sequences capable of invoking a transition between two predefined emotional states. Such a system can, for example, be installed on a mobile device and allow monitoring the emotional state of the device owner. Based on it, the system would invoke an emotional state transition plan as a sequence of musical types and durations. Appropriate pieces of music would then be obtained from online music resources and linked together to form the musical sequence transitioning to the target emotional state.

Music industry nowadays goes well beyond the physical world surrounding us. The intangible worlds created by virtual reality applications, for example, have spatial sound capabilities and support advanced music integration – indispensable features in education and training. With respect to this, we have experimented with virtual tours incorporating spatial sound and music and providing immersive experiences through stereo viewing of 360 degree panoramas (Cohen et al., 2009). Such experiences could be further augmented by employing various tangible interface components. In our case, we have used an input component implemented as a physical cylinder with a printed panorama view of the explored scene. A CLUSPI based point-and-click interface (Kanev & Kimura, 2006) was employed for direct input of the yaw and pitch angles of the stereo panorama view and for controlling a motion chair linked to the system. Users were thus provided with highly immersive experience both for the visual and spatial audio.

The children are nowadays raised with sound and music-enabled toys and educational games provided by the music industry. We have researched and discussed in our earlier work the different aspects of spatial sound generation for mobile devices and toys (Kapralos et al., 2015). Spatial sound and music support is also important for tabletop computers. As those devices employ a large horizontally placed presentation surfaces with touch capabilities, they require proper positioning of virtual sound sources, including music sources, as needed on the screen. We have conducted extensive research in this field attempting to determine the limits of human perception with respect to virtual and real physical sound sources (Kapralos et al., 2015; Lam et al., 2015; Collins et al., 2010). Another aspect of audio feedback is how it interacts with our other sensory channels. We have conducted some research and experiments in this area (Kapralos et al., 2019) examining the effects of sound and music on haptic fidelity perception.

We believe, therefore, that similar projects involving music industry related technologies could be integrated in the curriculum of various disciplines and spark interest among the students.

CONCLUSION

Initially, digital technologies were viewed as an adversary of the music industry, and there were many disputes over copyright and illegal downloads. In the last years, however, this trend changed and now streaming services are widely used by the professional musicians to spread their music. Hence, digital technologies play an important role in Music Industry professional preparation, and the students must stay current with them. There is no one universal system integrating all the elements that are necessary for a Music Industry professional. We, therefore, recommend that software addressing the specific need be introduced in the appropriate course. This will provide curriculum specific instruction and real-life experience that will best prepare Music Industry graduates for the myriad music industry professions.

Acknowledgement: Part of the work reported in this article is supported by the 2019 Cooperative Research Project of the Research Institute of Electronics, Shizuoka University.

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COMPARATIVE ANALYSIS OF THE INFORMED CONSENT PROCESS

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ABSTRACT

The enforcement of the contractual relationship between the physician and the patient needs to be considered in light of state informed consent statutes. If the informed consent process is incomplete, the patient's right to medical self-determination is jeopardized. So long as the practitioner complies with the informed consent provisions, the statutes provide a limitation on the right of a medical malpractice action by the patient for a claim based on the lack of informed consent. The use of the informed consent process is a customary practice in the medical community and an established standard for health care providers to follow in providing information to a patient. Physicians often rely on intermediaries, such as a nurse practitioner or a physician assistant to shift responsibilities from one party to another party to inform the patient. The interpretation of the statutory provisions by physicians may present uncertainty because of recent court decisions and a multitude of scenarios. According to a Pennsylvania Supreme Court decision, the obligation of a physician to obtain the informed consent of the patient for a medical procedure is a non-delegable responsibility. Prior research to examine the variances in the provisions associated with informed consent legislation within the United States has been limited. To address this gap in the literature, this paper will examine informed consent legislative trends including the duty of disclosure, the requirement of direct communication, the risks inherent in the proposed procedure, the acceptable alternative procedures and a description of the nature and purposes of the proposed procedure.

INTRODUCTION

This paper presents a literature review and critique of a specific aspect of informed consent legislation to understand the emerging health care trends. Under the Medicare Condition of Participation guidelines, the hospital is expected to develop an informed consent process. According to the federal law, the patient has a right to make an informed decision about whether to consent to a procedure, the intervention, and the type of care that requires consent to treatment (42 CFR 482.13 b(2)). In addition to federal regulations that are enforced by the United States Department of Health and Human Services, state laws also address the rights of patients to make informed decisions. States have promulgated informed consent protocol measures as a tool to protect patients. However, the applicable state laws lack uniformity in stipulating the assignment of the responsibilities for obtaining the informed consent from the patient. This study evaluates the various state statutes and summarizes the similarities and differences of the informed consent laws that have been adopted by the states. This paper attempts to examine important aspects of current state legislation that enables patients to make informed decisions about their care. In addition, the paper investigates further provisions to expand the standard informed consent model to enable other qualified persons to disclose the nature of the treatment to the patient.

EXISTING REGULATORY INFORMED PROCESS

In order to review the doctrine of informed consent, this paper reviews the relevant regulatory provisions in various jurisdictions. The scope of the informed consent doctrine differs among the jurisdictions, however for purposes of this investigation the paper will specifically address the role or duty of the physician. The Supreme Court of Pennsylvania has indicated that the statutory doctrine of informed consent flows from the discussions each patient has with his physician and that the duty to obtain informed consent belongs solely to the physician (*Valles v Albert Einstein Med. Ctr.*). The United State District Court for the Eastern District of Pennsylvania allowed a plaintiff to proceed with discovery to determine whether there was a basis upon which to extend the duty to obtain informed consent to parties other than the physician. However, the court held that the Pennsylvania informed consent statute addressed only the physician's duty to obtain informed consent and was silent as to third parties and non-physicians.

Medicare Act Requirements

Under Title XVIII of the Social Security Act, the Medicare Act establishes a federally subsidized health insurance program for the elderly and disabled (42 USC 1395). The Centers for Medicare and Medicaid Services (CMS), a component of the Department of Health and Human Services, administers the Medicare program (42 USC 1395). The Medicare Patients' Rights under the Condition of Participation for hospitals addresses the patient's right to make informed decisions regarding their treatment and services (42 CFR 482.13 b2). The Interpretive Guidelines stipulate that the information that the patient receives is provided in a manner that the patient can understand. According to the

guidelines, the way the information is provided should assure that the patient can effectively exercise their right to make informed decisions.

The rules stipulate that prior to surgery, an informed consent process should be established to ensure that the patient is given information and disclosures necessary to make an informed decision about whether to consent to a surgical procedure (42 CFR 482.51 b2). The guidelines do not indicate the party responsible for obtaining the patient's informed consent.

American Medical Association Guidance

According to the American Medical Association e-learning module, "the process of informed consent occurs when communication between a patient and physician results in the patient's authorization or agreement to undergo a specific medical intervention" (Ch.2.1.1 Informed Consent). In these guidelines, the physician is identified as the responsible party.

American College of Surgeons

The Statements on Principles by the American College of Surgeons asserts that the informed consent standard enhances the surgeon patient relationship and may improve the patient's care and the treatment outcome (Statements on Principles, !!A). The Statement limits the surgeon from exaggerating the potential benefits of the proposed operation and restricts the surgeon from making promises or guarantees.

STATUTORY REFORM MEASURES TO EXPAND INFORMED CONSENT PROCESS

In 2017, the Supreme Court of Pennsylvania held in the case *Shinal v Toms* that the physician may not delegate to others their obligation to provide sufficient information to obtain the patient's informed consent according to the existing Mcare Act's codification of informed consent (Mcare Act, 40 P.S. 1303.301). Recently, the General Assembly in Pennsylvania introduced legislation, House Bill 1580 to amend the Mcare statute concerning the informed consent to treatment requirements. This proposed amendment to the Mcare Act would modify the practice in which the patient's informed consent to treatment is obtained. The proposed amendment would permit the physician to delegate the task of obtaining the informed consent of the patient to a qualified practitioner.

PRIOR RECOURSE TO JUDICIAL INTERVENTION

Fiduciary responsibilities are derived from the patient- physician relationship. Courts in various jurisdictions have addressed the legal written requirements under the informed consent doctrine. Courts have held that informed consent involves a process and is not evidenced merely by a signature on a piece of paper (Indian Health Service). A review of the relevant case law is necessary in order to trace the development of the informed consent process for physicians in various roles and settings. Since a patient may have adverse consequences following a treatment or procedure, legal action may be necessary to preserve the right of the patient to obtain information in the best interest of the patient. These types of arguments are based on the concept that patients have the right to make decisions about their medical treatment (*Bottemiller v Gentle Dental Serv. Corp.*). The claimants attempt to protect patient rights and to obtain the timely access to health care information. The patients seek to obtain timely access to health care information by challenging the informed consent practices of physicians.

In the past, courts have considered claims to enforce informed consent protections. However, health care providers do not have equal informed consent obligations (*Bottemiller v Gentle Dental Serv. Corp.*). Courts have been requested to determine the legal duty of the physician depending on their role, such as the treating physician, the second opinion physician, the consulting physician and the referring physician.

The Supreme Court of Hawaii found that a consulting physician did not owe a duty to the patient to warn of the inherent risks of a proposed treatment or surgery because their primary duty was to advise and make recommendations to the treating physician (*O'Neal v Hammer*). However, the court determined that the second opinion physician would have a duty to inform the patient because the patient chose the physician to provide advice about the proposed course of treatment.

New Jersey law also makes a distinction between a consulting physician and a physician to whom a patient is referred for a second opinion. According to a Superior Court of New Jersey, Appellate Division decision, the primary duty of a consulting physician is to advise and make recommendations to the treating physician and not the patient (*Sinclair v Roth*).

In a United States District Court for the Middle District of Georgia opinion, the Georgia informed consent statute was strictly construed and was not extended beyond its plain and explicit terms, meaning there was no impermissibly expanded, judicially-created duty of disclosure (*Callaway v O'Connell*).

In the case, *Harrold v Artwohl*, the Supreme Court of Alaska upheld the validity of a consent form that was witnessed by a nurse instead of being signed in the presence of the physician. The court based its ruling on its interpretation of the Alaska informed consent statute. According to the court opinion, no specific language in the statute required the treating physician to personally read the consent form to the patient or witness the patient's signature (AS 09.55.556). The court recognized past precedent that the duty to obtain informed consent extended only to a health care provider who proposes and directs the procedure at issue and does not imply that a provider to whom this duty extends is the only person who can obtain the consent of the patient.

The Court of Appeals of Washington found that a majority of the jurisdictions including New Jersey and Pennsylvania have concluded that the referring physician does not have a duty to obtain a patient's informed consent (*Bottemiller v Gentle Dental Serv. Corp.*).

In a United States District Court for the Eastern District of Washington opinion, the court addressed a claim for failure of the referring physician to secure the informed consent of the patient (*Brotherton v United States*). The court held that the physician specialist performing a procedure should advise the patient on the risks of the procedure and that the primary care/referring physician had no legal duty to obtain the informed consent for the surgery nor explain the risk of the surgical procedure.

According to a Pennsylvania Supreme Court opinion, informed consent flows from the discussions each patient has with the physician, based on the facts and circumstances each case presents (*Valles v Albert Einstein Med. Ctr.*).

FEATURES OF INFORMED CONSENT PROCESS LEGISLATION

Numerous informed consent laws have been enacted by states to establish standards and regulate the manner of informed consent for patients by health care providers in order to protect the public health and safety of patients and to ensure that the patient is informed of a particular treatment or procedure. Lack of informed consent may cause serious negative patient outcomes. Therefore, several states have intervened to regulate the implementation of these practices. The informed consent statutes have many similarities and unique specific provisions. In this paper, the statutory differences of a random sample of informed consent laws are documented for comparative analysis.

Definition of Informed Consent

The Indiana Code stipulates that the explanation provided to the patient includes the general nature of the patient's condition, the proposed treatment, the material risks of the treatment and the reasonable alternatives to the treatment (Ind. Code 34-18-12-3). Under the Oregon statute, informed consent of patient entails an explanation of the procedure or treatment, that there may be alternative procedures or methods of treatment, and that there are risks to the procedure or treatment (ORS 677.097). According to the Delaware Health Care Act (Del. Code Ann. 6801(6)), informed consent means the consent of a patient to the performance of health-care services by a health-care provider given after the health-care provider has informed the patient of specific requirements.

According to the New Jersey Administrative Code, prior to the start of nonemergency procedures or treatments, the physician or clinical practitioner is required to provide the patient with an explanation of the complete medical condition, the recommended treatment, the risks of treatment, the expected results and reasonable medical alternatives (N. J. Admin. Code 8:43G-4.1).

Interpretation of Responsible Party

The Alaska statute refers to the health care provider in the law without specifically referencing the physician (AS 09.55.556). In the Delaware statute, the term of health care provider is also used (Del. Code Ann. 6852(a)). The Indiana Code makes a reference to the qualified health care provider having the duty to obtain informed consent (Ind. Code 34-18-12-9). The Hawaii Code refers to the health care provider (Haw. Rev. Stat. 671-3). In these jurisdictions, the meaning of health care provider is subject to interpretation by the courts.

Under the Georgia statute, the term of responsible physician means the physician who performs the procedure or the physician under whose direct orders the procedure is performed by a nonphysician (O.C.G.A. 31-9-6.1(h)). According to the New York Public Health statute, the person providing the professional treatment or diagnosis is required to disclose the information to the patient (NY CLS Pub. Health 2805-d).

According to the New Jersey Administrative Code, prior to the start of nonemergency procedures or treatments, the physician or clinical practitioner is required to provide the patient with information in terms that the patient understands (N.J. Admin. Code 8:43G-4.1).

Other statutes afford the opportunity for delegated authorization by a member of the treatment team. According to the Texas Code, the physician or the health care provider is required to disclose to the patient the risks and hazards involved in the care or procedure (Tex. Civ. Prac. & Rem. Code 74.101). The Oregon statute makes the acceptance of delegated informed consent very clear. According to the Oregon law, a physician or physician assistant may obtain the informed consent of the patient (ORS 677.097).

Responsibilities of Physicians

The Georgia informed consent statute (O.C.G.A. 31-9-6.1(c)) indicates that the responsible physician has the responsibility to ensure that the information is disclosed and that the consent is obtained. According to an Ohio Attorney General opinion, the physician has the duty to obtain the consent of the patient before treating the patient medically or surgically (OAG 82-095). According to the Pennsylvania statute, the physician owes a duty to a patient to obtain the informed consent prior to performing surgery (40 P.S. 1303.504a).

Disclosure of Information

According to the Wisconsin statute, the disclosure of information by the physician is governed by the reasonable physician standard (Wis. Stat. 448.30). The standard requires disclosure of only information that a reasonable physician in the same or similar medical specialty would know and disclose under the circumstances to the patient (Wis. Stat. 448.30).

Supplemental Information

In the Georgia statute, the information provided to the patient may be disclosed through the use of video tapes, audio tapes, pamphlets, booklets, or other means of communication (O.C.G.A. 31-9-6.1(c)).

Opportunity for Further Explanation

An Oregon statutory provision requires the physician or physician assistant to ask the patient if the patient wants a more detailed explanation of the procedure or treatment (ORS 677.097). If the patient requests further information, the physician or physician assistant is expected to disclose in substantial detail the procedure, the viable alternative and the material risks (ORS 677.097). In the Iowa Code, a consent in writing is valid if the patient acknowledges that the disclosure of information was made and that all questions asked about the procedure were answered in a satisfactory manner (Iowa Code Ann. 147.137).

Nondisclosure of Information Exceptions

The Wisconsin statute identifies information that is not required to be disclosed to the patient by the physician. According to the duty of disclosure, the physician is not required to reveal technical information that a patient would

probably not understand, apparent or known risks to the patient, extremely remote possibilities that might falsely or detrimentally alarm the patient, or alternate medical modes of treatment for a condition which is not part of the diagnosis (Wis. Stat. 448.30).

Materially Detrimental Information

Under certain conditions, detailed information to the patient may be contraindicated. In the Oregon statute, if the physician or physician assistant determines that a further explanation of the procedure would be materially detrimental to the patient according to due consideration to standards of practice, then the detailed information may be withheld (ORS 677.097).

Ancillary Persons

According to the Georgia statute, the disclosure of information to the patient is permitted through conversations with nurses, physician assistants, trained counselors, patient educators, or other similar persons known by the responsible physician to be knowledgeable and capable of communicating such information (O.C.G.A. 31-9-6.1(c)).

Definition of Health Care Provider

The Washington informed consent statute broadly defines a health care provider to include an acupuncture and Eastern medicine practitioner, a physician, osteopathic physician, dentist, nurse, optometrist, podiatric physician and surgeon, chiropractor, physical therapist, psychologist, pharmacist, optician, physician assistant, midwife, osteopathic physician's assistant, nurse practitioner, or physician's trained mobile intensive care paramedic (Wash. Rev. Code 7.70.020). The statute also includes an employee or agent of the former and entities in the definition of a health care provider. The statute leaves the court to interpret the particular party having a legal duty to obtain the informed consent of the patient for surgery.

The Florida statute recognizes information provided by the physician, osteopathic physician, chiropractic physician, podiatric physician, dentist, advanced practice registered nurse or physician assistant in obtaining the consent of the patient (Fla. Stat. 766.103).

Principle of Patient Autonomy

According to the Vermont statute, the person providing the professional treatment or diagnosis is required to disclose to the patient the alternatives and the reasonably foreseeable risks and benefits in a manner permitting the patient to make a knowledgeable evaluation (Vt. Stat. Ann. 12:1909). Furthermore, the patient is entitled to a reasonable answer to any specific questions about the foreseeable risks and benefits and the medical practitioner is prohibited from withholding any requested information from the patient (Vt. Stat. Ann. 12:1909). According to the Nevada statute, a consumer admitted to a facility for evaluation, or treatment has a right to be free from abuse, neglect and aversive intervention and express and informed consent needs to be obtained in writing from the patient (NRS 433.484).

Agent of Responsible Physician

if the responsible physician requests an employee of a hospital or ambulatory surgical treatment center to participate in any conversations with the patient, the employee is considered for informed consent purposes to be solely the agent of the responsible physician under the Georgia informed consent statute (O.C.G.A. 31-9-6.1(c)).

Failure to Secure Informed Consent

The Alaska informed consent statute imposes liability on a health care provider for the failure to obtain the informed consent of a patient by establishing with a preponderance of the evidence that the provider failed to inform the patient of the common risks and reasonable alternatives to the proposed treatment or procedure and that but for that failure the patient would not have consented to the proposed treatment or procedure (AS 09.55.556). According to the Delaware informed consent statute, an injured party may bring an action for medical negligence based upon a lack of informed consent. The patient needs to prove that the health care provider did not supply information regarding such

treatment, procedure or surgery to the extent customarily given to patients by other licensed health care providers in the same or similar field of medicine as the defendant (Del. Code Ann. 6852(a)).

A claim based on the failure to secure informed consent has four elements under the Washington informed consent statute. The patient must establish that the health care provider failed to inform the patient of material facts relating to the treatment; the patient consented to the treatment without being aware of or fully informed of the material facts; a reasonably prudent patient would not have consented to the treatment if informed of a material fact; and the treatment in question proximately caused injury to the patient (Wash. Rev. Code 7.70.050).

According to the Texas Civil Practice and Remedies Code, a lawsuit is permissible against a physician or health care provider on a theory of negligence for failing to disclose the risks or hazards involved in the medical care or surgical procedure rendered by the physician or health care provider (Tex. Civ. Prac. & Rem. Code 74.101).

Standard of Practice

The standard of practice for obtaining the patient informed consent varies among the different jurisdictions. In the North Carolina statute (N.C. Gen. Stat. 90-21.13), the action of the health care provider in obtaining the consent of the patient is in accordance with the standards of practice among members of the same health care profession with similar training and experience situated in the same or similar community. The Wisconsin statute (Wisc. Stat. 448.30) holds the physician to the reasonable physician standard for informing a patient which requires disclosure only of information that a reasonable physician in the same or a similar medical specialty would know and disclose under the circumstances. The standard for obtaining the consent of the patient in the Florida statute refers to the accepted standard of medical practice among members of the medical profession with similar training and experience in the same or similar medical community as that of the person treating, examining, or operating on the patient (Fla. Stat. 766.103).

In the Nebraska statute, informed consent refers to a procedure that is based on information which would ordinarily be provided to the patient under like circumstances by health care providers engaged in a similar practice in the locality or in similar localities (Neb. Rev. Stat. 44-2816). According to the Tennessee Code, to prove inadequacy of consent, a litigant should demonstrate that the patient was not supplied with appropriate information in accordance with the recognized standard of acceptable professional practice in the community (Tenn. Code Ann. 29-26-118). In the Kentucky statute, the health care provider is required to obtain the consent of the patient in accordance with the accepted standard of medical or dental practice among members of the profession with similar training and experience (KRS 304.40-320).

Presumption of Consent

In the North Carolina statute (N.C. Gen. Stat. 90-21.13), a valid consent is presumed if the consent is evidenced in writing and is signed by the patient. According to the Texas Code, consent to medical care is considered effective if it is given in writing, signed by the patient or a person authorized to give the consent and by a competent witness (Tex. Civ. Prac. & Rem. Code 74.101). According to the Florida statute, a consent in writing that meets the Florida consent law requirements and is validly signed by the patient raises a rebuttable presumption of a valid consent (Fla. Stat. 766.103).

Medical Modes of Treatment

The Wisconsin statute (Wisc. Stat. 448.30) indicates that the physician who treats a patient must inform the patient about the availability of reasonable alternate medical modes of treatment and about the benefits and risks of those treatments.

Emergency Exceptions

According to the Georgia statute, the disclosure of information and the consent process are not required if an emergency exists, a prior consent was obtained within thirty days, the procedure does not involve a material risk to the patient, the patient requested that information not be disclosed or the procedure was unforeseen at the time consent was obtained (O.C.G.A. 31-9-6.1(e)). The Indiana Code provides an exception from the consent requirements for an

emergency (Ind. Code 34-18-12-9). According to the Hawaii Code, the informed consent of the patient is not a requirement when emergency treatment or an emergency procedure is rendered by a health care provider and the obtaining of consent is not reasonably feasible without adversely affecting the condition of the patient's health (Haw. Rev. Stat. 671-3). In the Kentucky statute, there is no requirement for a health care provider to secure the consent of the patient in an emergency situation before providing health care services (KRS 304.40-320).

Disclosure of Technical Information

According to the Wisconsin statute (Wisc. Stat. 448.30), the physician's duty to inform the patient does not require disclosure of detailed technical information that in all probability a patient would not understand, the risks apparent or known to the patient, and extremely remote possibilities that might falsely or detrimentally alarm the patient.

Discretionary Authority

The Georgia Composite Medical Board has authority to promulgate rules and regulations governing and establishing the standards necessary to implement the informed consent requirements (O.C.G.A. 31-9-6.1(g)). According to the Hawaii Code, the Hawaii medical board is authorized to establish the standards for health care providers to follow in giving information to a patient (Haw. Rev. Stat. 671-3).

In Texas, the Texas Medical Disclosure Panel was created to determine which risks and hazards related to medical care and surgical procedures the health care providers or physicians need to disclose to their patients (Tex. Civ. Prac. & Rem. Code 74.101).

Disciplinary Sanctions

Under the Georgia statute (O.C.G.A. 31-9-6.1(g)), a physician who fails to comply with the informed consent provisions is subject to disciplinary action by the Georgia Composite Medical Board.

DISCUSSION

The patient informed consent process varies in different jurisdictions. The existing statutory and regulatory framework for the informed consent process creates a dilemma for the administrative agency, the health insurance company, the health care facility, the patient and the treating physician. Delegated informed consent legislation needs to encompass a balanced approach which takes into consideration the various perspectives of the interested parties. The state statutes need to incorporate the broad range of perspectives in order to reconcile these competing interests.

If the practice of delegating to other third parties the responsibility to obtain the informed consent of the patient results in unsafe outcomes or violates professional norms, state legislative bodies could enact laws to ban the practice. If insurance entities have concerns with the informed consent process, reimbursement could be denied for failure of the physician to follow patient care guidelines. State licensure agencies may also monitor the practice patterns of physicians. One of the elements may involve the informed consent process.

Delegated informed consent protocols do not eliminate the right of a patient to obtain treatment. The protocols provide a controlled access to care and alternatives of treatment. Ultimately, the decision to choose treatment is made by the patient in consultation with the patient's health care provider and the patient's health care team.

In a typical health care arrangement, the patient selects the physician after the insurance carrier prescreens and evaluates the credentials of the provider. The auxiliary team is selected by the physician. The patient selects the treatment from among alternatives identified by the physician. The doctor may not be aware nor concerned about the cost of the treatment. The payment is made by the patient or a third-party payor such as a public or private insurer. If the coverage for the treatment of a medical condition is restricted for use by the health plan, then states with delegated informed consent legislation expect that uniform policies are in place so that patients receive the equivalent or most appropriate treatment.

The state delegated informed consent laws were enacted to shift the process to the auxiliary members in conjunction with the physician. However, the selection process may be influenced by extenuating factors such as profit margin,

financial incentives and discount measures. Under this model, the interest of the patient may not always be a priority. Other influences may be interfering in the proper selection of the best treatment for the patient. Therefore, the delegated informed consent legislation has been enacted to provide extra safeguards for the patient.

Treatment decisions are typically made between the patient and the physician under the doctrine of the right of self-determination. Although the delegated informed consent process could abrogate this right by imposing barriers to informed decisions, by establishing a team model approach the physician assumes the role of overseer and the implementer of the treatment options. In a patient-centered team-based approach, the team engages the patient as a partner in their care, which builds relationships and encourages the patient to express their needs and preferences in the development of a treatment plan (Schottenfeld, Petersen, Peikes, Ricciardi, Burak, McNellis & Geneviro, 2016). Delegated informed consent provisions could be problematic in their current statutory language and require further modification to address shortcomings. One of the criteria that requires more specificity is the exceptions process for patients with special needs. The informed consent criteria may have already been predetermined that are based on current standards of direct patient to physician contact.

The delegated informed consent criteria seem to focus on protections for the physician with little attention to safeguards for the patient. The statutes should require relevant patient protection measures for addressing safeguards for patients with impairments and disabilities.

The statutes should mandate that the state medical licensure boards develop clinical review criteria with an appropriate standard of care and an explicit and transparent informed consent process to explain the relationship between the treatment options and the patient outcomes. The statutes should provide require provisions for clinical guidelines to address the handling of informed consent in matters of atypical patient populations.

As a matter of public interest, the statutes should afford patients access to a fair, transparent and independent process for requesting a physician to provide the clinical information. The statutes should address the need to provide the dissemination of information to the consumer concerning delegated informed consent.

The statutes should address annual filing requirements to report the frequency of delegated informed consent and the clinical criteria used by the provider to determine its use to the health department and the state medical licensure board. The statutes should stipulate that the prescribing practitioner needs to demonstrate with sound clinical evidence that the delegated informed consent protocol has actually been effective in the patient understanding of the risks, benefits and alternatives to treatment.

In the past, courts have recognized the right of the patient to informed consent in the treatment decision-making process. In the future, the delegated informed consent process may be challenged in the courts under theories of failure to ensure the protection of patient rights.

Implications

The doctrine of informed consent is based on the principle that the patient is afforded the opportunity to comprehend and evaluate the medical risks and benefits of their selected treatment and the available alternative treatments (Sawicki, 2018). Regardless of the source of this information, the objective may be achieved by considering the aggregate of this information so long as the physician continues to assume ultimate responsibility for patient informed consent.

Responsibility for obtaining informed consent is questionable in a team-based and technology- driven era of modern medical practice (Lynch, H.F., Joffe, S. & Feldman, E.A., 2018).

The issue of the delegation of the informed consent process to other health care providers raises many competing concerns from numerous constituencies with a broad spectrum of supportive and negative viewpoints. If delegation laws are enforceable, the physician and patient will still need to have a thorough discussion about the elements of informed consent, and the potential benefits and risks of treatment.

As discussed in this paper, many states have statutes setting forth the duties and responsibilities of physicians in the informed consent process. Opponents to the delegation of informed consent may assert that process may result in

patients being potentially exposed to risky and ineffective treatments. The lack of safety and effectiveness information could expose patients to potentially harmful outcomes by restricting patients from comprehensive informed consent. Another view of delegation questions the fairness of informed consent. Opponents may maintain that the informed consent process could compromise fairness in the availability of adequate treatment information. If patients with superior insurance coverage obtain extended access to the physician under their insurance plan coverage, other patients who may have less extensive coverage for the same prescribed treatment may be disadvantaged from obtaining information creating inequities.

LIMITATIONS

The scope of research in this paper is limited to an analysis of state legislation concerning the delegation of responsibility by the physician to other health care providers to obtain the informed consent of the patient. This analysis does not address informed consent requirements for specialty provisions involving HIV testing, research protocols and the protection of human subjects, genetic testing, DNA samples, and pregnancy services. Issues concerning surrogate decision making and incompetency matters are not reviewed in this project.

FUTURE CONSIDERATIONS AND CONCLUSION

The current health care industry framework for defining the legal requirements of obtaining informed consent appears to be vague and outdated. Many of the state informed consent statutes appear to be outdated and in need of updating in conformity with current practices in the medical community.

Recently, state governments have taken measures to clarify and streamline the regulatory process to secure informed consent of the patient. Courts will need to determine whether other health care providers have a legal duty to obtain the patient's informed consent. If a health care provider other than the physician retains a degree of participation and control in the patient's treatment, the court may determine a duty on the part of the other provider to obtain the patient's informed consent (*Bottemiller v Gentle Dental*).

Future research may examine the merits of state informed consent laws which delegate the responsibility to obtain patient informed consent to other health care providers. The justifications for state informed consent legislation should be addressed in future research. In addition, other aspects of the informed consent laws may be studied including the individuals most frequently performing the informed consent process and discussing the risks, benefits and alternatives to the procedure.

A study of the use of advanced practice clinicians in physician practices revealed that one in four specialty practices and one in three primary care practices employed advanced practice clinicians (Martsolf, Barnes, Richards, Ray, Brom, & McHugh, 2018). In addition, a national survey of practicing physicians found that an overwhelming 92 percent of surveyed physicians have experienced burn out from practicing medicine at points in their career (Medical Economics Staff, 2019). Considering these findings in the practice of medicine, the informed consent statutes should clearly indicate that a state agency or regulatory board cannot revoke a physician license based solely on the physician's recommendation to delegate some of the responsibility for informed consent to other health care providers. The impact that the informed consent practices have on the quality of patient care should be considered in future research. Measures of performance require intense analysis, which is especially challenging in the health care environment. The results of these trial and error encounters by the medical community need to be documented in the medical literature for the advancement of science.

Further research is needed to determine if the practice of delegating responsibility for performing the informed consent process results in an overall reduction in health care costs or merely augments expenditures. The use of delegation measures may create inefficiencies in the health care system by the addition of increased administrative burdens for the physician. The delegating of authority may require ongoing monitoring and training of other health care providers by the physician.

The patient decision-making process needs protective safeguards including regulatory policies that uphold the best interests of the patient. To protect the patient, the informed consent statutes should require monitoring to avert relaxation of the informed consent doctrine. Another safeguard for inclusion in the informed consent legislation is

the requirement for a second independent evaluation by a board-certified physician in an appropriate specialty if the adequate informed consent of the patient is in doubt.

The patient may be coerced into making less informed decisions regarding their treatment options despite the possibility of exposure to unforeseeable risks and consequences. Therefore, the individuals responsible for the formulation of health care policies should uphold the right of patients to make their own autonomous health care decisions that are independent from third party influence.

The health insurance industry also needs to recognize the fundamental right of a patient to seek medically appropriate advice by obtaining complete information to choose their treatment options. Courts have long recognized the special relationship between the patient and the physician. Statutory frameworks need to uphold the preservation of the patient-physician relationship. The patient should be afforded the right to make a treatment decision in consultation with the physician. The government and the insurance industry should not unilaterally make treatment decisions without the informed consent of the patient. Research should address whether administrative agencies and insurance companies are stipulating the delegation of responsibility to other health care providers. If patients are restricted from having direct access to clinical information from the physician, the insurance plans should be required to disclose this limitation to the patient.

Public policy needs to assure that the right of the patient to informed consent is not limited by legislative changes in the law. Our society has championed the principles of the patient-physician relationship and the right of self-determination. Clearly, our society should be entitled to augment these social policies with a corresponding right to seek medically appropriate advice in the best interests of the patient and affording them a right to obtain informed consent according to the appropriate standard of care.

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A COOPERATIVE LEARNING ASSIGNMENT TO EFFECTIVELY REVIEW THE ACCOUNTING CYCLE FOR THE GEN Z STUDENT

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ABSTRACT

Many years ago, accounting students were required to complete a practice set, a lengthy problem detailing the full accounting cycle. This has gone by the wayside with advancements in technology. However, the downside is the full accounting cycle is rarely assigned as a project from start to finish. This paper is a means of addressing the issue of the students understanding all of concepts in accounting.

Institutions of higher education are preparing a new generation of students called digital natives or Generation Z. Like previous generations, these students have learning preferences and life experiences unlike their predecessors. They desire "real world" business experiences, engaged classroom activities and visual learning. This paper explains a classroom project that couples the need for reinforcing the full accounting cycle with the students learning style.

The project assigned to each of my accounting classes (Principles and Intermediate) requires students to play the game of Monopoly. Each student owns a real estate investment firm. With each role of the dice, the student must complete a business transaction. After 48 transactions, the equivalent of 12 months, the student must complete to remainder of the accounting cycle from journal entries to producing financial statements to the closing process. With three semesters of data, this project has overwhelmingly helped students gain a deeper understanding of accounting.

INTRODUCTION

According to Pew Research Center, the Generation Z student was born after 1996 (Dimock, 2019) placing this generation currently in the classrooms of higher education. As a result, faculty members are faced with an opportunity to find new methods of engaging the Gen Z learner, who is eager to learn and apply their newfound knowledge to the business world (Seemiller and Grace, 2017). A profound difference in this generation is the desire for experiential, hands-on learning with the ability to find solutions within small groups while maintaining their individual identity. These students are highly visual learners, often focusing on bolded text or graphics over reading an entire page, with relatively short attention spans due to the degree of technology in their lives. Even though these students stress the importance of engaged learning environments, they also want to assert their independence to learn outside of the classroom.

The Gen Z student preferences align with adopting a cooperative learning strategy. Cooperative learning is student-centered learning while being facilitated by the instructor through specifically designed learning activities. This learning strategy requires four basic components including role interdependence, small group activity with individualized requirements, verbal conflict resolution among members of the small group and equal participation of all involved within the group.

A unique class project, utilizing the game of Monopoly, blends the Gen Z student preferences and cooperative learning strategy for a positive learning experience. This is not a new method of instruction. Using games and simulations as an effective teaching tool was first introduced in 1965 by W. J. Brunns who found these tools allow the student to understand the ramifications of business decision-making. Almost 25 years later, Knechel tested Brunns assertions by introducing the game of Monopoly in accounting education to replace the practice set. Knechel (1989) and several others have proven gamification to be successful in the student learning process (Tanner & Lindquist, 1998; Shanklin & Ehlen, 2007) at the principles of accounting level.

The purpose of this case study is to expand on the previous research through the introduction of gaming into Intermediate Financial Accounting. Furthermore, the data collected over three semesters will show the student's preference for using this class project to strengthen their understanding of the accounting cycle as well as heighten their interest in continuing their accounting major.

LITERATURE REVIEW

Gaming in Education

Gaming entered higher education as early as 1904 when a game was developed by Elizabeth Magie to teach economics and the Single Tax theory; however, public opinion was negative toward this method of learning (Moncada & Moncada, 2014). As a result using games in higher education was not commonly used until 1958 when the idea was re-introduced at the American Management Association annual meeting. The 1960's and 1970's brought extensive research on using games in higher education (Cohen & Rhineman, 1961; Edwards & DeVries, 1972; DeVries & Edwards, 1974; Hulten & DeVries, 1976). Researchers found numerous advantages to game playing including (a) a positive attitude toward the learning process (DeCoster & Prater, 1973), (b) active participation in the learning process stimulates deeper understanding especially in students with shorter attention spans (Riley & Ward, 2017), and (c) games allow for application of business knowledge using quasi-real life experiences (Knechel, 1989). Lastly, Silva, Rodrigues and Leal (2019) empirically examined the use of several games in accounting education. The results show increased student interaction in the learning process, improved concentration while challenging the students in accounting content.

More specifically, the game of Monopoly has been utilized in teaching accounting and economic courses. Most recently, Mousa (2019) used Monopoly to access the core competencies required in Accounting education. Her research found this game successfully addressed decision-making, personal interaction, critical thinking and resource management (Mousa, 2019). This research also transitions into the cooperative learning strategies.

Cooperative Learning

Tanner and Lindquist (1998) found board games, specifically Monopoly, promote cooperative learning strategies. Cooperative learning entails students working in small groups yet individually responsible for their own completion of tasks. The learning responsibility is shared among members of the group as they work toward a common goal. Cooperative learning requires four key components (Tanner & Lindquist, 1998; Emerson, English & McGoldrick, 2015). First the small group must have role interdependence among its members. There is a positive relationship between the individual students success and the group success. Second the group dynamics must include verbal interactions including discussions and resolutions to disagreements. The third component of cooperative learning is individual accountability on learning the material evaluated by the completion and assessment of individual tasks. Lastly, cooperative learning requires equal participation of all small group members.

Researchers have shown cooperative learning strategies lead to positive student attitudes, deeper understanding of material, higher motivation and improved student interaction. Empirical testing concludes the personal interactions created throughout the learning process improve student motivation and learning achievement (Tran, 2019).

Generation Z students

Digital natives or the Generation Z students were born in the digital era. These students have never known a time when the internet did not exist. Therefore, this generation has had more access to immediate information than any previous generation (Dimock, 2019). This has created a generation of observers. These students prefer to watch a process being completed correctly then attempt to replicate the process. If they are unable to immediately achieve the correct answer, the student will use trial and error or watch the process once again (Seemiller & Grace, 2017). Another unique characteristic of this generation of students is the desire for individual learning while assigning value to peer interactions. The preference is to work independently at first to gain an understanding of the concepts then share with peers or gain additional insight or clarification from others. Personal interactions are important to Generation Z while maintaining independence (Miller, 2018). Because of their strong need for independence and self-sufficiency, most Gen Z's are entrepreneurial (Schwieger & Ladwig, 2018). 13% of Gen Z students already have experienced owning a business with many having career goals of self-employment (Kozinsky, 2017). Mohr and Mohr (2017) suggest numerous recommendations to engage the digital native in the learning process such as giving a sense of choice and freedom or assignments that allow the student to apply knowledge requiring both skill and strategy. Lastly, this class of students wants to be fully engaged in the learning process, not listening to lectures. 51% want to learn through an experience or project while only 12% preferred passive lecture learning. This paradoxical learning preference aligns with the cooperative learning method.

USING MONOPOLY TO INTEGRATE COOPERATIVE LEARNING

The game of Monopoly is used as a cooperative learning assignment. The benefit of using Monopoly is most students come into class knowing how to play the game. On the rare occasion when a student does not know how to play Monopoly (especially international students), these students are encouraged to join a group of students who have knowledge of the game.

The four components of cooperative learning are present in this assignment including role inter-dependence, small group activity with individualized requirements, verbal interactions among students and equal participation of all involved within the group. The speed of play for each player addresses the shortened attention span of the students while achieving the desired improvement in understanding of the accounting cycle. Moreover, by allowing each student to be their own business, the entrepreneurial competitive spirit emerges for many students.

Students play the game in their group of four creating a competitive environment, but then are required to prepare journal entries, adjusting journal entries, trial balances and financial statements for their own corporation. Each student will have different or opposing transactions, so the ability to copy another student's work is minimal. Students are reminded and encouraged several times to work methodically and carefully in the instructions of the assignment.

The students' degree of thoroughness shows through in the completion of the trial balance. For many students, the degree of motivation, competitiveness and grit emerges. Quite often, the trial balance will not balance on the first attempt. Some students will work until they find their error, while others will see the instructor for help, a few remaining students will attempt to move forward with an unbalanced trial balance and resulting unbalanced balance sheet. Those seeking assistance from the instructor as given numerous tools to find the error such as (a) is the difference divisible by 9? or (b) is there are transaction for half the dollar amount of the difference?, or still yet (c) count the number of T-accounts and the number of accounts on the trial balance. If none of these are successful, the instructor will step in for a cursory review of Excel file.

The student feedback has been overwhelmingly positive. Student comments include

- "I finally understand how the full accounting cycle flows together."
- "This assignment made me think outside the box and be more analytical with my work."
- "This was a fun and enjoyable way to learn accounting. I understood the full cycle more as the process went on."
- "I loved buying as many properties as possible. Everyone owed me money."

Several students commented on how this assignment is like owning their own business, needing to make decisions on investments, how to use company money, and completing the accounting for the business. Lastly, numerous positive comments revolved around working individually yet in small groups. These comments addressed this method as being the "best" learning environment for those students.

The game of Monopoly has been an out-of-class assignment during the Fall 2017 and Fall 2018 semesters in Intermediate Financial Accounting I. Assignment instructions are in Appendix A. The assignment is given at the beginning of the semester with the recommendation to complete the game play after the first exam. This exam is predominantly a review of the full accounting cycle learned in the principles of accounting class. The game is intended to deepen and solidify the accounting cycle in preparation for the more advanced topics as the course progresses. In addition, this assignment is intended to equalize and raise the baseline knowledge level. Multiple professors teach principles of accounting; therefore, students can have varying levels of experience in the full accounting cycle.

Students are instructed to form their own accrual-basis corporation as of April 1st with the instructor as the only initial investor. Once their corporation is formed, students are to self-select into groups of 4 players. If they are unable to enter into a four business grouping, the instructor forms groups with the remaining students. The instructor supplies Monopoly board games which are stored in a location available to all students at any time of day. Students are responsible for finding a convenient time for all four players to meet and play the game. Each student is required to have 36 business transactions, with every four transactions being a month. In general, this takes students 45-100 minutes to complete the required number of transactions. The median time required is 75 minutes to complete the 36 documented transactions. The entire assignment must be completed in Excel with individual tabs for the written documentation of each roll, the journal entries related to each transaction, T-accounts, Trial Balance, Financial Statements, Closing entries and Post closing trial balance. Assignments are graded by examining each corporation

accounting records but also randomly matching opposing transactions with other corporations. For example, if Joe records Rent Expense by landing on Michael's hotel, then the instructor expects to see Rental Income for Michael.

April 1st formation date adds another dimension of complication to the depreciation expense and interest expense adjusting entries. In addition, as students play the game of Monopoly and run into questions, the instructor encourages the group to resolve their own questions on how to handle challenging circumstances that might arise, especially with the chance cards. Group discussions must be noted in the notes to the financial statements. Lastly in Fall 2017, I had a set of twins who wanted to be in the same four-business grouping. These two students were expected to note related party transactions in the notes to the financial statements as well.

CASE ANALYSIS

Monopoly appears to have been a successful cooperative learning experience for two consecutive Intermediate Financial Accounting I courses. Fall 2018 had 12 males and 10 females with an overall cumulative GPA average of 3.15. Fall 2017 had 17 males, 8 females with an overall cumulative GPA average of 3.26. Students were asked to complete a short survey adopted and modified from Tanner and Lindquist (1998). Table 1 shows the survey results on several questions for Fall 2018 (n=22) and Fall 2017 (n=25).

Questions 1, 2 and 3 assess group dynamics. The results showed positive group dynamics with minimal dissention in Fall 2017. The assignment followed cooperative learning strategies allowing students to be independent of the Team. However, when students were asked in question 8 if the assignment would be better if they worked in pairs the results are overwhelmingly negative. 10/22 Fall 2018 students disagreed with working in pairs while 7 additional students were neutral to the proposition. More than 50% of Fall 2017 students disagreed with working in pairs with only 6/25 responding positively to pairing the assignment. These results reinforce the Generation Z preferred learning style.

Questions 4 and 5 evaluate perceived achievement. Fall 2018 has 100% of responses in agreement or strong agreement with the perceived value in the Monopoly assignment. Fall 2017 was more diverse with 94% showing a perceived value in the assignment. Interestingly, the overall GPA of 2018 is slightly less than those students in the 2017 class. This can be interpreted as the assignment offers greater improvement to those in need of a more detailed review of principle concepts. Moreover, the individuality within a small group setting increases the perceived value of an assignment, confirming the Generation Z assertions on their preferred method of learning.

Questions 6 and 7 relate to Mutual Concern for fellow students. These two questions addressed having more support from teammates and helping one another complete the assignment. The Fall 2018 results showed 37/44 or 84% students agreed or strongly agreed exhibiting mutual concern for their fellow players while Fall 2017 results show 47/50 or 94% strongly agreed or agreed with the mutual concern statements.

DISCUSSION AND CONCLUSION

Cooperative learning strategies has the potential to effectively teach Generation Z accounting students. It allows accounting professors to offer an out-of-class assignment with a perceived high value to the students while improving problem-solving skills and building team dynamics. The survey results demonstrate the assignment strengthened the student understanding of the accounting cycle and improved student interest in financial accounting. 20/22 recent students responded positively to the assignment increasing their interest in pursuing an accounting degree. Intermediate Financial Accounting I and II are challenging classes. An assignment such as Monopoly, that boosts the student's self-esteem and self-awareness, builds strong accounting students and grows programs. This two-semester study has confirmed the value of cooperative learning techniques in higher education.

Conversely, the findings are subject to limitations. First, the class sizes are relatively small with a two-year sample size of 47 students. In addition, there is not a control group so it is impossible to determine the incremental benefits. Lastly, even though the survey was anonymous and students were instructed to be honest in their responses, some students could have responded positively due to response bias. Cooperative learning has proven be beneficial to this sample of accounting students.

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TABLE 1: SURVEY RESULTS FOR FALL 2018 AND 2017

| | | Fall 2017 and 2018 2017 (n=25) 2018 (n=22) | | | |
|----|--|---|--------------|-----------------|------------------------------|
| | | <u>Strongly Agree</u> | <u>Agree</u> | <u>Disagree</u> | <u>Strongly Disagree</u> |
| 1) | All members of your Monopoly group were able to conveniently meet outside of class. | 35 | 12 | 0 | 0 |
| | | 74.47% | 25.53% | | |
| 2) | All individuals actively participated in playing Monopoly | 33 | 12 | 2 | 0 |
| | | 70.21% | 25.53% | 4.26% | |
| 3) | Any questions or problems that arose while playing Monopoly were discussed and a resolution was agreed upon with all members of the group. | 34 | 11 | 2 | 0 |
| | | 72.34% | 23.40% | 4.26% | |
| 4) | My understanding of the complete financial accounting cycle has been enhanced from the Monopoly Assignment. | 25 | 21 | 1 | 0 |
| | | 53.19% | 44.68% | 2.13% | |
| 5) | Being a part of a team helped me to complete the Monopoly assignment in a more timely fashion. | 27 | 10 | 8 | 2 |
| | | 57.45% | 21.28% | 17.02% | 4.26% |
| 6) | I experienced more support from my teammates than I experience during classroom practice exercises. | 24 | 18 | 5 | 0 |
| | | 51.06% | 38.30% | 10.64% | |
| 7) | My team members spent time working together on the remainder of the assignment, helping each other to complete the full assignment. | 7 | 35 | 5 | 0 |
| | | 14.89% | 74.47% | 10.64% | |

APPENDIX A

The purpose of playing Monopoly is to complete the full accounting cycle for your newly formed corporation formed on April 1st. Your company is organized as a corporation and the name of the company must include your last name. Each student must form their own corporation. Below is a list of detail instructions:

1. Initial Requirements

- a. Form a Monopoly group of 3-4 corporations.
- b. Identify one individual to act as banker. The banker is responsible for handling all necessary bank transactions such as making loans, accepting payments on loans or holding the Title Deed cards until a property is purchased. These transactions will not be recorded.
- c. If a particular transaction is not noted in these detail instructions, the Monopoly group must agree on an acceptable accounting solution. A short paragraph is required to explain the transaction and the agreed-upon resolution.

2. Playing Monopoly

- a. The first transaction for each corporation is the issuance of 100 shares of \$1 par common stock for \$6 per share.
- b. Every roll must create a business transaction. There are several potential scenarios that do not require a business transaction.
- c. Each corporation is required to complete 36 transactions. Every four transactions are considered to be a month. Remember your corporation is formed on April 1, so 36 transactions take your corporation to Dec. 31.
- d. Each time you land on a “colored” avenue, you must pay for a house/hotel on that avenue or the banker must auction it off to another corporation. Opening auction bids are always \$10. Each corporation must own at least one property with a house or hotel. A house or hotel may be purchased the first time landing on any of the colored “avenues” (this is different from the real monopoly rules). You may borrow money from the bank or purchase property from another corporation.
- e. If your corporation lacks cash, borrow money from the bank in \$100 increments at 12% interest. All loans may be paid off early. At the end of the game, you must pay off outstanding loans in \$100 increments. If you do not have enough cash to pay off the entire loan balance, that’s ok. Leave the balance on your balance sheet.
- f. If you land on a property owned by another corporation, you must pay rent equal to the amount stated on the Title Deed card. If you do not have available cash, you must borrow from the bank or negotiate with the landlord recording a payable.
- g. You may not remain in Jail for consecutive turns. You must pay \$50 to get out of jail if you do not roll a double. You will also pay \$50 if you are just visiting jail.
- h. If you land on a Utility, Income Tax or Luxury Tax you must pay the amount stated on the board as expense.
- i. If you land on Railroad, this is treated the same as a “colored” avenue. Buy it or Auction it. Opening auction bids are always \$10.
- j. If you land on Chance or Community Chest, do as the card states and record the transaction to an appropriate income or expense.
- k. Common Sources of Income:
 - i. Pass Go
 - ii. Receiving Rental Income equal to the amount on the Title Deed card.
 - iii. If you receive a “Get out of Jail Free” card this is considered to be a Short Term Investment. You may set the value of this card and can be sold to any other corporation if you do not need it.
 - iv. Chance or Community Chest cards
- l. Sources of Expense
 - i. Landing on property owned by another corporation
 - ii. Paying to get out of Jail
 - iii. Landing on Utilities
 - iv. Chance or Community Chest cards

v. Depreciation Information:

1. Use straight line depreciation. Depreciation should be calculated by month. Use the following information to calculate depreciation:

| <u>Asset</u> | <u>Life</u> | <u>Salvage</u> |
|--------------|-------------|----------------|
| House | 5 yr | 10% of cost |
| Hotels | 10 yr | 10% of cost |
| Railroads | 10 yr | zero |

- vi. Interest Expense is calculated by month and recorded when the loan is paid off or at the end of the year if a balance remains.

3. End of the Game

- a. The game ends when all corporations have 36 transactions. As a reminder, every four transactions is a month.
- b. Count and record your cash on hand. Note this balance at the end of your list of transactions.
- c. Complete the following assignments:
 - i. Complete Chart of Accounts, 5 point
 1. The Chart of Accounts must include, at a minimum, the following accounts:
Cash, at least one Property, Common Stock, Additional Paid in Capital, Retained Earnings, specific Revenues, and detailed Expenses.
 - ii. 36 Journal Entries with the list of recorded transactions compiled while playing Monopoly, 36 points
 - iii. T-Accounts, 10 points
 - iv. Trial Balance, 3 points
 - v. Income Statement, 10 points
 - vi. Statement of Retained Earnings, 6 points
 - vii. Balance Sheet, 15 points
 - viii. Closing Entries, 10 points
 - ix. Post Closing Trial Balance, 5 points

HOW SIGNIFICANT ARE HEALTHY FOOD LABELS TO COLLEGE STUDENTS?

David J. DiRusso, Millersville University of Pennsylvania

ABSTRACT

Food labels such as “local” “organic” and “Non-GMO” have been proliferating across various food product packages in the United States. Many food products with these labels carry price premiums. The aim of this study is to determine if college students find value in these labels. Several food categories were analyzed: fresh meat, produce, dairy/eggs, and processed foods. A survey was employed to determine how important students believe these are, how much healthier food is perceived to be if it carries these labels, and how much of a price premium they are willing to pay. Results indicate that these labels do increase perceived value, increase perceived healthiness, and create a willingness to pay a price premium, but do so at different rates based upon the type of food product.

INTRODUCTION

Value added food labels come in many different types, such as local, organic, non-GMO and other encompassing terms such as “real food.” Being labeled as organic appears to have a particularly strong effect on consumers. According to the Organic Trade Association (2019), in 2018 Americans spent \$50 billion on organic food products, and there has been double-digit growth in spending on organic foods over the past five years. There appear to be many factors that account for this increase in demand for organic and non-GMO foods. Organic food production is defined as being products produced with non-synthetic pesticides (Campbell, Mhlanga, and Lesschaeve 2013; Campbell et al. 2014) and is perceived to be better for the environment, safer, and more sustainable (Campbell, Mhlanga, and Lesschaeve 2013; Campbell et al. 2014). The value of organic food is often conflated with that of local food. Many consumers assume that organic food is local food and that local food is organic. Consumers view GMOs negatively due to health concerns (Anderson, Wachenheim, and Lesch 2006).

In university settings there has been a push recently to move towards providing organic, local, and non-GMO foods, as these foods are seen as a link to the local community, help educate students, and benefit local economies (Strohbahn and Gregoire 2005; Ng, Bednar, and Longley 2010). Some universities, such as Yale, Duke, Emory, the University of Vermont and the University of Connecticut have taken part in these initiatives. However, there is unclear evidence that there is student demand for these value-added food products in the university setting. The student demand is essential to the success of a large-scale shift to foods carrying these labels due to the increase in price of such foods (Ng, Bednar, and Longley 2010) and because students themselves are the major group that influences what sustainable practices university food service implements (Chen, Arendt, and Gregoire 2010).

There is existing research which shows that students are willing to pay a premium for foods with value-added labels. Porter et al. (2017) analyzed students’ preference for “real” food, which refers to foods that come from humane sources such as locally grown, ecological foods. These foods effectively have the value of combining local, organic, and non-GMO. This study surveyed 904 students in the University of Vermont to assess their willingness to pay more for “real” food. The study concluded that a majority (70.8%) of students are indeed willing to pay more for “real” food. Additionally, 30% of students surveyed at Clark University were very willing to pay more for a meal plan that had a higher percentage of local, organic, sustainable food, and 51% were somewhat willing to pay more (Feenstra et al. 2011). Research by Bruno and Campbell (2016) found that approximately half of students that they surveyed at the University of Vermont were willing to pay extra for meal plans with more local or organic options. However, the researchers did note skepticism about the notion that this increased willingness to pay would actually cover the costs of providing these options in meal plans, as students would only be willing to add an additional 1-2% of the total cost of their meal plan for these options.

There appear to be conflicts in previous research concerning the willingness for students to pay a premium for organic/non-GMO foods, and whether or not universities should offer such foods to students. Thus, this study will assess the value that students see in foods with these labels through their perceived healthiness, while also assessing their willingness to pay a premium for organic foods. In addition, in order to gain greater understanding of student organic/non-GMO food demand, specific food categories will be analyzed to determine if willingness to pay a premium and perceived health varies based on food type.

METHODOLOGY

Paper surveys were administered to 100 undergraduate students in April 2019. A quota sampling method was employed to obtain 25 students per class rank, in order to gain the perspective of students across class ranks. Scales were employed to assess how much healthier students perceive organic/non-GMO foods are compared to traditional foods, how important students find these labels, and how much the environmental impact of their food purchase influences which type of food they buy. Four food categories were assessed: processed, meat, produce and dairy/eggs. Students were then asked to note how much more they would be willing to pay for a \$5 item in those categories. This standardization was employed so that the premium for each category could be compared directly and that respondents were not thinking about two products that are traditionally significantly different in terms of price (eg. steak vs an apple) which would thus carry very different base prices and, most likely, price premiums. Results were tabulated and analyzed via SPSS.

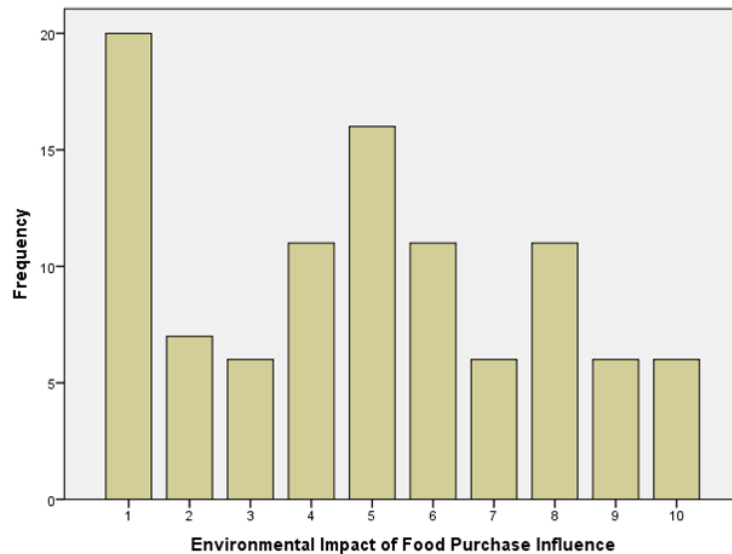
Respondent demographics were as follows: 67 identified as male, 30 as female, 2 as other, and 1 non-response. 77 responded as White, 8 as Black, 4 as Hispanic, 5 as Asian and 6 non-responses. There were 39 on-campus residents, 38 commuters, and 23 residents of off-campus affiliate housing. 89 of the respondents were between the ages of 18-22.

RESULTS

Respondents were asked to rate how much the environmental impact of their food purchases influence their decision to purchase organic/non-GMO foods on a scale from 1 (lowest influence) to 10 (highest influence). The mean response was 4.85, the median 5, with a mode of 1. The distribution of responses is shown below:

Figure 1

Role of Environmental Impact on Food Purchase Decision



The importance of the organic non-GMO label on the product categories was assessed on a 5-point scale (1 being the lowest level of importance and 5 is the highest). The results are summarized below:

Table 1**Importance of Food Type Being Labeled Organic/Non-GMO**

| Product | Mean Importance |
|----------------|------------------------|
| Meat | <i>3.82</i> |
| Produce | <i>3.60</i> |
| Dairy/Eggs | <i>3.55</i> |
| Processed | <i>2.53</i> |

Respondents considered meat to be most the most important food category to have an Organic/Non-GMO label, followed by produce, dairy/eggs, and, finally, processed foods.

Perceived healthiness of the organic non-GMO product categories was assessed on a 5-point scale (1 being the lowest perceived healthiness and 5 is the highest). The results are summarized in **Table 2**:

Table 2**Perceived Healthiness of Organic/Non-GMO Food by Category**

| Product | Mean Perceived Healthiness |
|----------------|-----------------------------------|
| Produce | <i>4.01</i> |
| Meat | <i>3.94</i> |
| Dairy/Eggs | <i>3.89</i> |
| Processed | <i>3.43</i> |

Organic/non-GMO produce ranked as the most healthy, followed by meat, dairy/eggs, and processed food.

Willingness to pay a premium for an organic/non-GMO food product in each category was assessed by asking the respondent to consider a \$5 product in that category and to note how much more they would be willing to pay than that for the product. Results are summarized in **Table 3**.

Table 3**Willingness to Pay Price Premium**

| Product | Total respondents willing to pay premium | Mean premium in dollars respondent is willing to pay on \$5 item |
|----------------|---|---|
| Meat | <i>78</i> | <i>\$3.61</i> |
| Produce | <i>68</i> | <i>\$2.47</i> |
| Processed | <i>42</i> | <i>\$2.45</i> |
| Dairy/Eggs | <i>65</i> | <i>\$2.42</i> |

The results indicate that the highest number of respondents are willing to pay a price premium for meat products with the non-GMO/organic label, followed by produce, dairy/eggs then processed foods. Among those willing to pay a premium for foods with these labels, meat had the highest mean premium that they were willing to pay, followed by produce, processed foods and dairy/eggs, with the latter three all being very close.

Associations with Price Premiums

Correlation tests were employed to determine if there are any possible causal factors associated with respondents' willingness to pay a price premium. The results of the relationship between the impact of environmental influence and the willingness to pay a price premium are summarized in **Table 4**.

Table 4

Relationship Between Environmental Impact and Price Premiums for Organic/Non-GMO Foods

| | | Environmental Impact of Food Purchase Influence |
|---------------|---------------------|---|
| Price Premium | Pearson Correlation | .142 |
| Fresh Meat | Sig. (2-tailed) | .165 |
| | N | 97 |
| Price Premium | Pearson Correlation | .326** |
| Produce | Sig. (2-tailed) | .001 |
| | N | 96 |
| Price Premium | Pearson Correlation | .286** |
| Dairy/Eggs | Sig. (2-tailed) | .004 |
| | N | 97 |
| Price Premium | Pearson Correlation | .093 |
| Processed | Sig. (2-tailed) | .364 |
| Foods | N | 97 |

** . Correlation is significant at the 0.01 level (2-tailed).

Environmental impact has a positive correlation with willingness to pay a premium for produce and dairy/eggs, but not for meat or processed foods. This highlights that the concern for the environment could make students more likely to pay a premium for produce and dairy/eggs that is organic/non-GMO.

The relationship between the perceived importance of each category of food being organic/non-GMO and the willingness to pay a price premium was also assessed. The results are highlighted below in **Table 5**.

Table 5

Relationship Between Importance and Price Premiums for Organic/Non-GMO Foods

| | | Importance Organic/Non GMO - Meat | Importance Organic/Non GMO - Produce | Importance Organic/Non GMO - Dairy/Eggs | Importance Organic/Non GMO - Processed Foods |
|-----------------|---------------------|---|--|---|---|
| Price Premium | Pearson Correlation | .238* | .138 | .072 | .159 |
| Fresh Meat | Sig. (2-tailed) | .019 | .178 | .488 | .122 |
| | N | 97 | 97 | 96 | 96 |
| Price Premium | Pearson Correlation | .374** | .375** | .184 | .145 |
| Produce | Sig. (2-tailed) | .000 | .000 | .075 | .160 |
| | N | 96 | 96 | 95 | 95 |
| Price Premium | Pearson Correlation | .318** | .249* | .284** | .106 |
| Dairy/Eggs | Sig. (2-tailed) | .002 | .014 | .005 | .305 |
| | N | 97 | 97 | 96 | 96 |
| Price Premium | Pearson Correlation | .125 | .085 | .064 | .278** |
| Processed Foods | Sig. (2-tailed) | .224 | .407 | .535 | .006 |
| | N | 97 | 97 | 96 | 96 |

**, Correlation is significant at the 0.01 level (2-tailed).

*, Correlation is significant at the 0.05 level (2-tailed).

The results indicate that respondents are willing to higher pay price premiums for a specific product category if they find it important that the product is Organic/Non-GMO. This positive correlation was found for each product category.

Finally, the relationship between how much healthier each organic/non-GMO food type is and the price premium were assessed. The results are shown in **Table 6** Below:

Table 6

Relationship Between Perceived Healthiness and Price Premiums for Organic/Non-GMO Foods

| | | How Much Healthier is Organic/Non GMO Meat | How Much Healthier is Organic/Non GMO Produce | How Much Healthier is Organic/Non GMO Dairy/Eggs | How Much Healthier is Organic/Non GMO Processed Foods |
|-----------------|---------------------|---|--|---|--|
| Price Premium | Pearson Correlation | .119 | .099 | .134 | .021 |
| Fresh Meat | Sig. (2-tailed) | .246 | .332 | .191 | .840 |
| | N | 97 | 97 | 97 | 97 |
| Price Premium | Pearson Correlation | .184 | .162 | .167 | -.160 |
| Produce | Sig. (2-tailed) | .073 | .116 | .104 | .119 |
| | N | 96 | 96 | 96 | 96 |
| Price Premium | Pearson Correlation | .080 | .088 | .126 | -.158 |
| Dairy/Eggs | Sig. (2-tailed) | .436 | .394 | .221 | .122 |
| | N | 97 | 97 | 97 | 97 |
| Price Premium | Pearson Correlation | -.138 | -.063 | -.002 | .017 |
| Processed Foods | Sig. (2-tailed) | .176 | .540 | .988 | .867 |
| | N | 97 | 97 | 97 | 97 |

**, Correlation is significant at the 0.01 level (2-tailed).

No statistically significant ($p < .05$) correlations were found among any of the food categories tested. Perceiving a specific category of food to be healthier if it is organic/non-GMO does not appear be associated with the willingness to pay higher prices for organic/non-GMO foods among respondents.

CONCLUSION

There is evidence to suggest that students perceive organic/non-GMO labels on food products as being significant. Foods with these labels were overall perceived to be important and healthier, and a majority of students are willing to pay a price premium for them. Meat products appear to be the type that students deem to be most important and they perceive organic/non-GMO produce to be the food type that is most likely to be considered “healthier” compared to non-organic, GMO foods. This offers some support to the notion that students would be open to accepting organic/non-GMO offerings. There is also evidence to suggest that the importance is directly related to the willingness to pay a premium, indicating that universities should engage their students to determine how important they believe organic/non-GMO foods are to them. In addition, there does indeed appear to be segments of students who are indeed willing to pay a price premium for organic/non-GMO foods of several types. This lends credence to the notion that universities should consider offering additional food options on campus, perhaps outside of meal plans, to satisfy demand.

It should be noted that no relationship between the perceived healthiness of the organic/non-GMO food types was found, indicating that students may not be willing to pay higher prices for healthier options if they were offered. Additionally, the effect on student meal plan prices was not directly assessed, as the focus here was on individual food types. If universities implement organic/non-GMO food options as part of student meal plans, it is quite possible that the increase in the price of meal plans and costs to the university associated with that decision would not be commensurate with student demand, which would be consistent with previous research by Bruno and Campbell (2016). Further research should be performed to further assess organic/non-GMO food demand and willingness to pay higher meal plan prices before universities consider wholesale changes to their food offerings.

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A DYNAMIC SHIFT-SHARE ANALYSIS OF EMPLOYMENT CHANGE IN NORTH DAKOTA

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ABSTRACT

With the boom in shale oil and gas extraction that began in the mid-2000s, North Dakota experienced strong economic growth accompanied by substantial increases in employment. This largely continued into the early part of this decade, but came to an abrupt halt when oil and gas prices declined rather dramatically in 2014. Here we conduct a dynamic shift-share analysis of the employment experience of North Dakota and its regions from the 2001 recession on. This allows us to decompose the employment experience of each region of the state into separate components based on relative industry performance across NAICS supersectors.

INTRODUCTION

This paper investigates the employment experience in North Dakota from the 2001 recession and subsequent recovery through the Great Recession and the continuing recovery that has followed. Recognizing that North Dakota has had a unique economic experience among states over the past decade and a half, due to its wealth of shale oil and gas resources, we seek to analyze the industry employment experience of the state and how that has played out across different regions of the state. It is informative to look at the variation of employment growth across the state and investigate some of the drivers behind those differences. An important factor in this involves the differences in employment distribution across industries in the different regions of the state. In looking into this, we apply the dynamic shift-share analysis of Barff and Knight (1988) and Arcelus (1984) and then graphical procedures are used to support and display the results. The extension of dynamic shift-share analysis through the use of graphics was developed in Doorn and Jacobson (2008) and used in Doorn and Kelly (2015) to assess the performance of employment growth across regions of the United States. As we will see, such graphical displays are a useful means of demonstrating the power dynamic shift-share analysis has in identifying differences in industry performance across regions and how these result in such an array of employment outcomes, for the regions relative to each other and also relative to the state as a whole.

In conducting the study, we make use of county employment data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW) that is aggregated into eight Workforce Development Regions (WDR) across the state, as defined by the North Dakota Department of Commerce. Figure 1 is a map of North Dakota indicating the WDR breakdown, while Appendix Table 1 tabulates this information.

Figure 1
North Dakota Workforce Development Regions



Table 1
North Dakota Workforce Development Regions

| Region | Name | Counties |
|--------|----------------------|--|
| 1 | Tri-County | Divide, Williams, McKenzie |
| 2 | Souris Basin | Burke, Renville, Bottineau, Mountrail, Ward, McHenry, Pierce |
| 3 | North Central | Rolette, Towner, Cavalier, Benson, Ramsey, Eddy |
| 4 | Red River | Pembina, Walsh, Nelson, Grand Forks |
| 5 | Lake Agassiz | Steele, Traill, Cass, Ransom, Sargent, Richland |
| 6 | South Central Dakota | Wells, Foster, Griggs, Stutsman, Barnes, Logan, LaMoure, McIntosh, Dickey |
| 7 | Lewis & Clark | McLean, Sheridan, Mercer, Oliver, Burleigh, Kidder, Morton, Grant, Sioux, Emmons |
| 8 | Roosevelt-Custer | Dunn, Golden Valley, Billings, Stark, Slope, Hettinger, Bowman, Adams |

Source: North Dakota Department of Commerce

Table 2 indicates the industry taxonomy used, which is essentially North American Industry Classification System (NAICS) supersectors. In what follows, the Trade, Transportation, and Utilities supersector is separated into two components in order to provide additional detail. The first of these aggregates the Wholesale and Retail Trade sectors into one Trade sector, while the second aggregates the remaining into Transportation and Utilities. Here we consider the behavior of employment growth in each region and investigate which industries had the greatest impact in relative terms. Given North Dakota's unique employment experience, we place additional focus on the Natural Resources and Mining NAICS Supersector, which includes Sector 11—Agriculture, forestry, fishing and hunting and Sector 21—Mining, Quarrying, and Oil and Gas Extraction.

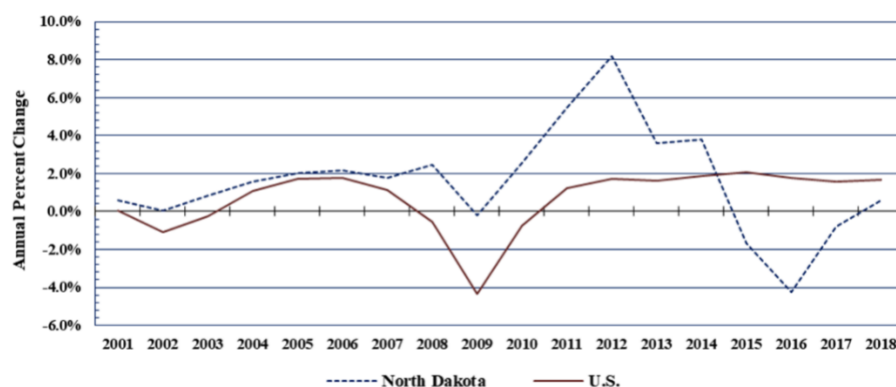
Table 2
NAICS Supersectors and Component Industries

| GOODS PRODUCING | |
|--------------------------------------|--|
| Natural Resources and Mining | Sector 11—Agriculture, forestry, fishing and hunting |
| | Sector 21—Mining, Quarrying, and Oil and Gas Extraction |
| Construction | Sector 23—Construction |
| Manufacturing | Sectors 31, 32, 33—Manufacturing |
| SERVICE PROVIDING | |
| Trade, Transportation, and Utilities | Sector 42—Wholesale trade |
| | Sectors 44, 45—Retail trade |
| | Sectors 48, 49—Transportation and warehousing |
| | Sector 22—Utilities |
| Information | Sector 51—Information |
| Financial Activities | Sector 52—Finance and insurance |
| | Sector 53—Real estate and rental and leasing |
| Professional and Business Services | Sector 54—Professional, scientific, and technical services |
| | Sector 55—Management of companies and enterprises |
| | Sector 56—Administrative and waste services |
| Education and Health Services | Sector 61—Educational services |
| | Sector 62—Health care and social assistance |
| Leisure and Hospitality | Sector 71—Arts, entertainment, and recreation |
| | Sector 72—Accommodations and food services |
| Other Services | Sector 81—Other services |
| Public Administration | Federal, State, Local Government |

EMPLOYMENT CHANGE IN NORTH DAKOTA AND ITS WORKFORCE DEVELOPMENT REGIONS

In this section we set the stage for the later analysis by first looking at employment growth in North Dakota relative to the U.S. and then focusing on statewide performance and its breakout across the eight WDR to compare and contrast outcomes over the periods of interest. Using employment data from the Current Employment Statistics program of the BLS, Figure 2 indicates the annual average growth rates of All Industries employment for the U.S. and North Dakota. We immediately see that North Dakota has outperformed the nation in employment growth throughout the period from 2001 to 2014. As the U.S. continued to see employment declines through 2003 following the 2001 recession, North Dakota maintained positive employment growth right up through 2008 when the country was in the throes of the Great Recession. We see in particular the effects of the shale oil boom that began in North Dakota in earnest in 2006 with the increasing extraction from the Bakken Shale formation (see Wikipedia contributors, 2019). There is a significant divergence in the employment growth experience going forward from 2006 that resulted from the oil boom. As employment began its steep decline nationally, we see that North Dakota experienced significant growth in its employment even in 2008, with 2.48 percent expansion in employment as nationally it declined 1.55 percent. In 2009, when the nation saw a very significant 4.32 percent decline, employment in North Dakota fell by only 0.19 percent. This was followed by strong return to growth of 2.56 percent in 2010, as the nation continued to suffer declining employment. The largest annual expansion in North Dakota employment over the period of interest occurred in 2012, with a rise of 8.17 percent. This was followed by another two years of strong growth in employment of over 3.5 percent per annum in North Dakota, outstripping the nation's growth in each of these years by nearly two percentage points.

Figure 2
Annual Average Growth Rates for All Industries Employment – State and National (CES)



As the nation has continued to see growth in employment through the rest of the research period, we see that employment in North Dakota experienced a large decline of 1.69 percent in 2015 followed by an even larger drop of 4.23 percent in 2016. In 2017 North Dakota experienced another decline of 0.81 percent before finally seeing employment expand again in 2018, with a 0.60 percent increase. The large decline in statewide employment that began in 2015 was in large part due to the huge drop in oil prices that began towards the end of 2014 and which have yet to recover to anywhere near their previous highs. In fact, we can essentially see the correspondence of North Dakota's employment experience with the price of oil by considering Figure 3, which plots the West Texas Intermediate (WTI) Crude Prices that correspond with our study period. As we will see below, the oil boom and bust has had the largest effects on employment in only three of North Dakota's Workforce Development Regions.

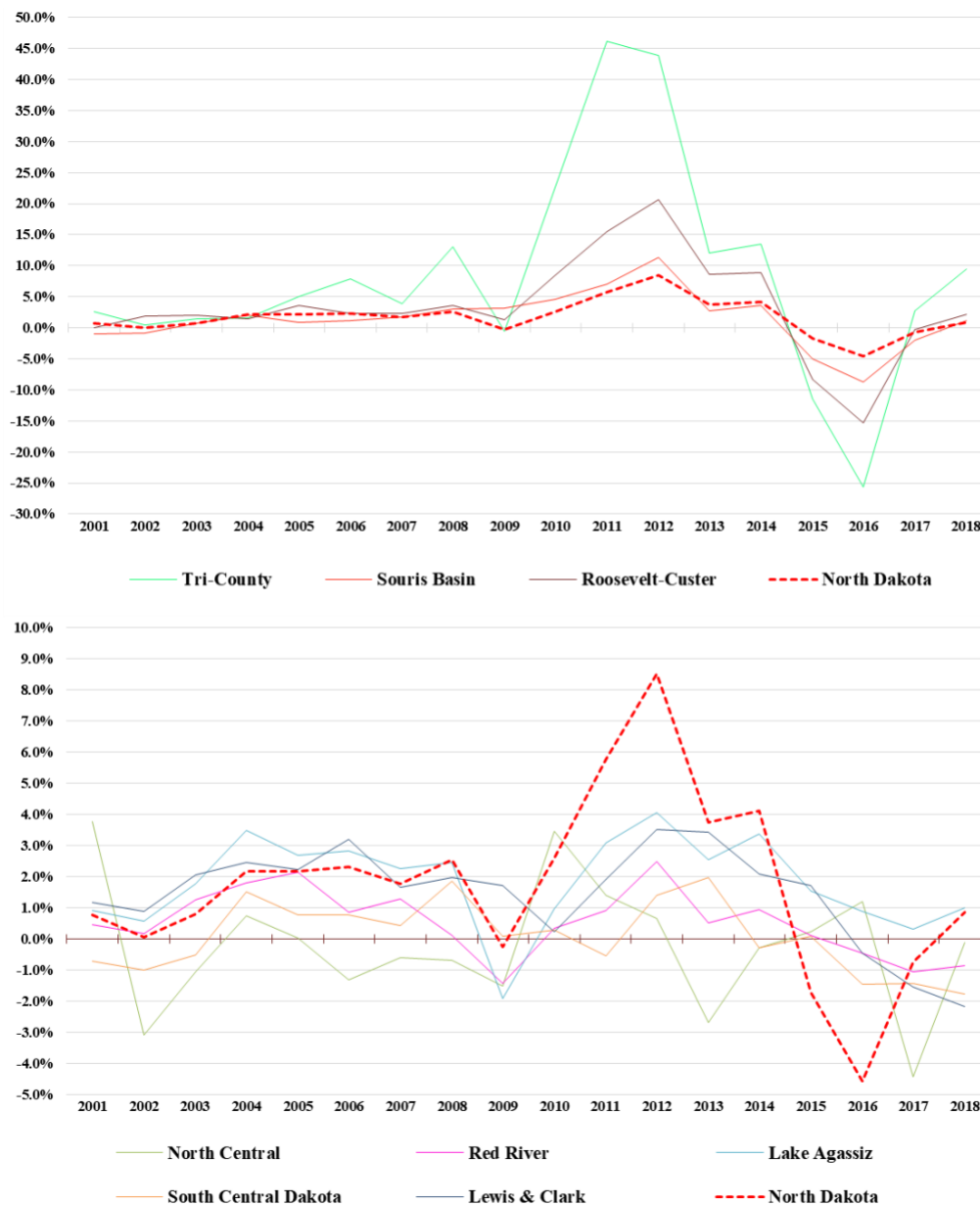
Figure 3
West Texas Intermediate (WTI) Crude Prices, 2001 – 2018



Source: U.S. Energy Administration

The two panels of Figure 4 indicate the relative employment experience of the individual regions as well as that of the state over the period of study, using QCEW employment data. Please note the different scaling in each panel. At the regional level we most directly see the correspondence between employment growth and oil prices in regions 1, 2, and 8, which are the Tri-County, Souris Basin and Roosevelt-Custer regions, respectively. In fact the large movements in employment in these regions were strong enough to cause the statewide average to differ significantly from that of the remaining five regions once the oil boom began in 2006 and particularly after the Great Recession ended, although most regions seemed to benefit to some extent. This is the reason for the two panels in Figure 4. Without the split it is difficult to ascertain the actual employment experience of the other five regions.

Figure 4
Annual Average Growth Rates for All Industries Employment –Workforce Development Regions



One thing to note is that nearly all of the regions have experienced positive employment growth over most of the period through 2015. The North Central region, on the other hand, has had declining employment in all but five of the eighteen years covered. The oil bust seems to have resounded through most of the regions, with only the Lake Agassiz region remaining in positive territory throughout.

In what follows we will be taking a closer look at the industry breakout in each region and their positive and negative contributions to the employment outcomes we see in Figure 4. Before doing so, however, we first want to aggregate performance outcomes over designated periods to make the analysis more tractable than would be the case if we compared and contrasted outcomes for every single year of the study. While in general economists like to think in terms of the business cycle, with turning points as determined by the NBER's Business Cycle Dating Committee, as we are working with employment it makes more sense to focus on an alternative measure that depends on employment expansions and contractions. Based on the national employment experience, Table 3 gives the employment

performance for each North Dakota WDR, the state, and the nation over four periods of employment expansion and contraction at the national level.

Table 3
Overall and Annualized Average Growth Based on National Employment Expansion and Contraction

| Region | 2001 - 2003 | | 2003 - 2007 | | 2007 to 2010 | | 2010 - 2018 | |
|------------------------|-------------|--------------------|-------------|--------------------|--------------|--------------------|-------------|--------------------|
| | Overall | Annualized Average | Overall | Annualized Average | Overall | Annualized Average | Overall | Annualized Average |
| Tri-County | 1.60% | 0.80% | 19.61% | 4.58% | 37.25% | 11.13% | 98.11% | 8.92% |
| Souris Basin | -0.44% | -0.22% | 6.44% | 1.57% | 11.17% | 3.59% | 9.19% | 1.11% |
| North Central | -4.70% | -2.38% | -0.63% | -0.16% | 1.03% | 0.34% | -4.04% | -0.51% |
| Red River | 1.43% | 0.71% | 6.44% | 1.57% | -1.34% | -0.45% | 3.07% | 0.38% |
| Lake Agassiz | 2.37% | 1.18% | 11.75% | 2.82% | 1.51% | 0.50% | 18.05% | 2.10% |
| South Central Dakota | -1.46% | -0.73% | 3.57% | 0.88% | 2.24% | 0.74% | -2.05% | -0.26% |
| Lewis & Clark | 2.97% | 1.47% | 9.91% | 2.39% | 3.99% | 1.31% | 8.67% | 1.04% |
| Roosevelt-Custer | 3.65% | 1.81% | 9.02% | 2.18% | 13.78% | 4.40% | 30.64% | 3.40% |
| N. Dakota (Aggregated) | 1.40% | 0.70% | 8.95% | 2.17% | 4.86% | 1.59% | 15.96% | 1.87% |
| U.S. (CES) | -1.32% | -0.66% | 5.87% | 1.44% | -5.53% | -1.88% | 14.35% | 1.69% |

Again we see that the majority of the WDR outperformed the nation throughout, with only the Red River WDR actually experiencing an overall decline in employment from 2007 to 2010. Of course we also see that the North Central region only experienced employment growth over that same period.

DYNAMIC SHIFT-SHARE ANALYSIS

Shift-share analysis breaks down the change in a variable over a particular time period into contributing factors – those changes that are due to aggregate growth trends for total employment in a larger reference area and those that can be attributed to the particular industry make-up within each region and the relative performance of those industries, both in the aggregate and within each region of analysis. This decomposition is given in equation (1):

$$AC_i = AG_i + IS_i + RS_i \quad (1)$$

where AC_i is the actual change in employment in labor market region i over the period of interest; AG_i is termed the *aggregate growth effect*; IS_i is called the *industry shift effect*; and RS_i the *regional share effect*.

The formula for AG_i is given in equation (2), where the growth rate for overall employment in the larger region – the state in this case – is applied to initial period employment in each industry in the labor market region of interest and then the result is summed over all industries. In effect this is the same as applying the aggregate growth rate to the initial level of employment for the region.

$$AG_i = \sum_j G_* \cdot E_{ij}^t = G_* \cdot E_i^t \quad (2)$$

Where G_* is the growth rate of aggregate employment for the state; E_{ij}^t denotes beginning of period industry j employment in labor market region i ; and E_i^t denotes beginning of period level of total nonfarm employment in labor market region i .

In essence, AG_i tells us what the change in employment would have been had region growth matched that of the state as a whole. Any difference between that and the actual change in a region's employment over the period, AC_i , is then explained by breaking that difference into the two remaining components of equation (1). Equation (3) gives the formula for the industry shift effect, which explains the portion of the growth difference that is due to industry performance at the state level relative to the growth in overall aggregate employment. The regional share effect, generated through equation (4), then explains that portion of employment change in the region that is due to its particular industry mix and performance relative to the statewide experience. The breakdown of employment changes in this fashion allows a determination of each area's relative strengths and weaknesses.

$$IS_i = \sum_j (G_j - G_s) \cdot E_{ij}^t \quad (3)$$

$$RS_i = \sum_j (G_{ij} - G_j) \cdot E_{ij}^t \quad (4)$$

where G_j is the percentage growth in industry j employment for the state and G_{ij} is the growth in industry j employment in labor market region i .

In contrast to a comparative static shift-share analysis, which calculates the above components just once for each extended period of interest (such as a decade) using only the beginning and final employment levels, the dynamic approach to be employed here involves calculating the component breakdown for each year of the study. Thus the growth rates used in each formula are the actual annual percent changes in employment for each industry and area. This allows for any changes in the distribution of employment across industries each year to be explicitly taken into account, as E_{ij}^t is updated annually. To determine the overall effect over a lengthier period the annual changes can just be summed. The result is, of course, different from what the static approach would generate over the same period.

As can be seen in equations (3) and (4), both IS and RS are affected by an area's initial distribution of employment across industries. For IS , the direction of impact on every area is the same for each industry. However, the overall impact of IS on an area's employment will depend on its industry distribution. The IS contribution will be positive for those labor market regions which have a larger share of employment in high growth industries, i.e. those which grew faster than the statewide average for all industries. A negative industry shift indicates that an area's initial employment mix was heavy in what turned out to be low growth or declining industries. Although interesting, the IS contribution to employment growth in each region is relatively small, and therefore we focus on the RS contribution in the discussion that follows.

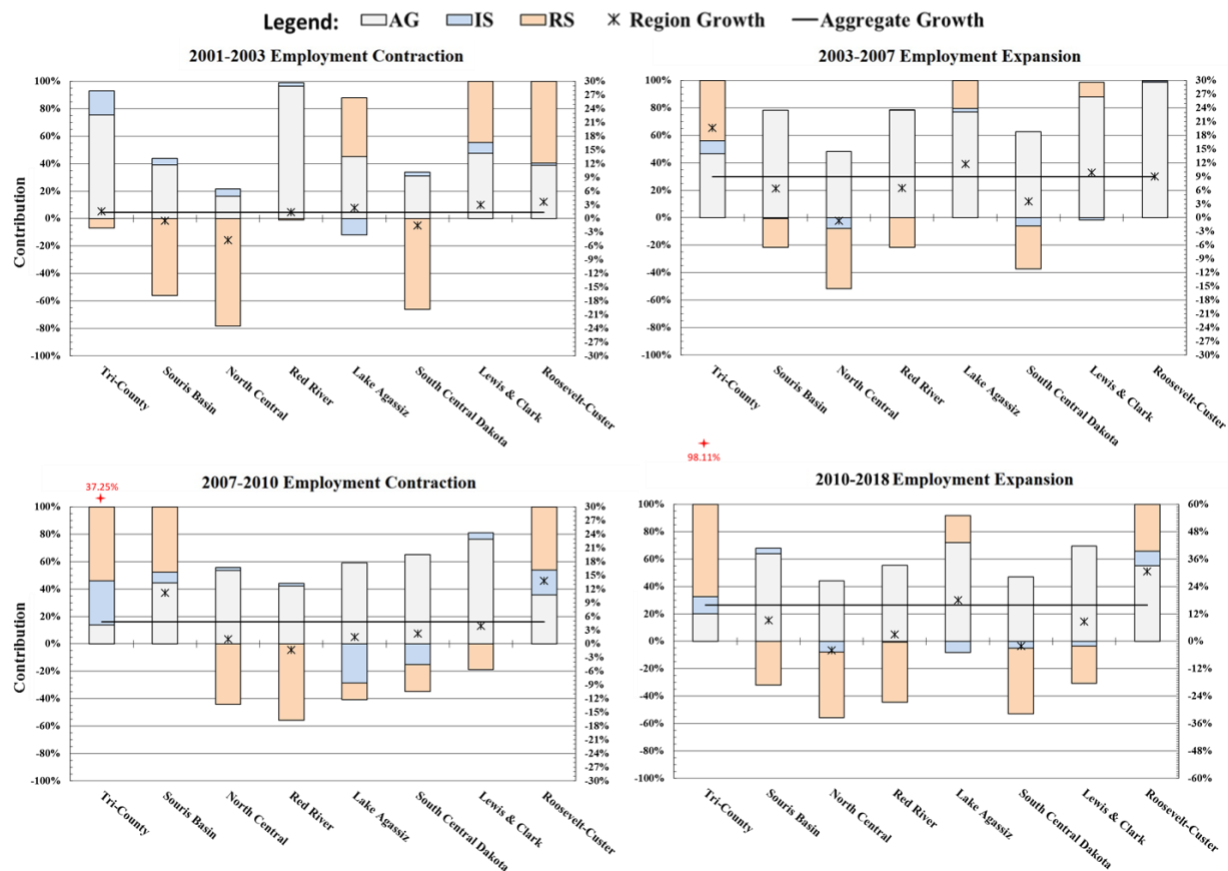
The direction of impact from industry performance on the RS contribution to growth within each area will differ according to its performance relative to the same industry in the state as a whole. An area with many of its industries outperforming the industry average for the state is considered to have had a competitive advantage over those areas which do not have such high performing industries, and thus will have a positive regional share. This makes RS the primary determinant of differences in growth rates across areas.

ANALYSIS OF EMPLOYMENT CHANGE IN THE WORKFORCE DEVELOPMENT REGIONS

This section applies the shift-share technique outlined above to employment change in each of North Dakota's Workforce Development Regions. This will allow us to consider regional *industry* performance that will help explain the differences in the overall employment experience across the eight regions that were apparent in Figure 4 above. Here we focus on the four multi-year periods of national employment contraction and expansion and sum the associated annual effects, making good use of the dynamic approach to shift-share analysis. Figure 5 contains four panels that indicate the contribution of each shift-share component to employment change in each region over each of these periods. In addition each region's overall growth rate for each period is indicated along with the growth rate of aggregate employment statewide. (State employment here is an aggregate of regional employment to ensure consistency in the results of the shift-share decomposition.) This allows us to see visually the differences in regional employment performance that the shift-share decomposition seeks to explain. One thing to note is that the industry shift component is generally quite small, which is typical in such regional analysis. In the interest of space, we will not discuss this component in the following.

In conjunction with the analysis of the results shown in Figure 5, it is useful to take a deeper look at the relative industry performance driving the regional share effect for each WDR, as this tends to be the biggest source of disparities in employment growth. Figure 6 contains eight panels that provide that additional detail by indicating the contribution to each region's RS component in each period that is due to relative industry performance in the region. Together with Figure 5, these graphics give us a much more complete picture of the relative industry performance underlying the overall change in employment within each region. For periods over which industries with positive impacts outweigh those with negative, the overall RS will be positive, and vice versa. As we will see, it is fairly straightforward to determine which industries provided the greatest boost.

Figure 5
Shift Share Component Contributions (left axis) and Regional Growth in Employment (right axis)



The 2001 to 2003 Employment Contraction

The first panel of Figure 5 indicates the contributions of each of the shift-share components to employment growth in each WDR over the national employment contraction from 2001 to 2003. As we saw in Table 3, the Souris Basin, North Central Region and the South Central Division all experienced employment declines mirroring the national experience. In each case we see that the Regional Share component provided the only negative contribution to their overall employment growth, but that these negative contributions greatly outweighed the positive contributions from the IS and AG components.

Panel 2 of Figure 6 indicates the relative industry performance in the Souris Basin that resulted in its large negative RS for the period. In fact, only four of the region's industries outperformed their statewide averages in employment growth for the period – Public Administration, Manufacturing, Construction and Natural Resources and Mining – and all very slightly. The largest negative contributions were from the Education and Health Services and Professional and Business Services industries, with Other Services, Trade, Transportation and Utilities and Leisure and Hospitality also providing significant negative contributions. For the North Central Region, Panel 3 of Figure 6 indicates that only Leisure and Hospitality provided a positive contribution to its regional share, while all others underperformed their statewide counterparts. The largest negative contributions in this case were from the Information and the Education and Health Services industries. As seen in Figure 6, Panel 6, the large negative regional share for the South Central Division is due primarily to the relative poor performance of its Education and Health Services industry, followed by Trade and Financial Services.

The Tri-County and Red River regions also experienced negative regional shares, but in both cases these were dwarfed by the positive impact of the state's strong growth in employment overall. For the Tri-County region we see in Panel

1 of Figure 6 that its strong outperformance in Manufacturing and in Transportation and Utilities, along with five other industries providing smaller positive contributions, was marginally outweighed by the underperformance in Natural Resources and Mining, Financial Activities, Professional and Business Services, and Other Services industries. For the Red River region Panel 4 of Figure 6 indicates that it also saw relative outperformance by the majority of its industries, led by Professional and Business Services. This was only very slightly outweighed by its five underperforming industries, with Manufacturing being the biggest detractor in this case.

The remaining regions all saw large positive regional shares over this period, with the Roosevelt-Custer region having the best outperformance in the state. As we see in Panel 8 of Figure 6, only three industries underperformed in this region – Manufacturing, Financial Activities, and Other Services, while the remaining industries positive contributions strongly outweighed those negative contributors. Construction, Professional and Business Services and Transportation and Utilities were the main contributors to the region’s 3.65 percent employment growth over the period, which was the highest we saw across regions in Table 3. The Lewis and Clark region’s strong regional share resulted from seven of its industries outperforming, led by Education and Health Services, Trade, and Professional and Business Services, as seen in Figure 6, Panel 7. The strong positive RS for the Lake Agassiz region was led by outperformance in Manufacturing, Financial Activities, Other Services and Trade, while Professional and Business Services was the largest underperformer in the region over this period.

Figure 6
Contributions by Industry to the Regional Share of each WDR – Legend for All Panels



Figure 6 – Panel 1: Tri-County and Panel 2: Souris Basin

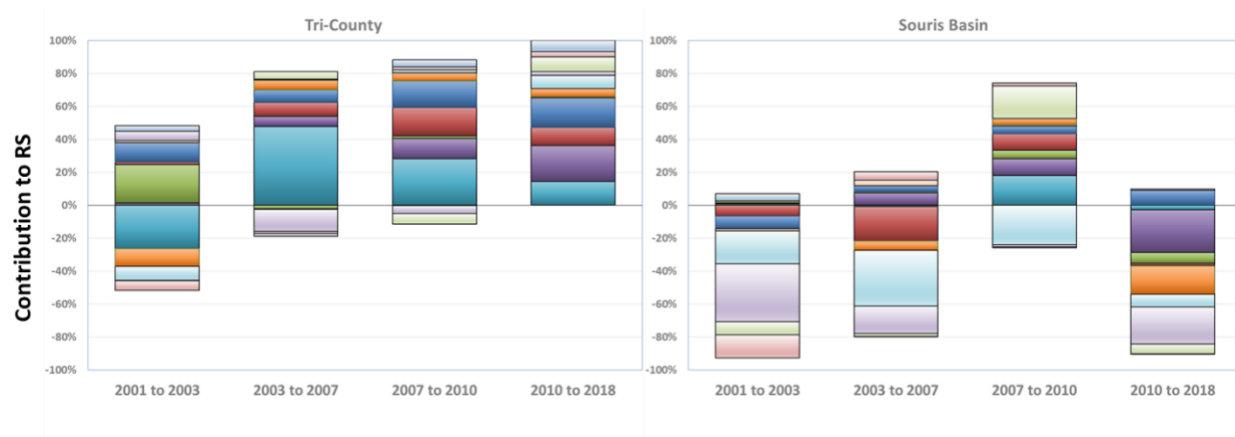


Figure 6 – Panel 3: North Central and Panel 4: Red River

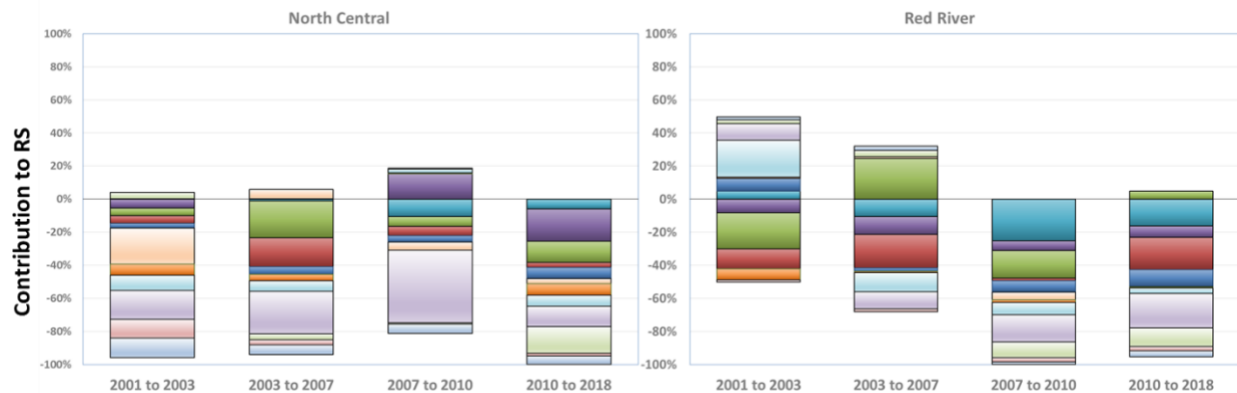


Figure 6 – Panel 5: Lake Agassiz and Panel 6: South Central District

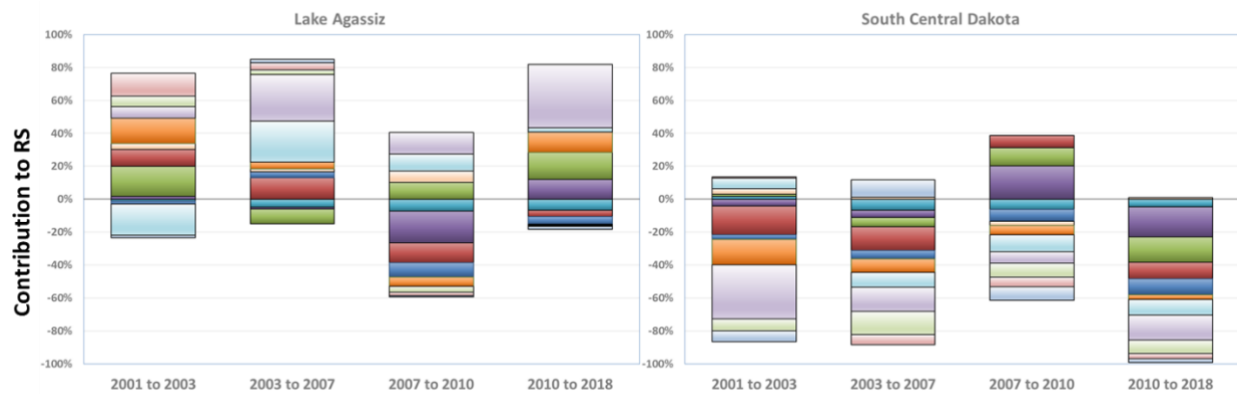
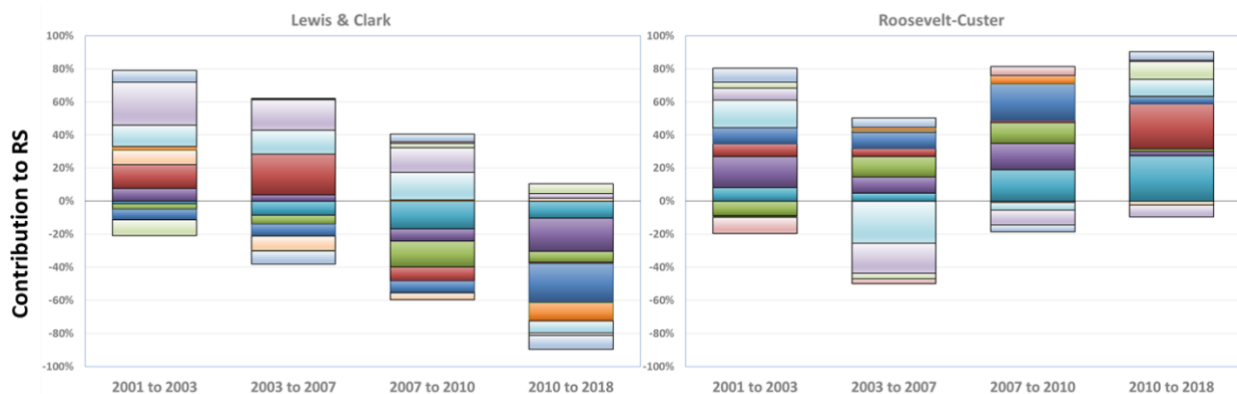


Figure 6 – Panel 7: Lake Agassiz and Panel 8: South Central District



The 2003 to 2007 Employment Expansion

Over the national employment expansion from 2003 to 2007, we see in Figure 5 that half of the WDR had positive regional share contributions and half had negative. All were fairly sizeable, save that for the Roosevelt-Custer Region and perhaps the Lewis and Clark region. Beginning with the Tri-County region's strong 19.61 percent growth in employment over this period, we see in Panel 1 of Figure 6 that the Natural Resources and Mining industry was by

far the largest positive contributor to the region's growth. Of course this period includes the beginning of the North Dakota oil boom, and in viewing all of the panels from Figure 6 it is clear that this region was the biggest beneficiary.

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COST SHIFTING AND UBTI REPORTING IN COLLEGES AND UNIVERSITIES

Ahmed Ebrahim, Fairfield University

ABSTRACT

This paper analyzes the reporting practices of Unrelated Business Taxable Income (UBTI) in colleges and universities, as well as examines evidence of cost shifting between related tax-exempt sources of income and unrelated taxable income in order to minimize or eliminate tax liability. Increasing commercial-type activities and programs in colleges and universities (among other nonprofit tax-exempt organizations) generates a growing amount of income unrelated to their core mission and, therefore, is taxable based on the tax code. To minimize tax liability on their growing unrelated income, colleges and universities are motivated to shift expenses from the regular tax-exempt operations and assign them as tax deductible expenses directly associated with the unrelated income. Using a sample of colleges and universities during years 2013-2015, significant evidence of cost shifting was found that leads to minimizing tax liability in colleges and universities.

INTRODUCTION

While the for-profit entities and their owners are generally subject to federal and state income taxes, Non-For-Profit organizations (NFPs) are generally tax exempt. Furthermore, nonprofit entities that are committed to pursuing charitable, educational, religious, or other public-benefitting purposes also enjoy a host of other tax benefits. Most prominently, the ability to receive tax-deductible contributions, and exemption from most other types of state and local taxes such as sales tax. However, many of the present NFPs have engaged in business-like activities, not essentially related to their core mission, and have generated significant amounts of income from these activities. The emergence of these hybrid activity organizations raises the question of whether the simple fact that they pursue public-benefitting goals should entitle them to any or all of the tax benefits they enjoy.

The overall economic activity conducted by NFPs with tax exemption designation has significantly increased over the last decades. Likewise, the universe of public charities has changed dramatically over the years. For example, in 1985, the IRS Master File listed approximately 335,000 active public charities and tax-exempt organizations under IRC section 501(c)(3). By 2004, this number had nearly tripled to 933,000. Not all public charities are included in this figure because most churches and certain other religious organizations do not need to apply for recognition of tax exemption, unless they specifically request an IRS ruling.

These organizations are exempt from taxes to help them advance and promote the general welfare of the society. However, increasing commercialism of NFPs has caused their income from sources that can be designated as Unrelated Business Taxable Income (UBTI) to grow at an annual rate of up to 30% (Foran & Theisen, 2000). This shift has caused continuous concern by the US Congress over the rapid expansion of NFPs commercial activities and the potential for unfair competition with other for-profit organizations that provide similar products and services.

In 1950, the US Congress added the UBTI provisions to the Internal Revenue Code requiring these NFPs to report and pay tax on income generated from conducting any activity that is deemed unrelated to their core charitable or non-for-profit mission. The main goal for enacting a tax on the UBTI is to create a fair competition plain field between these tax-exempt organizations and other for-profit entities that provide similar services or products.

There are more than 29 different types of tax-exempt entities in section 501(c) of the US tax code alone and by some counts more than 70 overall. The PGA Tour and the NFL are two of the largest 501(c)(6)s (Miller, 2014). According to the tax code (section 511), the income of the NFPs is considered UBTI if it meets three conditions: (1) It is income from a trade or business as defined in the Code, (2) the trade or business is regularly carried on by the organization, and (3) the conduct of such trade or business is substantially unrelated to the organization's performance of its tax-exempt function.

Unless the activity that generates the passive income is debt financed, the code excludes some types of income from the UBTI reporting requirements such as passive income including dividends, royalty, rent, interest, and capital gains. Current examples of UBTI in tax-exempt colleges and universities may include diverse revenue generated by athletic programs and operation of certain facilities such as dining rooms, bookstores, in addition to some sponsorship and advertising contracts. According to the current reporting requirements, NFPs with UBTI should report summary of

this income (both revenue and allocated expenses) in their annual tax return (Form 990) with details of these revenues, allocated expenses, net taxable income, and the tax liability on the tax return form (Form 990-T).

Both Congress and the IRS have paid increasing attention to the rapid growth of UBTI in tax-exempt organizations and the lack of compliance in reporting this income and paying the tax due on it. Congress has always expressed concerns about the rapid expansion of NFPs commercial activities and the potential for unfair competition due to their preferential taxation (Manzullo, 2001). For example, some introduced legislations have proposed repealing the tax exemption for professional sports leagues. Other proposed legislations have introduced new rules to tighten the UBTI reporting (especially for colleges and universities) including the following proposed provisions:

- Any sale or licensing by a tax-exempt organization of its name or logo (including any related trademark or copyright) would be treated as unrelated trade or business, and royalties paid with respect to such licenses would be subject to UBTI. That would have included many institutions that have affinity credit cards or license their name for apparel.
- A change in the rules for qualified sponsorship payments where mentioning of a sponsor's product lines would turn a mere acknowledgement that is not taxed into taxable advertising income.
- Organization officers, directors, or responsible employees would be penalized for the substantial understatement of the UBTI tax.

A recent IRS examination of UBTI reporting requirements in colleges and universities has revealed a widespread lack of compliance with the UBTI reporting rules that resulted in a significant underestimation of their taxable income and tax liability. The report uncovered that, for more than 40 percent of colleges and universities examined, activities that were effectively treated as related to the tax-exempt functions were determined, upon examination, to be unrelated activities that should have been reported on Form 990-T, and were subject to tax (IRS, 2013). The IRS examination of a sample of colleges and universities resulted in disallowance of more than \$170 million of reported losses in forms 990-T, and increase in UBTI by 90% as a result of disallowing improperly allocated expenses that were not connected to the unrelated business activities, and reclassifying income originally reported as income from exempt activities under unrelated taxable income.

The main goal of this paper is to examine compliance with the UBTI reporting requirements in non-for-profit and tax-exempt colleges and universities, as well as detect any signs of managing their taxable income to minimize or avoid paying tax on it. Using a sample of colleges and universities for the years 2013, 2014, and 2015, the study employs various statistical models to detect and isolate evidence of under-reported UBTI as a result of intentional allocation of tax deductions against the unrelated income as expenses that are "directly connected" to this reported income. Section II of the paper summarizes the prior literature and introduces the paper's expectations. Section III introduces the research design and methodology. Section IV presents the study sample and results, while Section V concludes the paper.

PRIOR LITERATURE AND STUDY EXPECTATIONS

Because of limitations on the availability of data required to conduct empirical research in this area, prior literature that analyzed the UBTI reporting in different NFPs and examined their cost shifting practice is limited. Some of the prior literature in this area has presented the common challenges in applying the UBTI requirements, definitions issued by tax courts, and the different factors that affect NFPs' reporting of their UBTI. In addition, some prior empirical research has tried to detect evidence of NFPs attempts to manage their reported UBTI in order to minimize or eliminate their tax liability.

In a theoretical modeling analysis, Bois et al (2004) suggests that the presence of agency problems inside organizations can explain the occurrence of material amounts of UBTI. They proposed that the more agency problems a NFP organization has, the larger the revenues derived from the production of ancillary output and activities unrelated to the organization's core mission. In their model, they used compensation as a proxy measure for the agency problem. Yetman (2003) developed the concept of production complementary between related and unrelated activities in NFPs and argued that the existence of such complementation increases the chances of UBTI and the amount of directly connected expenses that can be allocated to it. The level of such production complementation is expected to be much higher at specific types of NFPs, including colleges and universities. Furthermore, Yetman and Yetman (2009) concluded that a nonprofit is more likely to engage in a taxable activity and generates more taxable income when the activity provides higher profits relative to the non-taxable income and when donor aversion is relatively lower.

For the factors affecting NFPs' engagement in UBTI, Foran and Theisen (2000) reported that the main factors affecting UBTI are size, donations, type, Net Operating Losses (NOL), and activities similarity. They also reported evidence of the effect of engaging a paid CPA tax preparer. NFPs with paid CPA tax preparer are more likely to report near-zero taxable income indicating that the CPA firm assists its NFP client in managing their taxable income near zero (Omer & Yetman 2003).

Some prior literature also analyzed the trends in tax court cases with regard to UBTI reporting and calculation. For example, Levenson (1998) analyzed the case of the Mississippi State University Alumni Association regarding its affinity card income (TC Memo 1997-3970). Kenny (1998) presented the IRS guidance with regard to college golf courses that are made available for non-student members (Letter Ruling 9645004) where the IRS ruled that golf course fees from alumni and president club (and some from the spouses and children of students, staff, and faculty) don't come under the convenience exception in the tax code and are subject to UBTI. Fiore (2001) analyzed the IRS guidance about differentiating taxable advertising from nontaxable sponsorships in college sports activities. Furthermore, Schuster (2010) analyzed the advertising vs. sponsorship distinction in light of the famous NCAA tax court case (914 F.2d 1417).

Treasury regulation 1.512(a)-1 requires that allocation of expenses between income from related (exempt) and unrelated (taxable) activities should be done on a reasonable basis. However, the regulation gives little specific guidance as to what might be considered reasonable. Therefore, the allocation of indirect expenses is a gray area that provides a subtle opportunity for tax avoidance or evasion in the form of expense shifting towards the UBTI. Omer Yetman (2007) analyzed hand-collected data from Forms 990-T for their sample of NFPs and reported that about 19% of them misreported their UBTI. For the expense shifting research stream, Hofmann (2007) examined tax-motivated expense shifting by NFP associations and reported evidence of a significant positive amount of expenses shifted to UBTI by those associations. She found that approximately 20 - 21% of expenses reported as deductible expenses against the UBTI is a result of shifting or reclassifying common expenses as directly connected to the UBTI. Hofmann (2007) sent a mail survey to nonprofit organizations that reported UBTI to obtain data items from their Form 990-T. Therefore, the sample in Hofmann (2007) includes 399 observations from 126 organizations over the years 1994-1997.

This paper examines the cost shifting practice in colleges and universities and predicts that colleges and universities with unrelated business income will be motivated to allocate abnormal amount of expenses and assign them as directly connected to the taxable unrelated income in an effort to minimize or eliminate their tax liability.

RESEARCH DESIGN AND METHODOLOGY

Building on the methodology used by both Yetman (2001) and Yoder et al (2011), this paper will conduct empirical tests to examine the UBTI reporting and detect any evidence of expense shifting or allocation of excessive deductions against reported UBTI as directly related expenses. UBTI reporting in colleges and universities was analyzed and evidence of any systematic shifting or allocation of expenses to match the UBTI as reported in Form 990-T, especially for colleges and universities that reported taxable income close to zero or net taxable losses, was looked at in detail. Yetman (2001) has modeled expected investment expense as a function of gross investment income. This paper will employ a similar model to estimate expected expenses that are allocated to the reported UBTI as a function of different explanatory variables including gross UBTI, total income, total assets, and income from investments. The relation will be estimated with the following regression.

$$EXP_{it} = \alpha + \beta_1 UBTI + \beta_2 Income + \beta_3 Assets + \beta_4 Inv + \epsilon \quad (1)$$

Where:

- The dependent variable EXP_{it} is the total expenses allocated to the UBTI as directly connected to it,
- $UBTI$ is the gross UBTI as reported by the college in its filing with the IRS,
- $Income$ is the total revenue and donations reported by the college,
- $Assets$ is the natural logarithm of the total assets as reported by the college,
- Inv is the total investment income as reported by the college.

The regressions are estimated using all years in the balanced panel. Expected allocated expenses are the predicted value from the above regression. The unexpected amount of allocated expenses is estimated as the actual amount reported less the expected amount. Positive unexpected allocated expenses indicate additional general and

administrative expenditures have been allocated to match the reported UBTI, while negative unexpected allocated expenses indicate less general and administrative expenditures have been allocated to match the reported UBTI. The paper also employs the model in equation (2) to test the relation between expense shifting, as represented by the amount of unexpected allocated expenses, and the probability that the sample NFP organization is being tax motivated using the following model:

$$UEXP_{it} = \alpha + \sum_{j=1}^n \beta_j X_j + \epsilon \quad (2)$$

Where;

- $UEXP$ is the unexpected expenses allocated to the UBTI as directly connected (the error term in equation (1) above).
- J denotes to the array of explanatory variables that represent the characteristics of the NFPs that are more likely to manage their reported UBTI and minimize their tax liability by allocating more common expenses as directly connected to the unrelated business income. These variables may include items like the college's size, total revenue, unrelated income, and investment income.

STUDY SAMPLE AND RESULTS

As reported by Patton and Bishop (2009), programs that generate unrelated business income in college and universities (i.e., sports programs) always draw scrutiny by tax regulators and enforcement agencies. In 2007, the US Senate asked the CBO to analyze the athletic programs in college and universities in the context of the UBTI. As seen in the IRS 2013 final report, the IRS is always looking at colleges and universities UBTI. Therefore, this paper is using a sample of four-year colleges and universities with data available for years 2013, 2014, and 2015 as compiled manually by the GuideStar organization. The limited number of prior empirical studies in this area (i.e., Omer Yetman 2007) always relied on hand-collected data from Form 990-T which is not publicly available. After a subscription to the GuideStar database was obtained, a request was made to compile data items for all four year colleges and universities for fiscal years 2013, 2014, and 2015. The final sample includes 3,521 observations of colleges and universities (and other organizations or associations affiliated with them such as alumni associations) over the three years period.

Table (1) provides a general description of the study sample. Out of the sample's observations of 3,521 colleges and universities (and their affiliates) in the 2013-2015 period, 1,144 of them (32.5%) have filed Form 990-T to report UBTI. Out of the 1,144 colleges and universities reporting UBTI, 349 of them (31%) have allocated expenses (as directly connected to the unrelated business income) just equal to the gross income resulting in a taxable income and liability of zero. Out of the observations reporting UBTI, 552 of them (48%) have assigned expenses as directly connected even more than the gross unrelated business income resulting in a net operating loss for tax purposes. Only 243 of the colleges and universities reporting UBTI (21%) have allocated less directly connected expenses than the gross income leaving some taxable income and resulting in a tax liability.

Table (2) shows descriptive statistics of the main variables examined and tests of mean differences for these variables between the colleges and universities that reported UBTI and those that did not. With highly significant results across all tests, table (2) shows that colleges and universities with reported UBTI are significantly bigger than those without reported UBTI with higher total assets, total liabilities, and total revenue. Colleges and universities with reported UBTI have significantly higher investment income, which is one of the main candidates for unrelated business income. More importantly, Table (2) shows that colleges and universities that reported UBTI have significantly higher mean for accounting fees which is consistent with the general expectation that NFPs reporting UBTI tend to engage accounting firms and paid tax preparers with expertise in filing the UBTI and consultation experience to help minimizing taxes paid on unrelated business income.

Table (3) presents the correlation coefficients among the main variables of the study with all coefficients statistically significant at less than 1% level. The main highlight from table (3) is that colleges and universities that reported higher unrelated business income have higher expenses assigned to that income (the coefficient between UBR-T and EXP variables is .712) which resulted in significantly lower (zero or even negative) unrelated business taxable income (the coefficient between EXP and UBR-N variables is -.432). Another major highlight from table (3) is that both the assigned expenses variable (EXP) and the dummy variable indicating the reporting of net unrelated business taxable income of zero or negative (N-Z) are positively correlated with the accounting fees variable ACC (correlation coefficients of .483 and .207 respectively). The overall univariate results from table (3) confirm the expectations that colleges and universities with reported unrelated business income have generally allocated enough amounts of

expenses as directly connected to such reported income to offset it leading to either a zero or negative net taxable income (and no tax liability) in most of the cases.

The study also conducted a multivariate regression analysis to examine the cost shifting practices by colleges and universities that reported unrelated business income as indicated in equations (1) and (2) above. The results of estimating equation (1) to assess abnormal amount of expenses assigned to unrelated business income are reported in table (4), and the residuals of that regression are used as proxy variable for abnormal assigned expenses. The estimation in table (4) regression uses the explanatory variables total assets, total revenue, gross unrelated business income, and investment income to estimate the expenses assigned against the gross unrelated business income. The regression in table (4) shows an R-squared of .73 and F value of 742 which is significant at less than 1% indicating that the model is a reasonable estimate of the assigned expenses. Table (4) shows that the coefficients of all the explanatory variables are significantly positive at less than 1% level affirming the expectations that big colleges and universities shift increasing amounts of expenses to offset their reported unrelated business income.

The model in equation (2) is examining the cost shifting expectation that colleges and universities with reported unrelated business income have mostly assigned enough expenses to offset this income, resulting in the reporting of net taxable income of zero or a net operating loss. The model in table (5) examines the association between the abnormal assigned expenses as estimated by the model in equation (1) and the dummy variable of reporting net taxable income of zero or net operating loss (N-Z) among other explanatory variables. The coefficient of the variable N-Z is .198 and significant at less than 1% indicating that colleges and universities that shifted more abnormal expenses as directly connected to the reported unrelated business income were able to offset that income and eliminate their tax liability. Table (5) shows also that the quality of the engaged accounting firm (as indicated by accounting fees) is a significant factor in the cost shifting practice employed by the firm's nonprofit clients. The coefficient of the accounting fees variable is .125 and is significant at less than 1% level. Results in table (5) may also indicate that the agency problem may not be a significant factor in the cost shifting practice in colleges and universities contrary to the results of Bois et al (2004), or it might even be a mitigating factor. Coefficients of the variable of total compensation (which is often used as a proxy for the agency problem in nonprofit organizations as suggested by Bois et al, 2004 model) is negative and significant. The agency problem as suggested by Bois et al (2004) model may not be applicable to colleges and universities where director compensations are based on predetermined contractual agreements, and not directly connected to the overall financial revenues or outcomes of the organization.

SUMMARY AND CONCLUSION

There has been a notable increase in both the number of nonprofit tax exempt organizations and their engagement in unrelated business activities that generate increasing amounts of taxable income that should be reported in Form 990-T. Reporting the UBTI and compliance with its rules has been a growing concern for Congress and the IRS, and prior examinations showed a lack of compliance in reporting and calculating the taxable income and tax liability. If they report their unrelated business income, nonprofit organizations are motivated to shift enough expenses from the tax exempt income related to their mission into the unrelated taxable activities to offset their income.

This paper used a specially compiled data for colleges and universities during the years 2013-2015 to examine the cost shifting practice in this nonprofit segment. Results of the paper show significant evidence of cost shifting in colleges and universities, leading the majority of colleges and universities with unrelated business income to report zero taxable income or net operating loss with no tax liability. Results also show that cost shifting practice and minimizing tax liability is associated with engaging a paid accounting firm and the accounting fees amount paid. The paper results give some indication that the agency problem in colleges and universities may be different from other nonprofit organizations and may not be an explanatory variable with regard to UBTI reporting and cost shifting in colleges and universities.

Further research can focus on colleges and universities with active and nationally recognized athletic programs which is currently generating increasing amounts of income that naturally meets the UBTI criteria. Samples of this further research can include colleges and universities qualifying to the "Sweet 16" or the "Final 4" of the major college athletic programs over the last few years.

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Table (1) Study Sample Description

| | |
|--|-------|
| Sample Observations | 3,521 |
| Observations Reporting UBTI in Form 990-T | 1,144 |
| Observations Reporting UBTI = 0 (Expenses Assigned = Gross UBI | 349 |
| Observations Reporting UBTI < 0 (Expenses Assigned > Gross UBI | 552 |
| Observations Reporting UBTI > 0 (Expenses Assigned < Gross UBI | 243 |

Table (2): Descriptive Analysis of Colleges with or without UBTI

| Variable | UBTI | Mean | T-value | Standard Error |
|-------------------------|------|---------------|-----------|----------------|
| Investment Income | 1 | 10,951,537 | 5.885*** | 1,579,545 |
| | 0 | 3,444,688 | | |
| Total Revenue | 1 | 352,303,628 | 11.851*** | 24,195,388 |
| | 0 | 110,904,383 | | |
| Total Wages | 1 | 124,056,808 | 8.937*** | 9,174,417 |
| | 0 | 48,146,643 | | |
| Total Employee Benefits | 1 | 18,410,662 | 8.369*** | 1,360,241 |
| | 0 | 7,417,697 | | |
| Management Fees | 1 | 1,183,933 | 2.697*** | 178,406 |
| | 0 | 702,139 | | |
| Legal Fees | 1 | 873,085 | 6.805*** | 80,216 |
| | 0 | 353,181 | | |
| Accounting Fees | 1 | 261,008 | 11.032*** | 13,968 |
| | 0 | 113,892 | | |
| Lobbying Fees | 1 | 78,526 | 5.874*** | 5,567 |
| | 0 | 33,913 | | |
| Investment Fees | 1 | 2,590,622 | 4.999*** | 391,193 |
| | 0 | 781,320 | | |
| Total Assets | 1 | 1,200,098,898 | 8.080*** | 137,172,919 |
| | 0 | 316,314,232 | | |
| Total Liabilities | 1 | 362,881,337 | 6.416*** | 50,210,054 |
| | 0 | 110,624,906 | | |

*** Significant mean differences at less than 1% level.

Table (3) Correlation Coefficients

| | UBR-T | UBR-N | N-Z | EXP | INV | REV-T | ACC |
|----------|---------|----------|---------|---------|---------|---------|---------|
| UBR-T | | | | | | | |
| UBR-N | .325*** | | | | | | |
| N-Z | .144*** | -.133*** | | | | | |
| EXP | .712*** | -.432*** | .235*** | | | | |
| INV | .061*** | -.449*** | .115*** | .392*** | | | |
| REV-T | .353*** | -.339*** | .206*** | .588*** | .593*** | | |
| ACC | .323*** | -.235*** | .207*** | .483*** | .401*** | .666*** | |
| ASSETS-T | .269*** | -.407*** | .153*** | .558*** | .756*** | .781*** | .528*** |

*** Significant mean differences at less than 1% level.

UBR-T: is the gross unrelated business income

UBR-N: is the net taxable unrelated business income

N-Z: is a dummy variable that takes 1 for observations with zero or negative taxable income, and 0 otherwise

EXP: is the total expenses assigned to unrelated business income

INV: is the total investment income

REV-T: is the total revenue

ACC: is the total accounting fees

Assets-T: is the total assets

Table (4): Assigned Expenses Estimation

| Variable | Standardized Coefficient | T-value |
|------------------|--------------------------|-----------|
| UBR-T | .536 | 30.347*** |
| INV | .116 | 4.937*** |
| REV-T | .273 | 10.494*** |
| ASSETS-T | .176 | 5.824*** |
| F value = 742*** | | |
| R-squared = .73 | | |

Dependent variable is the assigned expenses to the unrelated business income

*** Significant mean differences at less than 1% level.

Variables as defined in Table (3)

Table (5): Examining for Cost Shifting Evidence

| Variable | Standardized Coefficient | T-value |
|---------------------|--------------------------|-----------|
| N-Z | .198 | 4.307*** |
| Grants | .248 | 7.315*** |
| Wages | -.345 | -5.500*** |
| ACC | .125 | 2.690*** |
| LOB | -.063 | -1.838* |
| F value = 15.988*** | | |
| R-squared = .14 | | |

Dependent Variable is the abnormal expenses assigned to UBR in calculating the UBTI (the standardized residual from Equation 1)

*** Significant mean differences at less than 1% level.

* Significant mean differences at less than 10% level

Grants: is the total government grants

Wages: is the total compensations

LOB: is the total lobbying fees

Other variables as defined in Table (3)

DEVELOPING TEAM DECISION MAKING SKILLS IN THE BUSINESS CAPSTONE COURSE

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ABSTRACT

A common attribute of undergraduate business programs is the inclusion of a capstone course that is taken by all business students in their senior year after successful completion of other business core courses and most of their required major courses. The business capstone course typically focuses on strategic management and introduces students to strategic planning methodologies designed to facilitate the development of environmental scanning, strategy formulation, and strategy implementation skills required of successful business professionals.

While the specific pedagogical approach may vary and include the utilization of case studies, consulting projects, and/or simulation games, it is common to have students work in teams as they complete course assignments and projects. This is beneficial given the prevalence of group decision making in many organizational activities, including those related to strategic planning. Through participation in these skill development activities, students are afforded the opportunity to contribute the knowledge and skills that they gained from previous courses and real-world internship and employment experiences as they learn from each other while completing the various assignments and projects. The capstone course must therefore focus on strategic thinking and the development of conceptual skills, but also companion skills in decision making and teamwork. This article reports on our experience over the past few years in the development of team decision making skills in *Business Policy*, our business capstone course.

While over the years the course has been enhanced to include skill development activities in group decision making, our decision six years ago to offer this course during an intensive two- or three-week Winter Intersession was cause to proactively consider how we could “ramp up” the decision making skills and outcomes of student consulting teams in order for them to complete the three required consulting assignments effectively and efficiently.

We have found that requiring students to attend a pre-course briefing six weeks before the first class meeting enables them to properly prepare and become productive members of their consulting teams which are established during the first course meeting. During the pre-course briefing students are provided a realistic preview of the course, including: course introduction, overview, and expectations; consulting project scope of work and deliverables; assignment of consulting project organization; research strategies and resources; and pre-course readings and assignments.

Prior to the first class meeting, each student is expected to conduct the necessary individual research and prepare a SWOT Analysis on the assigned organization, including the identification of organizational strengths and weaknesses in light of environmental opportunities and threats. Immediately after forming the consulting teams, we utilize an “ice breaker” decision making exercise. In facilitating this decision making exercise, we begin by dividing each team into subgroups of two members each. After each individual reviews the information that he or she has been provided and determines the individual decision that they would recommend, each subgroup engages in the necessary discussion to reach consensus. Then the subgroups within each consulting team meet together and engage in the necessary discussion to reach consensus as a whole team (which consists of anywhere from 4 to 8 students). Finally, teams report on their recommendations during a facilitated discussion that focuses on both the recommendations and the team decision making processes.

We have sought student feedback on this process through worksheets completed at three points during the semester, with the first administered immediately after the decision making exercise, the second following completion of the first consulting assignment, and the third at the end of the course, after completion of the final consulting assignment. We asked students about the challenges faced in making subgroup and team decisions as well as the processes which were followed in making these decisions. Students were also asked to comment on how participation in the decision making exercise was useful in preparing the team to function effectively, efficiently, and cohesively.

Students have found this process both engaging and rewarding. While we recognize that the particular decision-making exercise may vary widely across programs or schools, students reported that the resultant team knowledge of large-group, small-group, and individual behaviors was invaluable for their future decision making contexts. Our recent experience shows that cooperation activities which require critical questioning of partner and team decisions (such as those described in Audebrand, Camus, & Michaud, 2017), rather than purely competitive management games

for the classroom (as in the analysis of Brady & Devitt, 2016), help students learn more about each other's and their own communication and decision patterns. Without prompting from their professors, the students themselves recognized their personal growth, their team's growth (and or lack of it, at times), and development of their personal voice in strategy formulation and strategic thinking contexts.

Christensen and Bertram Gallant (2016) explain that faculty must "employ active learning pedagogies, so that students are not only exposed to ethical philosophies and frameworks, but additionally have the opportunity to debate, apply, and internalize context-specific lessons, in order to develop essential skills and attitudes" (p. 1055). Researchers in the current project concur, and believe that students can indeed recognize their own growth in decision making. In addition, our experiences show that students are able to objectively evaluate their own process and that of their group members when prompted with specific scenarios and outcomes which focus their attention on acquisition of these skills.

Guided team building activities experienced before graded assignments are due can help students identify their common (or lazy) patterns of thinking, and can help students to see alternatives they had not yet considered. Gatlin, Hallock, and Cooley (2017) studied confirmation bias among business students, and concluded that finding positive ways to challenge "Yes Men" attitudes or "Devil's Advocate" communication styles was challenging. Our students mentioned all of these topics and more in their feedback, which displayed the kinds of reflective attitudes we all hope to instill in business majors before sending them out into the work world.

Specifically, our decision making activity had no "right answer," which set students up to work on creating and defending their own decisions, backed by facts and informed reasoning in their conversations with each other. We were pleased that disclosing this information had upset only a few students out of hundreds, who were using a "game the system" approach for scoring well on school assignments. Naturally, once the class discovered that there were many right answers -- and that they had to focus on their group's patterns, preferences, and biases -- the "game" element of the class activity faded quickly into the background. We believe that this would likely occur with any type of activity for which there is no one path and/or no one right answer at which to arrive.

When isolating the group dynamics first, before the high-stakes content was added to their task, we were able to facilitate earlier and deeper group relationships and understandings. Mladenovic and Martinov-Bennie (2016) pursued a project which confirmed that class activities which elicited a variety of viewpoints helped to develop students' understanding of ethical concepts. Specifically, heterogeneous groups, or groups which purposefully considered heterogeneous arguments to test their validity helped the researchers confirm "the importance of supporting group members to constructively challenge each others' perspectives" (p. 26). We found this to be true as well, bringing students together to check their assumptions and reflect on their process in advance of a graded assignment.

The activity facilitator was able to point out ethical failures and confirmation biases of past groups, such as not recognizing diversity, or being influenced too much by what the faculty members said or did during the game instructions. Hughes (2018) also explained that leader behavior was the most important influencer of follower behavior, especially in the workplace, and clearly in this scenario, some students seemed to want to follow the leader's word choices or nonverbal clues too closely, or for the wrong reasons. By pointing these pitfalls out to students, the activity helped them to reflect on common mistakes in individual, duo, or team decision making and possible corrections for them or preventions of them.

When the leader discussed process experiences with the whole group, troublesome issues were acknowledged readily and openly by the students (many of whom saw them coming), with students laughing at their own mistakes and offering discussions of similar points. In one case, when the activity facilitator had to re-route a group that did not follow the directions, the whole class had a chance to participate in a reconsideration of what they would do if their group went down an inefficient or ineffective path as well. This result confirms the work of Teach & Szot (2019) concerning the positive effects of debriefing by the activity leader.

Lastly, students definitely experienced what Mihaly Csikszentmihályi (1990) would call "flow," which is associated with higher retention of concepts and learning outcomes in nearly all contexts. Games and activities in the business classroom can make quite an impression on students, regardless of their degree of clarity on the goal (Buil, Catalán, and Martínez, 2018). When our students can remember, years later, not only details of the activity but also the reason

why it was employed as part of the course objectives, this becomes a best practice learning activity which is exciting and anticipated each semester by both faculty and students.

Our experience has affirmed that with proper planning and implementation, the use of decision making exercises or “serious games” can be instrumental in preparing individual students and their teams to become cohesive, high-performing teams. In addition, these processes contribute as well to the development of teamwork and group decision making skills that will serve students well throughout their progressive business careers. In embedding a decision making exercise in our condensed intersession course in order to help student dynamics “ramp up” faster, we have found an enjoyable and effective process which provided the necessary results. Subsequently, we recognized the merit of this approach and incorporated a team decision making introductory activity into the offerings of traditional-length semesters of the capstone course as well.

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DEPENDENCE OF A FIRM'S PERFORMANCE ON ITS ECOSYSTEM'S UPSTREAM/DOWNSTREAM CHALLENGES

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ABSTRACT

This paper studies holistically the supply-chain ecosystem of a focal firm, when the firm innovatively deciphers a market invitation. It employs the thinking logic and methodology of systems science to establish a series of generally true conclusions regarding the challenges facing either the suppliers or the complementors. In particular, this paper shows among results that (1) challenges upstream components face help build performance advantage for the focal firm over its competitors; however, if the firm's challenges are mostly on its upstream suppliers, then the performance advantage's lifespan will be greatly shortened. (2) An innovative firm has to consider the availability and development of appropriate complements in its introduction of innovative products. (3) In contracting with upstream suppliers, a focal firm has to deal with technological uncertainty and suppliers' behavioral uncertainty with the former affects the firm's ability to create value and the latter impacts its ability to capture value. And (4) a firm's performance advantage, as a consequence of applying vertical integration within the firm's ecosystem, increases over time within the life cycle of the technology developed to meet the firm's innovative need. At the conclusion of this paper, practical managerial recommendations and open questions for future research are given.

INTRODUCTION

When a firm comprehends a market signal innovatively, it has located a potential way to develop a significant competitive advantage over its competitors. However, to materialize such a potential, other than internal reasons the firm has to analyze how other players in its supply-chain ecosystem (Adner et al., 2013) could affect its fortune. In this regard, two natural questions arise: When a firm innovatively deciphers a market invitation, how will the consequent design of the firm's new product(s) post challenges to other players within its ecosystem? And how can the firm systemically manage its vertical interdependence within its ecosystem?

This paper seeks to address these two theoretically and practically important questions by randomly selecting a firm as the focal firm and by using the thinking logic and methodology of systems science. When a firm provides its outputs for the focal firm to integrate into a complete product for its customers, the firm is known as a supplier. When a firm facilitates necessary conditions for customers to utilize fully the focal firm's product, the firm is known as a complementor. With these terms defined, this paper establishes the following main conclusions amongst others.

- The performance advantage of a focal firm over its competitors is positively correlated to the level of challenges the firm's suppliers face, and negatively to that of the firm's complementors;
- To successfully ride waves of transient competitive advantages, a firm has to introduce such innovative products that suppliers can possibly provide necessary components and complementors can readily facilitate needed complements; and
- When contracting with upstream suppliers, a firm has to deal with technological and behavioral uncertainty, where the former affects the firm's creation of value, and the latter impacts the firm's capture of value.

The remainder of this paper is organized as follows. The following section provides a literature review while showing how this work contributes to established knowledge. After listing the necessary background information to make this paper self-contained, we focus on challenges facing the upstream suppliers of the ecosystem and those confronting the downstream players. Based on what is established in the previous sections, this paper then investigates the benefits of vertical integration within the ecosystem. The last section concludes the presentation of this work.

LITERATURE REVIEW

Owing to the employment of systems thinking and methodology, this paper contributes simultaneously to a range of different literatures, including business ecosystems, competitive advantage, customer adoption of innovation, firm uncertainties (contractual, behavioral and technological), as well as technology life cycle. In this section, we review relevant works in each of these discrete literatures.

In the literature of ecosystems, addressing how system players collaborate and compete with each other Adner et al. (2013) publish a collection of papers. Refuting the common belief that knowledge ecosystems in technology hotspots lead to business ecosystems, where each player enjoys competitive advantages, Clarysse et al. (2014) find a case where a knowledge ecosystem is only concentrated around a few central players. Zahra and Nambisan (2012) claim that success of such an ecosystem, consisting of well-established companies and new ventures, requires collaboration and competition that demands strategic thinking to leverage a firm's resources and capabilities. Kapoor and Agarwal (2017) study how firms in a business ecosystem orchestrate the ecosystem's functioning by providing platforms and setting the rules for participation by complementor firms. By using a business model lens in an energy business ecosystem, Hellström et al. (2015) point to the importance of locating factors that drive the business models of collaborating firms in facilitating system transitions and change in the logic of an industry. Attour and Lazaric (2018) find that transformation of knowledge ecosystem(s) can lead to the emergence of a technological platform required especially for firm start-up. Adner (2017) examines the relationship between ecosystems and a host of other constructs, such as business models, platforms, coopetition, multisided markets, networks, technology systems, supply chains, and value networks.

Regarding the literature of performance and competitive advantages, Yadav et al. (2017) look at the association between a firm's environmental efforts and the sustainability of its competitive advantage. They empirically support the proposition that benefiting the environment can lead to economic value. Prajogo and Oke (2016) show that human capital is positively correlated to the creation of value or service innovation advantage (SIA), which in turn results in rent generation, and that the effect of SIA on business performance is influenced by environmental factors. Chang et al. (2016) confirm the early claim that each dimension of supply chain integration indeed improves financial performance.

As for the literature of market adaptation of innovation, Oliveira et al. (2016) find that compatibility, perceived technology security, performance expectations, innovativeness, and social influence have significant effects on consumer adoption. Bilgicer et al. (2015) show that social contagion does play a major role with long-term versus short-term customers being less inclined to consider alternate sales channels. Brem and Viardot (2015) consider the market adoption of innovations by providing conceptual insights and manners that appear to stimulate and facilitate the adoption of every kind of innovation. Laukkanen (2016) maintains that all innovations meet consumer resistance and overcoming this unfriendliness needs to occur prior to product adoption, and that value is the strongest barrier, while image slows adoption; and that both gender and age significantly predict adoption and rejection decisions.

As for the literature of various uncertainties, Hendrikse et al. (2015) provide empirical evidence that somewhat supports the following hypotheses: 1) general trust of the franchisor reduces the franchisor's perception of relational risk and hence the necessity to control the network relationship by more complete contract planning, and 2) knowledge-based trust increases information sharing between the partners and hence the knowledge base for specifying more detailed contracts. To better understand how contractual and relational governance interact, Cao and Lumineau (2015) conduct a qualitative review and meta-analysis of the existing literature. Some findings uncovered by these researchers include the following: 1) Contractual governance is positively related to trust and relational norms, 2) There are two sides to relational governance, 3) Contracts, trust, and relational norms jointly improve satisfaction and relationship performance while jointly reducing opportunism, and 4) Contractual and relational governance can complement or substitute for each other in certain situations. Hallberg (2015) argues that uncertain governance choices are subject to specific decision-biases and potentially corrective functions of current organization as well as asymmetries in actors' access to decision-supporting systems. Specifically, Hallberg maintains that with overestimated unbiased rationality and asymmetric access to decision-supporting systems, transaction cost economics runs the risk of underestimating the degree of vertical integration in actual firms. By looking through the lens of the relational view, Bstieler and Hemmert (2015) disentangle the effects of relational and contractual governance on collaborations outcomes by using survey data from South Korea. They find that the strength of prior business ties enhances relational governance and contributes to knowledge acquisition and collaboration satisfaction. And even

though the impact of contractual governance is weaker than relational governance, when both governance mechanisms are applied simultaneously, the positive returns on collaboration satisfaction diminish.

Mondragon and Mondragon (2018) investigate the role of systems integrators at managing complex products with modular architectures under technological uncertainty in the automotive supply chain. They show that systems integrators in low technological uncertainty have to be able to redesign their architectures due to the implementation of unknown technologies in key individual components, and for complex product and architectures under high technological uncertainty, the most important source of innovation still lies in the specialization of individual activities. Addressing inconsistent empirical findings regarding the relationship between supply chain integration (SCI) and performance, Huang et al. (2014) develop a SCI model that includes buyer-supplier-supplier relationships, and propose a contingency framework for reexamining the SCI-supplier performance relationship under demand and technological uncertainties. These scholars find that although SCI seems to have a significant positive effect on the suppliers' performance, this positive relationship can be weakened by demand uncertainty and strengthened by technological uncertainty. Considering the challenge facing the commercialization of an emerging technology that employs an immature production process, Roca et al. (2017) unpack how the characteristics of a technology may influence the options for regulatory intervention. These scholars propose a generalizable framework for regulating emerging process-based technologies in safety-critical industries. By employing the industrial economics and knowledge-based perspective, Burton and Galvin (2018) hypothesize how the combined effects of product architecture type, product complexity and the rate of product component change may influence task, knowledge and firm boundaries. They suggest that whether mirroring or misting is an efficient strategic choice is influenced by the characteristics of both the product architecture and the rate of technological change at the product component level, as well as changes across time as products evolve.

By drawing on effectuation theory, Jiang and Tornikoski (2018) theorize how founder teams' perceptions of uncertainty and behavioral logics develop during new venture creation processes, suggesting a possible evolution from a causal conditional relationship between perceived uncertainty and behavioral logics to an integrative relationship. Through integrating transaction cost economics and justice theory, Trada and Goyal (2017) examine the impact of perceived unfairness on distributor opportunism and uncover the dual effects of perceived unfairness on opportunism: directly enhancing opportunism and aggravating (positively moderating) the effects of economic forces on opportunism. By theoretically clarifying from a transaction cost economics point of view under what circumstances multinational companies (MNCs) should outsource their innovation functions, Yeo and Saboori-Deilami (2017) show that heterogeneity between the home and host country affects the autonomy of the innovation at the host country. This autonomy in turn leads to higher transaction cost, which turns out to be the main determinant of the decision on whether or not to outsource the innovation function. Bruneel et al. (2017) empirically show that technology complexity within new technology-based firms negatively influences the level of inter-organizational trust in key partner relationships, while both relationship and partner characteristics moderate the technology complexity-trust relationship.

Regarding technology life cycle, addressing the fact that previous studies have not considered the dynamic and idiosyncratic aspects of a technology's progression, Lee et al. (2017) propose a stochastic technology life cycle analysis to trace the phases of a technology's progression based on patent citations, thus leading to the identification of the patterns of technology life cycles at the individual patent level. Due to the significance of discussions on the patterns of technological innovation in terms of the efficient distribution of national R&D resources and the establishment of corporate managerial strategies, Byun et al. (2018) calculate and analyze technology cycle time (TCT) by technological area based on patent data. Contrast to the common belief that firms should match their organizational form to the prevailing nature of technology, Helfat et al. (2016) provide a new explanation for why vertically integrated and specialized firms may continue to coexist as industries evolve and why these firms may rationally choose to stay integrated and bear the sunk costs of developing integrative capabilities as well as the ongoing costs of maintaining them, even when they lose money during some time periods due to competition from lower cost specialized firms.

This paper contributes to the literature in various ways. First, it introduces systems science into the investigation of the asymmetrical distribution of challenges across the ecosystem of a firm. Second, it establishes generally true propositions, leading to reliable applications, without suffering from the constraints and limitations of anecdotal and data analysis (or data mining). That is, the results developed herein hold true universally within the system of a few basic assumptions and logical reasoning.

PREPARATION

To make this paper self-contained, this section introduces the fundamentals of systems science and methodology and the basic assumptions and terminology necessary for the rest of the presentation.

Basics of Systemic Thinking

By system, it simply means an organization or structure. Because economic issues and business decision making involve mostly properties and behaviors of the systems of concern, other than numbers and variables the methodology developed for studying systems presents a more adequate tool for developing insights and conclusions. And these insights and conclusions can potentially lead to tangible, reliable conclusions in real life.

Historically, scholars from different disciplines have directly or indirectly studied the concept of systems. For example, in economics Rostow (1960) wrote that: The classical theory of production is formulated under essentially static assumptions ... to merge classical production theory with Keynesian income analysis ... introduced the dynamic variables: population, technology, entrepreneurship, etc. But ... do so in forms so rigid and general that their models cannot grip the essential phenomena of growth ... We require a dynamic theory ... which isolates not only the distribution of income between consumption, savings, and investment (and the balance of production between consumers and capital goods) but which focuses directly and in some detail on the composition of investment and on developments within particular sectors of the economy. In biology von Bertalanffy (1924) points out that because the fundamental character of living things is their organization, the customary investigation of individual parts and processes cannot provide a complete explanation of the phenomenon of life. And many others, such as Klir (1985), Lin (2009), Porter (1985), etc., demonstrate how powerful holistic thinking and relevant methodology could be used in developing results regarding organizations. Because firms, economies, markets, and other business entities represent different forms of organizations, they possess their individually different internal structures and interact externally with one another. Hence, all these business related objects can and should all be investigated by using the concept of systems.

Although numbers and systems are respectively conceptualized from nature, they are abstracted from two different points of view. The former comes into being when internal structures are ignored, while the latter emerges when aspects of organization need to be emphasized. It is because for any organization, its components have to be associated somehow to form the visible structural whole. In other words, the concepts of numbers and systems are different in two major ways: 1) numbers are a small-scale local concept, while systems are a large-scale organizational concept (Lin, 1988; 1999); and 2) numbers appear only post existence, while systems arise simultaneously with physical or intellectual existence (Lin, 2009).

These two major differences between numbers and systems explain respectively why (1) systems methodology is a more appropriate tool than the classical ones, either calculus-based or statistics-based, for investigating economic entities when their internal structures are the focus, and (2) scholars and practitioners cannot successfully make advanced predictions for imminent occurrences of economic disasters (Lin & OuYang, 2010).

By systems science, it simply stands for all studies of systems of various kinds. Similar to how the Cartesian coordinate system – consisting of the crossing of several number lines – plays its important role in traditional science (Kline, 1972), the systemic yoyo model (Lin, 2007), Figure 1, is available in systems science.

Specifically, each system can be theoretically seen as a multi-dimensional entity that spins about its axis (Lin, 2009). If this spinning entity is fathomed in the 3-dimensional space within which we live, the structure, as shown in Figure 1(a), appears. The input side pulls in *things*, such as human resources, materials, information, investment, profit, etc. After funneling the inputs through the “neck”, *things*, such as products and services, are spit out from the output side. Some outputs never return to the input side while some will (Figure 1(b)). Because of its general shape, such a structure is referred to as a yoyo.

What this systemic model says is that each physical or intellectual entity in the universe, be it an object (either tangible or intangible), a living being, an organization, a market, an economy, etc., can all be treated as a realization of a certain multi-dimensional spinning yoyo with an eddy and meridian field around. This yoyo spins as depicted in Figure 1(a).

When it stops its spin, it is no longer an identifiable system. Due to the interaction of the eddy field, which spins perpendicularly to the axis of spin, and the meridian field, which rotates parallel to axis, *things* that are either new to the yoyo body or returning travel along a spiral trajectory, Figure 1(c).

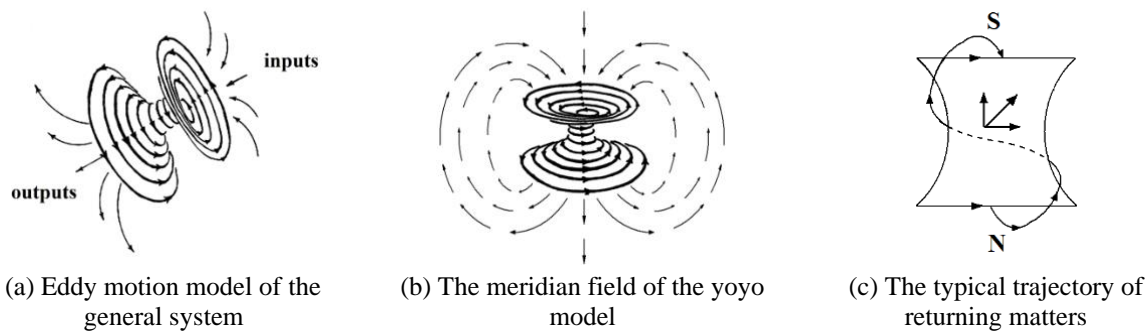


Figure 1. The systemic yoyo model in the 3D coordinate system

Basic Assumptions and Terminology

To make the logical reasoning of the rest of this paper valid, assume that each firm in our discussion exists for filling a specific market niche by creating a positive cash flow. The cash flow can be a result of profits from either the marketplace, or investments from various investors, or both.

By a *value system*, it means (Porter, 1985) associated activities, usually performed by various firms, that jointly transform raw materials into products or services for end users, known as *consumers*. And intermediate B2B purchasers are known as *customers*. When a firm delivers its products and/or services to both customers and consumers simultaneously, these users will just be referred to as customers.

Assume that value creation is the principal objective of any firm so that the outputs are more valuable than the sum of the inputs. There are two components in each value creation: creating value for either customers or shareholders. The former helps sell products and services; the latter, in rising stock prices, insures the availability of future investment capital for funding the operations or helping with the positive cash flow of the enterprise. The expected benefits consumers will receive from their purchases, represented by their willingness-to-pay (WTP), determines the *value creation* of any value system. Because perfect price discrimination is generally absent, consumers most likely maintain a consumer surplus due to the reason that consumers' spending with payments into the value system is mostly less than the aggregate WTP.

After the creation of value, the trying firm needs to capture the value in order to achieve its financial goal of first surviving and then thriving in the economic world. For an individual firm, many factors determine its value capture, such as the firm's ownership of resources and power status within the value system, as well as the firm's cost structure and negotiating skill in relation to other firms in the value system (Bowman & Ambrosini, 2001; Priem, 2007).

In terms of market competition, the following theorem indicates when new competition appears.

Theorem (Forrest et al., 2017). In the oligopoly market described below, if the number of the consumers who make purchase decisions based on which firm's price is most competitive is greater than the size of the loyal customer base of any incumbent firm, then at least one new firm will enter the market profitably. The said market consists of m incumbent firms, $m = 1, 2, \dots$, which provide consumers with mutually substitutable products such that

- Each of the incumbents has developed its share of loyal consumers who purchase the products from their respective firms only if the price is not more than their reservation price;
- The incumbents compete over switching customers by adjusting their prices; and
- The managements of the incumbent firms are well aware of the pricing strategies of other firms and respond by playing the Nash equilibrium through pure self-analyses.

For an arbitrarily chosen focal firm, it forms jointly with other firms within its input-output environment such an ecosystem that the inputs of one firm are the outputs of some other firms, Figure 2. So, the firms in this ecosystem can be classified as either upstream components or downstream complements of the focal firm (Adner & Kapoor, 2010). Here, suppliers represent some of the upstream components of the focal firm; customers, supporters and assistants, called complementors, who help make the product of the focal firm usable by consumers are the downstream complements. Although they are outside the focal firm's direct supply chain, the complementors need to invest and develop new infrastructure to make the focal firm's product usable by the ultimate consumer. From this explanation we see that the set of components of the focal firm also includes upstream complementors that help to make the outputs of the suppliers usable by the focal firm.

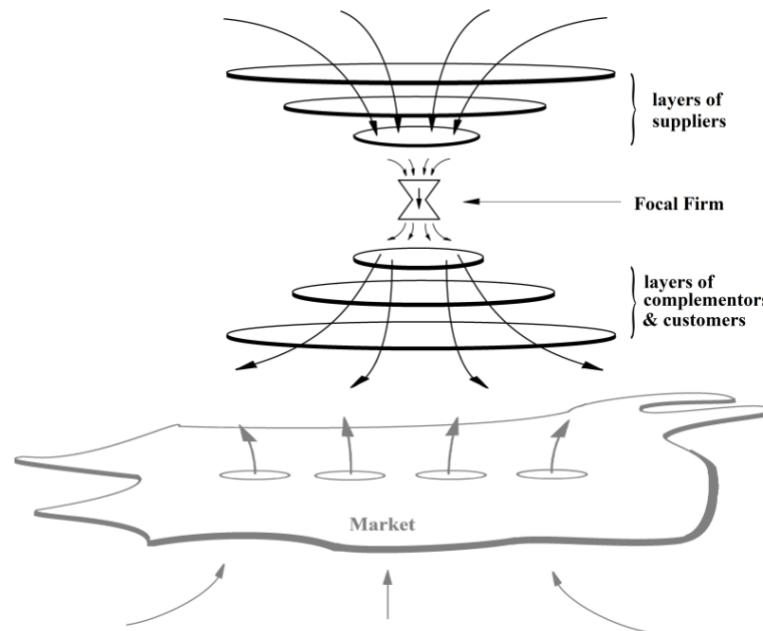


Figure 2. The yoyo structure of the focal firm's ecosystem

4. Challenges Located in the Upstream of the Ecosystem

In this section, we look at the effects on the focal firm of challenges that appear in the upstream of the ecosystem if the firm aspires to be a market leader. Generally, innovative ideas of the focal firm are often objectified into actual products through necessary changes in components, while the focal firm needs to originally integrate these new components into its desired offer (Brusoni, et al., 2001; Iansiti, 1998). Here, the origin of the innovative ideas really comes from an epoch-making understanding of the market cue, as what the earlier theorem describes.

Proposition 1. The greater challenges the upstream components face, the greater performance advantage the focal firm has over its competitors.

By considering a linear branch of the supply chain in the focal firm's ecosystem, it can be readily seen that when an innovation of the focal firm requires corresponding innovations in the upstream components and/or complements, the development challenges of the firm increases. In such a case, the firm has to overcome additional obstacles in specifying, sourcing, and integrating new components into its newly designed products. These obstacles generally challenge the firm to revamp its existing production as well as organizational routines or to totally replace these routines by new ones. Hence, challenges of the components increase the scale and scope of the firm's learning and doing, and consequently the performance advantage the firm gains over its rivals from progressing along its learning curve.

Additionally, the increased coordination with upstream suppliers (Dyer & Singh, 1998) and more frequent travels through the cycles of learning, design, and production that accompany challenging components (Clark & Fujimoto, 1991) benefit the focal firm through greater experiences with new knowledge, different ways of creating innovative

designs, and forever improving procedures of operation and production, Such benefits enjoyed by the focal firm help to reduce the ease for later rivals to imitate this progress (Lippman & Rumelt, 1982; Rivkin, 2000) and consequently the offers. For example, such difficulty in imitating innovations, which emerged from extensive collaborations between Toyota and its suppliers, has been well documented by Dyer and Hatch (2006).

Proposition 2. If a challenge the focal firm brings on its ecosystem as a consequence of its particular capability of learning and practical follow-ups is mostly on the upstream suppliers, then the lifespan of the exclusive performance advantage of the firm will be greatly shortened.

This conclusion follows from the fact that the actual learning experience of the focal firm will be mainly located at the step of specifying what necessary components it needs to relatively readily assemble into its designed product(s). In other words, the key developments within the focal firm's effort to produce its new offer to the market are undertaken by the upstream suppliers. So, once the required developments are done, the components will also be available for the firm's rivals. These rivals can then free ride on the learning, discovery, and investments of the focal firm to offer their similar products. That will definitely shorten the focal firm's period of exclusivity in the market or the firm's performance advantage. This analysis also explains why Proposition 2 does not contradict the conclusion in Proposition 1.

Systemically, the input-output mechanism of the challenge the focal firm brings on its ecosystem can be depicted in Figure 3(a), where the amount of inputs and that of outputs need to be at equilibrium in order for the yoyo structure of the firm to stay healthy and viable for the long run. So, when the challenge places most of its burden on the mechanism of inputs while that of outputs stays unaffected, the viability of the yoyo structure of the challenge on the ecosystem cannot last two long, because the input-output mechanism will be so congested that it has to stop working (Figure 3(b)).

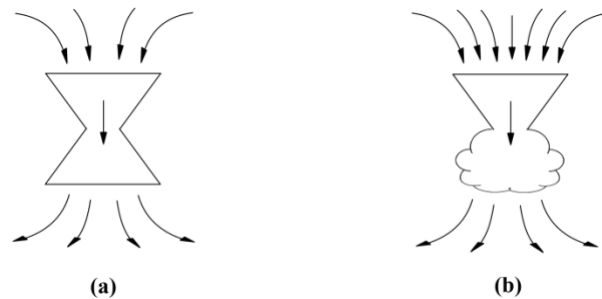


Figure 3. The input-output mechanism: (a) in balance; (b) unbalanced

As a corollary of Proposition 2, we have the following result conveniently.

Proposition 3. The more innovative the focal firm is in its effort to assemble components internally, the longer its performance advantage in the marketplace will last.

Empirically, this conclusion is supported by Brusoni and Prencipe (2001) and Hoetker (2006) when they demonstrate the increasing need in the present world of technological advances for the focal firm to possess its greater organizational and learning capabilities in its role as system integrators when specialist component suppliers appear. At the same time, such capabilities generally take good amount of time and great effort to acquire (McGrath, 2013).

CHALLENGES LOCATED IN THE DOWNSTREAM OF THE ECOSYSTEM

Compared to upstream suppliers, whose outputs enable the focal firm to practically produce its innovative offer and present it to the market, the actual value of the offer for customers is only created through the availability of appropriate complements. For example, the ability for flying cars (Lemoussu, et al., 2018) to create value for users is realistically hampered until the appropriate road conditions and air traffic controls, as key complements, are constructed and installed in order for such cars to move and fly around freely. As a matter of fact, many innovative products rely on the availability of appropriate complements to expose their full value to users. So, in this section, we look at how what is learned by the focal firm and what it innovatively designs post challenges on the downstream complementors, Figure

4. This figure actually also provides an explanation for why different firms receive the market invitation differently. In particular, the market calls – the upward moving arrows of the market – for additional competition and new innovation is partially shielded off by the downward moving field of the ecosystem of the firm, while different firms have their individually different systemic yoyo fields in terms of their spinning directions, strengths, etc.

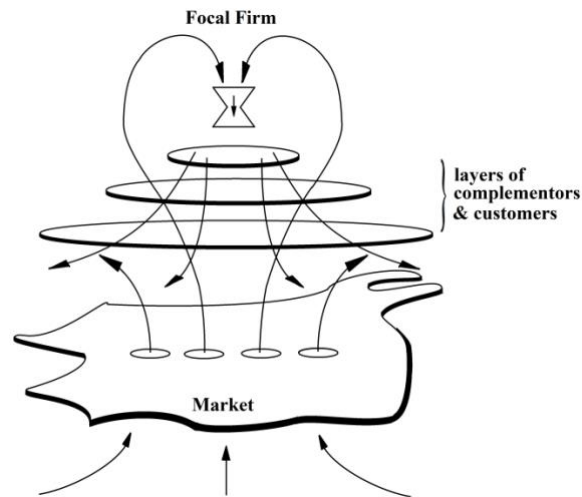


Figure 4. Interaction between focal firm's innovation and challenges of complementors

Proposition 4. In general, the opportunities and challenges faced by customers in adopting an innovative offer of the focal firm can be influenced by the state of development of complements. In other words, any innovative offer of the focal firm rarely constitutes a 'complete innovation'.

In fact, it suffices to list particular cases to support the conclusion in this proposition. To this end, the evolution of modern technology has many times experienced imbalances in the development pace of complementary innovations, which created 'reverse salients' (Hughes, 1983). In the personal computer industry, for example, the value of various products developed by suppliers had been constrained by complements (Ethiraj, 2007). Similarly, over one hundred years ago, the railroad and printing industries delayed their adoption of electricity due to challenges that were unconquerable at the time in complements (Goldfarb, 2005). Please note that Proposition 4 was initially suggested by Rosenberg (1972, p. 21).

Intuitively, this conclusion can be readily seen from Figure 4. In particular, for the focal firm to deliver its offer to the market, appropriate layers of complementors and customers have to be in place first in order for the firm's outputs to reach the field of the market.

Proposition 5. The greater challenges complementors face, the less performance advantage the focal firm will enjoy from its innovative offer.

That is because when complementors confront with great challenges, delays will appear inevitably in the availability of appropriate complements needed for customers to fully enjoy the value of the innovative offer of the focal firm. Such delays consequently reduce the timely value creation of the offer, because the lack of appropriate complements slows down the adoption rate of the offer. Other than giving rivals additional time to catch up with the innovative design and production of the offer before the market takes off, the delays also prevent the focal firm from greatly expanding its production, perfecting its initial offering, and recuperating its earlier heavy investment on the design and production of the offer. Without the advantage of a sufficient period of market exclusivity, the focal firm will not be able to muster enough manpower and financial resources to embark on its next innovative frontiers. In other words, beyond the issue of imitation, later entrants will not suffer from much of the disadvantage of being late to the market. By lowering the adoption rate of the innovative offer of the focal firm and by stripping away the necessary resources for the firm to look beyond the current offer, no matter how innovative the focal offer is, greater challenges complementors face in reality not only reduce the performance advantage the focal firm from its offer, but also wear away the firm's capability to successfully ride waves of transient competitive advantages.

Hence, this analysis also implies the following result.

Proposition 6. For the focal firm to successfully ride waves of transient competitive advantages, other than thinking about how to introduce innovative designs of products, which generally challenges upstream suppliers, it also needs to consider whether or not appropriate complements can be readily developed by downstream complementors.

SYSTEMIC MANAGEMENT OF VERTICAL INTERDEPENDENCE

From the discussions in the previous two sections, it can be seen quite clearly that the focal firm is closely associated with the upstream suppliers and the downstream complementors and customers. So, it is natural for us to look at how such vertical interdependence that threads through the ecosystem of the firm can possibly be managed. The yoyo structure of the focal firm's ecosystem and its relation with the market are depicted in Figure 2, where the sustainability of the focal firm really depends on the outputs of the upstream suppliers and the accommodation of downstream customers and complementors.

So far in this paper we have looked at how an initial receipt of a market invitation for innovation by the focal firm starts a chain of associated challenges, some of which confront upstream suppliers while others confront downstream complementors. In particular, from the recognized market invitation, the focal firm first designs and then attempts to produce its innovative offer. However, to present a particular offer to answer the market invitation and a value-creating solution to customers, the firm has to combine its innovative design and effort of new production with specifically needed supplies. This will most likely pose challenges to upstream suppliers, and unambiguously necessary complements, which generally presents challenges to downstream complementors, to facilitate the indispensable conditions for customers to enjoy the full potential of the focal offer. Our established propositions indicate that the distribution of the associated challenges across the ecosystem is an essential driver behind the outcomes of all firms involved. In this section, we will investigate how vertical integration can actually play the role of a governance strategy to manage such interdependence among all the parties of the ecosystem.

Proposition 7. When contracting with upstream suppliers, the focal firm has to deal with the following two kinds of uncertainties that affect the performance advantage of the focal firm:

- Technological uncertainty, and
- Suppliers' behavioral uncertainty,

where the first uncertainty affects the focal firm's ability to create value, while the second uncertainty impacts the firm's ability to capture value.

In fact, when the focal firm contracts with upstream suppliers for special purpose components that involve high levels of development challenges, the suppliers do not really know whether or not they can discover appropriate solutions to their development challenges, and if successful with such discoveries, then when they will be able to actually deliver the contracted products (Clark, 1985). This scenario represents the technological uncertainty the focal firm has to face. Evidently, resolution of the technological uncertainty decides the focal firm's value creation: if the suppliers cannot provide the needed components, then the focal firm will not be able to bring its imagined product to the market to satisfy the demand of customers. In this case, Proposition 1 implies that the greater technological uncertainty the focal firm faces, the greater performance advantage it can enjoy over its competitors.

At the same time, the performance advantage of the focal firm, as a consequent of successful resolutions of technological uncertainties confronting upstream suppliers (Proposition 1), may realistically entice these suppliers to behave opportunistically due to suddenly increased demands from the competitors of the focal firm. That is, the focal firm has to deal with suppliers' behavioral uncertainty regarding whether or not and when (some of) the suppliers will behave opportunistically (Jap & Anderson, 2003; Sutcliffe & Zaheer, 1998). If (some of) the suppliers renegotiate the contract terms opportunistically with the focal firm because of the increasing demand for their products, then the focal firm will not be able to appropriate its originally expected rents. As implied by Proposition 2, suppliers' opportunistic behavior will then greatly shorten the lifespan of the exclusive performance advantage of the focal firm.

Systemically speaking, technological uncertainty appears with the situation of whether or not the desired inputs of the focal firm (Figure 2) can be adequately fed by the large arrowed input curves that trespass through the layers of the

upstream suppliers; and it might take a long time and a lot of effort to construct some of these needed curves. And suppliers' behavioral uncertainty exists because in the location of the focal firm in Figure 2, most of the firm's rivals can fit too.

Proposition 8. For each technology, the associated technological uncertainty always decreases over time within the technology's life cycle.

Generally, when a technology is in the germinating stage of its life cycle, the uncertainty about whether or not an appropriate technological solution to recognized development challenges can ever be developed is certainly high (Proposition 7). If the preliminary version of the technology (early stage) is supported by persistent market demand, then the development of the technology will take place. The accompanying knowledge accumulation helps to provide necessary guidance on the direction of future development, eliminating a lot of the uncertainties about *what* and *how*. That is, the forthcoming progress becomes more and more predictable than before (McGrath 2013), which means lowering technological uncertainty. This end explains why the level of technological uncertainty decreases over time although throughout the life cycle of the technology innovation challenges are always present. For relevant empirical studies, see (Dosi, 1982; Sahal, 1981). In other words, technological uncertainty decreases with time.

This conclusion can be intuitively seen readily by using the systemic yoyo model, Figure 5. In particular, at the germinating stage of a technology, it is an innovative idea that combines some different existing technologies (say, the yoyo pools *M*, *N*, and *P* in Figure 5) together in an attempt to provide a solution to some market challenge. Due to their different spinning directions of these pools, it is initially difficult for the small pool (the start of a new technology) in the center to form, because sparks of thoughts fly in all directions, as shown in the enclosed area in Figure 5. As the appropriate spinning directions of *M* and *N* eventually get the little pool in the middle started, both *M* and *N* will continuously feed the fledgling technology with what they have while all irrelevant influences from *P* will be ignored. So, from such a moment on, the growth of the new technology will become more stable and predictable. That is, the relevant technological uncertainty starts to decrease with time.

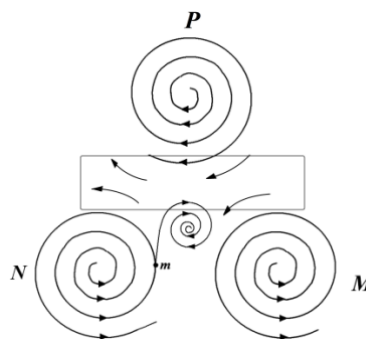


Figure 5. The development of a new technology

Proposition 9. Over the life cycle of a technology developed for a need of the focal firm, the suppliers' behavioral uncertainty potentially increases except when the demand for the technology does not rise by much and the technology does not need frequent improvement over time.

In general, the assumption that each firm in the business world exists for the purpose of satisfying a particular market niche through generating a positive cash flow as a result of profits from the marketplace, or investments from various investors, or both, necessarily implies that the suppliers' behavioral uncertainty over the life cycle of a technology is a function of how much the technology is in demand and how frequently it needs to be upgraded. Hence, there are four possible scenarios for us to consider:

- (1) The demand for the technology does not rise much and the technology does not need frequent improvement,
- (2) The demand for the technology rises drastically while the technology does not need to be improved frequently,
- (3) The technology needs to be improved frequently while the demand for the technology does not rise much, and
- (4) The demand for the technology rises drastically and the technology needs to be improved frequently.

For case (1), the increased experience and repeated interactions between business partners and associates generally allow firms to specify better contracts and extend relational contracts. In such cases, behavioral uncertainty decreases over time within the life cycle of the technology, as empirically evidenced by Mayer and Argyres (2004) and Argyres et al (2007).

For case (2), the assumptions insinuate that the particular technology is mature and that the focal firm has enjoyed good performance advantage, as a consequence of the introduction and development of the technology. That advantage in turn encourages the competitors of the focal firm to also acquire the technology. Consequently, the drastically rising demand entices (at least some of) the suppliers to renegotiate the contract terms opportunistically. In this case, the suppliers' behavioral uncertainty increases over the technology's life cycle.

For case (3), the focal firm needs the suppliers to improve their technologies frequently in order to continuously better its offer to the market. The fact that the demand for the technology does not increase much means that most of the competitors of the focal firm are not yet motivated to share the market with the focal firm. In this case, both the focal firm and its suppliers grow together in concert with increasing levels of co-specialization, creation of transaction-specific assets, etc. That generally makes any supplier switching extremely costly for the focal firm. So, for case (3), the suppliers' behavioral uncertainty could potentially increase over the technology life cycle because the frequent technology improvements place the focal firm in a relatively more vulnerable position than any of the suppliers.

For case (4), the drastically increasing demand for the technology entices (at least some of) the suppliers to behave opportunistically, while the need for continuous improvement makes the suppliers target very specific customers, such as the focal firm. So, as a consequence, at least some of the suppliers will behave opportunistically with their older versions of the technology, while the most recently improved version will be closely tied to the changing need of the focal firm. Hence, the close tie makes it extremely costly for the focal firm to switch suppliers. That increases the incentive for suppliers to behave opportunistically. That is, for case (4), the suppliers' behavioral uncertainty increases over the technology life cycle. This scenario is well illustrated by the experience between General Motors (GM) and Fisher Body. When the demand for closed metal bodies increased rapidly, GM suffered from significant contractual hazards, which led GM to eventually acquire Fisher Body (Klein, 2000).

A systemic intuitive is that when the demand for the technology rises drastically (cases 2 and 4), more of the competitors of the focal firm want to squeeze into the location of the focal firm in Figure 2. That provides an increasing amount of incentive for the suppliers to behave opportunistically. When the demand for the technology does not rise by much and the technology does not need frequent improvement (case 1), the systemic structure of the ecosystem in Figure 2 stays relatively stable, which means that suppliers' behavioral uncertainty decreases over time within the life cycle of the technology. And when the technology needs to be improved frequently while the demand for the technology does not rise much (case 3), it means that the meridian field of the ecosystem in Figure 2 needs to be renewed frequently. That frequent renewal provides the constantly challenged suppliers with knowledge accumulations and different versions of the technology to conveniently serve other customers. So, they are in a stronger position to renegotiate with the focal firm opportunistically.

By vertical integration, we mean that the focal firm controls more than one stage of its supply chain. For example, a typical supply chain contains four stages: raw materials, manufacturing, distribution, and retail. When the focal firm controls two or more of these stages, we say that the firm integrates vertically. In terms of the systemic yoyo model (Figure 2), when the focal firm integrates vertically, it means that the operation of the firm actually expands into several layers of the suppliers and complementors.

Proposition 10. The performance advantage of the focal firm, as a consequence of applying vertical integration within the firm's ecosystem, increases over time within the life cycle of the technology developed to meet the innovative need of the focal firm.

In fact, although it has no bearing on the technological uncertainty, vertical integration helps mitigate adverse effects of suppliers' behavioral uncertainty and provides an opportunity for the focal firm to develop a better understanding about how components and product architectures interact (Kapoor & Adner, 2012). Such firm-specific knowledge facilitates improvements of the technology. As the level of technological uncertainty decreases over time within the

technology's life cycle (Proposition 8), the performance advantage of the focal firm gained from vertical integration within its ecosystem will become greater at later stages of the technology's life cycle.

CONCLUSION

To grow and succeed in the present world of business, a firm has to be able to ride waves of transient competitive advantages, as anecdotally confirmed by McGrath (2013). Doing so means that a firm needs to understand market invitations regularly in an epoch-making fashion, while knowing accordingly how to handle uncertainties that appear within the interactions with upstream suppliers and downstream complementors. As pointed out by Adner and Kapoor (2010) and as shown in this work, challenges facing an innovative design, consequent production and eventual offer to the market are often situated inside both a focal firm and the firm's ecosystem. That makes this paper go beyond the literature of innovative firms' internal and environmental challenges by theoretically establishing a series of generally true conclusions.

By holistically investigating the input-output ecosystem of a focal firm that is able to successfully decipher a market invitation, this paper shows that each innovative idea of the focal firm, introduced to answer the market call, has to consider whether upstream suppliers and downstream complementors can handle their corresponding challenges or not. We demonstrate that challenges facing upstream suppliers help strengthen the focal firm's performance advantage over its competitors, while the state of development of complements insures customers' adoption of the focal offer. Specially, we establish the following main results among others:

- A focal firm's performance advantage over its competitors is positively correlated to the level of the firm's upstream component challenges, and negatively correlated to that of downstream complement challenges.
- To ride waves of transient competitive advantages successfully, a firm has to introduce innovative products, to which suppliers can certainly provide necessary solutions while complementors can readily develop appropriate complements.
- The strategy of vertical integration can help increase a firm's performance advantage over the life cycle of the technology developed for that firm's innovative need.

Beyond developing a series of practically useful conclusions, this work grows the traditional toolbox of research by demonstrating how systems science and methodology can be employed. By exploiting logic reasoning and holistic thinking, this paper is able to reveal some of the essential rules that govern the operation of a general input-output business ecosystem, producing more insightful knowledge than that in the literature (Anderson & Tushman, 1990; Cusumano et al., 1992; Utterback & Abernathy, 1975) on the performance of a focal firm and the distributions of challenges and uncertainties, and development of technologies within the ecosystem of the firm.

The general results developed in this paper provide practical managerial guidelines on how to manage challenges that are originated from attempts of answering market calls in epoch-making fashions. In particular, we have the following recommendations:

- When pursuing first mover advantage, a firm has to carefully evaluate whether or not its suppliers can adequately provide what is needed and its complementors can facilitate the necessary complements.
- The more upstream suppliers and the less downstream complementors are challenged by an innovative product, the greater value the product is expected to create for customers and capture for its firm.
- Investing in internal capability to assemble components into innovative products will help lengthen a firm's performance advantage in the marketplace.
- When investing jointly with suppliers in introducing a new technology, a firm needs to prepare for the increasing potential of suppliers' behavioral uncertainty. One effective method to mitigate this uncertainty is to employ the strategy of vertical integration.

Speaking differently, before a firm commercializes its innovative idea, it needs to and can well estimate the level of challenges facing its ecosystem.

To conclude this presentation, let us look at the limitations of this paper. First, the most important limitation is that all our conclusions are derived on the assumption that each firm exists for the purpose of generating positive cash flows.

This assumption is of course not universally true in the business world. Second, we need to consider the innovation challenges facing a focal firm in its core activities, especially when they are somewhat correlated with challenges external to the firm. Third, in the relationship among the players within the ecosystem of a focal firm, the history and nature of specific exchanges also need to be considered in order to reveal their possible effects on the relationship (Argyres & Liebeskind, 2002). Fourth, this study did not consider interactions of different ecosystems, which is in fact the norm of business and may very well affect the distribution of challenges within each of the interacting ecosystems. Fifth, this study assumes explicitly that all other variables, such as strategies employed and their interactions, the specific nature of innovative change, demand uncertainty, modes of cross-firm coordination, etc., are held constant. So, each of these other variables needs to be jointly considered either individually or collectively. These limitations of course point out to some of the future research directions that will be necessary to make the series of conclusions established in this paper more theoretically complete and practical useful.

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SIMULTANEOUS CONSUMER UTILITIES, MULTI-SIDED MARKETS AND CONSUMER SYNERGIES

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ABSTRACT

By employing a systemic approach, which is completely dissimilar to those used in the literature, this work scrutinizes issues related to the following problems: (1) What are the most fundamental decisions a retailer can make in terms of its offers to consumers? (2) When can simultaneous consumer utilities be produced by collocating products and/or services? (3) When can a positively correlated multi-sided market be formed? And (4) without particular talent and luck how can a synergistic innovation be introduced? Due to the specific approach taken, we are able to describe how simultaneous consumer utilities, two-sided markets and consumers' willingness to pay additional react with one another and how the previous problems can be addressed by establishing a series of 6 propositions. To explore the possibility of systemically generating new ideas instead of waiting for the seemingly sudden and random appearance of disruptive technologies, a mechanical procedure is developed for the potential of producing synergistic innovations on either the producer or the demand side. Because of the certainty systems science offers, the general conclusions developed in this paper are expected to provide practically useful recommendations for entrepreneurs, managers and retailers to create and to capture values for consumers and their companies.

INTRODUCTION

To effectively ride waves of transient competitive advantages (e.g., McGrath, 2013), a firm has to see inwardly what values it can create for consumers (e.g., Barney, 1991; Eisenhardt & Martin, 2000), and/or outwardly where consumer synergies are located so that potential products can be developed (Drucker, 1954). Either looking inwardly or outwardly, the essence is for the firm to find potentials of different competitive advantages (Porter, 1985; Santalo & Becerra, 2008; Ye et al., 2012). More specifically, the firm needs to address the following natural questions: (1) What are the most fundamental decisions a retailer can make in terms of its offers to consumers? (2) How can collocating products and/or services lead to simultaneous consumer utilities? (3) When can the firm develop a positively correlated multi-sided market? And, (4) without particular talent and luck how can the firm introduce a synergistic innovation?

To address these questions, this paper develops a cohesive theory of a series of formal propositions on how to produce consumer synergies by developing simultaneous consumer utilities and two-sided markets and related issues. This theoretical development relies 100% on logic reasoning, systems thinking and the systemic yoyo model without involving any data or anecdotes in order to derive general conclusions and widely employable recommendations. It is because our approach is not limited by any available data or anecdotes and is not constrained by the strict conditions of econometric tools.

The rest of this paper is organized as follows. The following section reviews the relevant literature and demonstrates the contributions of this work. After that we provide the basics of systems science and methodology in order to make this presentation self-contained and the necessary assumptions and terminology in order to make the following logic reasoning rigorous. We then address the concepts of simultaneous consumer utilities and consumer synergies, consider the relationship between two-sided markets and consumer synergies, and investigate the relationship between ownership and sustainability behind the idea of collocating commonly available products and/or services. Before concluding the presentation of this paper, we develop a mechanical procedure that leads to synergistic innovations.

LITERATURE REVIEW

This paper contributes simultaneously to the literatures of entrepreneurship, innovation and strategy. So, this section reviews the relevant literatures individually and demonstrates where our contributions lie in each case.

For the literature of entrepreneurship, Penrose (1959) notes that companies grow when they attend to the needs of consumers; Kor et al. (2007), Priem and Butler (2001a) and McMullen (2015) maintain that subjective entrepreneurial judgment is important to firm success and that resources gain economic value through customers' usage of them. And

a resource can be utilized in multiple different ways that can both differentially increase the magnitude and scale of internal activities of a firm and create additional values for consumers externally (e.g., Augier & Teece, 2008; Kor et al., 2007). While Sirmon et al. (2008) and others investigate how internal resources can be bundled to produce efficiency inside a firm, Ye et al. (2012) consider how consumers' preferences can be bundled outside a firm so that simultaneous consumer utilities and two-sided market effects will result. Their work indicates that the entrepreneurial alertness to external opportunities, the so-called pure entrepreneurial judgment (Kirzner, 1973; 2018), can come before making any investment and can exist without any intimate knowledge of available resources.

This paper emphasizes on the creation of consumer synergies through collocation of commonly available products and/or services, one aspect of pure entrepreneurial judgment. By doing so, it contributes to the entrepreneurship literature by establishing the following main results, among others, that can be generally applied in real life scenarios: (1) A retailer's location and the depth and breadth of offers represent the most important, most fundamental, as well as mutually constraining tactical decisions of the retailing firm. (2) If two offers of a firm facilitate beneficial interactions of two consumer segments, then that firm establishes a positively correlated two-sided or multi-sided market. And (3) when a firm conducts its business within a saturated market, its demand-side advantage established through collocating commonly available goods can be sustainable, if the marginal profit from the advantage is not more than the entry cost of a new competitor.

For the literature of innovation, since when Smith (1776) acknowledges the essential significance of innovation over two hundred years ago, many scholars have investigated the topic of innovation of the producer side (Aas et al., 2015; Adner & Levinthal, 2001; Damanpour, 1991; Visnjic et al., 2016). Innovation enables firms to competitively enter an existing market or create new markets (Becheikh et al., 2006; Smith & Tushman, 2005), as a major factor of long-term performance (Kanter, 2001). Veugelers and Cassiman (1999) find that high levels of perceived risks and costs and low appropriation determine the innovation sourcing strategy while not discouraging innovation from taking place. In particular, these authors find that small firms tend to restrict their innovation efforts to exclusive makes or simply buy strategies and large firms tend to acquire knowledge both internally and externally when implementing their innovation strategies. The fast development of internet-based technologies forces firms to become forever more competitive and innovative than before (Caputo et al., 2016; Buffington, 2016; Zollo et al., 2016).

Contributing to this innovation literature, this paper develops the following general result: Under the influence of a particular factor, such as location, circumstance, etc., if one of a firm's collocated offers that are necessary to consumers meets a competitive market demand, while other offers provide convenience, then the firm provides simultaneous consumer utilities.

In terms of the literature of strategies focusing on looking outside into the environment, Barney (2001) and Priem and Butler (2001a, b) recognize that issues of consumer demand need to be addressed seriously, because consumers eventually determine the firms' successes (Drucker, 1954; Penrose, 1959). Along this line of thinking, studies consider various strategic issues, such as how market demand affects technological innovations and competitive advantages (e.g., Adner & Zemsky, 2006; Tripsas, 2008); how consumer-focused strategies can lead to value creation and capture (e.g., Adner & Snow, 2010; Gans et al., 2008; Priem, 2007); and how consumers influence entrepreneurial innovation (Sawhney et al., 2005; Shah & Tripsas, 2007). In particular, Ye et al. (2012) study how firms can employ bundled preferences of consumers to develop their strategies.

By attending to the demand side of the literature of strategies, this paper develops the following main result, among others, that are generally true: when a firm operates a two-sided market with its collocated assortment of goods, if there are few attractors compared to attractees, then that firm can charge the attractees higher prices than the market norm.

Other than the contributions listed above, this paper systemically incorporates the demand side simultaneously with strategic management, entrepreneurship, and innovation. Our established theory moves beyond empirically confirming and anecdotally prescribing to the fact that subjective entrepreneurial judgment or managerial ability are important variables for strategic success (e.g., Foss et al., 2007; Holcomb et al., 2009; McMullen, 2015; Ye et al., 2012). Instead, this paper develops specific while generally applicable recommendations and a mechanical procedure for managers and entrepreneurs to explore and to identify demand side potentials in their efforts of developing economies of scope. Additionally, by using logic reasoning, as a well-tested method in the successes of natural science,

and the systemic yoyo model, this paper develops a theoretical foundation employable to the identification of strategies that lead to simultaneous consumer utilities of the demand side (Sakharov & Foltá, 2014; Ye et al., 2012).

Another contribution this paper makes to the literature is how it employs systems science to study consumer synergies. Because of this reason, conclusions derived in this paper hold true in general without suffering from the weaknesses and limitations of data and anecdotal analyses, and recommendations widely applicable in real life. To this end, the mechanical procedure developed in this paper for discovering possible collocation ideas on the demand side and possible ways of diversification on the producer side represents a vivid support.

PREPARATION

This section prepares for the presentation of the rest of this paper by introducing relevant concepts of systems science, the basic assumptions and terminology in order to make this paper self-contained.

An Introduction to Systems Science

By a system, it means a whole where parts (or components) are spontaneously organized so that the whole possesses functionalities none of the parts has. For example, each individual is a system that is made up of many smaller biological systems. At the same time, the person is a part of many social and economic systems, say, families, neighborhoods, communities, etc. And the person interacts with systems of different kinds, such as an automobile, retail business stores, the company he/she works for, etc. Through such individuals, large-scale social and economic systems interact with one another. Hence, when studying social and economic phenomena involving organizations, other than using numbers, variables and anecdotes, which is mostly reflected in the literature of social sciences, we need to employ the concept of systems and relevant methods to investigate the evolution and interaction of organizations to establish insightful conclusions and produce practically useful recommendations that can lead to tangible conclusions in addressing real-life challenges.

Historically, the concept of systems has been called for by many different scholars. For example, in economics Rostow (1960) wrote that: The classical theory of production is formulated under essentially static assumptions ... to merge classical production theory with Keynesian income analysis ... introduced the dynamic variables: population, technology, entrepreneurship, etc. But ... do so in forms so rigid and general that their models cannot grip the essential phenomena of growth ... We require a dynamic theory ... which isolates not only the distribution of income between consumption, savings, and investment (and the balance of production between consumers and capital goods) but which focuses directly and in some detail on the composition of investment and on developments within particular sectors of the economy. And in biology von Bertalanffy (1924) points out that because the fundamental character of living things is their organization, the customary investigation of individual parts and processes cannot provide a complete explanation of the phenomenon of life.

Many others, such as Klir (1985), Lin (2009), Porter (1985), etc., also demonstrate the power of holistic thinking in the study of organizations and their behaviors. Speaking intuitively, business entities, economies, markets, etc., when seen as organizations, do have their individually specific internal structures, while interacting externally with each other.

Both the concepts of numbers and systems are respectively abstracted out of the natural world from two different points of view. For example, when an organization is seen as a set of non-interacting components, numbers come into play, say, n employees, $\$m$ of investment, etc. And when each organization is treated holistically with internal structure, the concept of systems emerges so that all the components jointly and collectively form an organic whole through various relationships. In the business world, when organizational relationships do not exist, no business firm is standing. In other words, all disciplines that are business related are essentially about both internal relationships and external interactions of organizations (or systems), be they small economic agents, firms (large or small), markets (local, national or international), industries, or economies.

In short, numbers and systems represent two very different concepts in two ways: 1) the former is good at describing small scale local phenomena, while the latter large-scale structural, organizational (Lin, 1988; 1999); and 2) numbers appear only post existence or occurrence, while systems surface simultaneously with the emergence of physical or intellectual being (Lin, 2009).

As for why these differences matters, item 1) explains why systems thinking and methodology are a more appropriate tool than the classical theories developed on numbers and variables in terms of studies of economic entities and processes when relevant internal structures cannot be ignored. Item 2) points out the fundamental reason why business scholars and practitioners still cannot, as of this writing, successfully predict imminent economic disasters (Forrest, 2018; Lin & OuYang, 2010).

With the concept of systems in place, the so-called systems science is simply the collection of all studies of various kinds of systems. In this science, the systemic yoyo model (Lin, 2007), Figure 1, plays the role of intuition behind systemic thinking and reasoning. This role is similar to that played by the Cartesian coordinate system – consisting of the crossing of two or more number lines – plays in the development of the traditional science and mathematics (Kline, 1972).

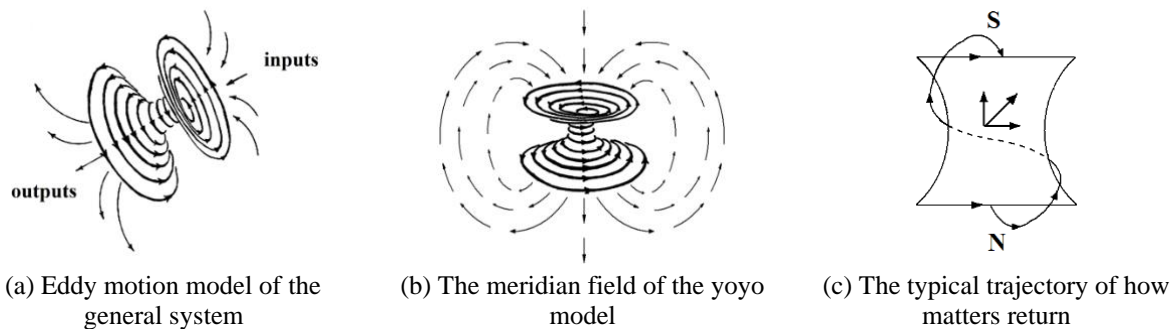


Figure 1. The systemic yoyo model in the 3D Cartesian Coordinate System

This yoyo model for each system is developed on the blown-up theory (Wu & Lin, 2002), a general theory of development, and discussions on whether or not the world can be seen from the viewpoint of systems (Lin, 1988; Lin, et al., 1990). Specifically, each system can be theoretically modeled as a multi-dimensional entity that spins about its axis. If such an entity is comprehended in the 3-dimensional space in which we live, the spinning body in in Figure 1(a) appears. *Things*, such as resources, raw materials, components, information, investment, profit, etc. are pulled into the input side. After passing through the axis of spin, processed *things*, such as products and services, are given off from the output side. Some of the outputs never return to the input side and some will, Figure 1(b). Due to its general shape, such a structure is referred to as a yoyo.

This systemic model says that each physical or intellectual entity in the universe, be it a tangible or intangible object, a living being, an organization, a market, an economy, etc., can all be seen as a multi-dimensional spinning yoyo surrounded by an eddy and meridian field. This entity stays in a spinning motion, Figure 1(a). When it stops its spinning, it will no longer be an identifiable system. The so-called eddy field is the one that spins perpendicularly to the axis of spin of the model, while the meridian field rotates parallel to the axis. The interaction between these fields is depicted in Figure 1(c), where *things*, be they new to the yoyo body or returning to the input side, travel along a spiral trajectory.

Relevant to this work, each market competition can be modeled as a collection of yoyo fields, each of which stands for a firm, struggling against each other for survival and for growth. Each market, be it large or small, can be seen as an ocean of yoyo fields that push against each other so that in the process similar fields are pulled together to form much larger and more powerful fields while dissimilar ones struggle to weaken or eliminate each other.

Basic Assumptions and Terminology

This subsection provides the definitions of all fundamental terms and basic assumptions used in the rest of this presentation.

First by a firm, we assume that it exists to satisfy a market niche through generating a positive cash flow and that the cash flow comes from business profits or investments or both. Speaking differently, each firm considered in this paper needs to actively pursue after certain endeavors to meet some market demand(s). And by consumers, it means the end users of products and/or services, while customers the intermediate users. When a product/service is used by both end and intermediate users, these users are collectively known as customers.

By resource, it means an asset of a firm, whether it is tangible or not (Harmancioglu et al., 2009), which the firm can use to design and implement its strategies (Barney & Arikan, 2001). Speaking differently, a resource is anything that can be physical, financial, intellectual, or organizational, the firm can employ to realize its business goals. Additionally, any resource provides alternative services that differentially escalate the efficiency of the firm or increase consumer value creation outside the firm.

By synergistic innovation, it represents such a strategy of a focal firm that systemically deploys and redeploys known elements, either within or outside that firm, to produce additionally economic benefits. Here, the so-called known elements can be resources, management routines, production processes, consumer preferences, market demands, etc. The word “systemically” stands for that a focal firm can develop a meaningful system or a set of systems based on the known elements to produce new products of improved functionalities and/or new services that meet a forever evolving market demand/consumer preference. Listed below are examples of synergistic innovations on either producer-side or consumer-side synergies.

- Combinations of known technological processes lead to positive synergy (Crossland & Smith, 2002).
- Benefits of transferred skills generally appear when knowledge is shared across business units of a focal firm (Hitt et al., 2001).
- When economies of scope are met with skill transfers, the level of a firm’s innovativeness can be lifted to a higher altitude (Tsai, 2001).
- Changing market preferences motivate technological development and innovation (Adner & Zemsky, 2006).
- The knowledge consumers learned from using one product can literally reduce or eliminate the learning effort required to use another product (Priem, 2007; Tanriverdi & Lee, 2008).
- Each disruptive technology helps reveal a new dimension or confirm an existing dimension of consumer preferences for various industries (Adner & Snow, 2010).

If it is possible to meet several market demands simultaneously, while saving valuable consumer resources, say, time and/or money, then the diversification effort of meeting different market demands is said to have created a simultaneous consumer utility effect. Assume that there are two such services that attract different segments of consumers, although they might be overlapping. If the joint offer of these services increases traffic flow in such a way that one segment of consumers served attracts an increasing traffic flow from the other segment, while the latter does not have any adverse effect on the former, then the diversification of services is said to have created a two-sided market effect.

SIMULTANEOUS CONSUMER UTILITIES AND CONSUMER SYNERGIES

In this section, we look at some fundamental properties of simultaneous consumer utilities, created by a focal firm through offering a collocated assortment of products and/or services to consumers.

Other than the concept of simultaneous consumer utilities, there is also that of sequential consumer utilities. The former, as described in the previous example of collocated laundry/indoor tanning services, means when the consumer saves time by performing two or more activities at the same time, while the latter describes when consumers benefit from making a series of purchases sequentially without spending much additional time from one store to another, say, in a shopping mall. This section will only focus on the concept of simultaneous consumer utility and relevant consumer synergies.

Because our focus in this section is on how a focal firm could potentially create simultaneous consumer utilities through offering a collocated assortment of products and/or services, let us first look at the strategic significance of the firm's depth and breadth of its assortment of products/services.

Proposition 1. For each retailer, both (1) location and (2) the depth and breadth of its assortment of products/services to be offered to consumers represent the two most important, most fundamental, as well as mutually constraining tactical decisions.

A retailer's location affects shopping time and other related costs (e.g., travel) that are generally borne by consumers when they shop for desired goods and/or services, while the depth and breadth of the assortment of products/services offered at a particular location provides the basis for consumers to evaluate the worth of their time and other related costs (Betancourt & Gautschi 1990). In other words, if a location is not good, convenience and savings on time and other shopping-related costs will dictate consumers to shop at nearby stores for their desired goods and services; and if the depth/breadth of the product/service assortment offered is not sufficient in the nearby locations, consumer will be happy to spend extra time and money to shop in a further off location to save time and increase their simultaneous utilities. That is, location and depth/breadth of the assortment of products/services offered are two mutually constraining factors that the value of one determines that of the other, where the values are best assessed by consumers (Moreau & Dahl 2005).

Consumers make their patronage choices among retailers by evaluating trade-offs of retailers' depth – such as that offered by specialty stores, breadth – such as that offered by general stores, and convenience – such as that offered by convenience store (Messinger & Narasimhan 1997). Therefore, consumers' demand for benefits and maximization of their overall utilities drives the demand for particular product combinations in a retailer's assortment, which in turn determines which location is considered convenient. That explains why both location and the depth/breadth of the assortment of products/services to be offered to consumers represent the two most important, most fundamental tactical decisions of retailers.

Systemically, a retailer's choice of the depth/breadth of its assortment of products/services offered to consumers stands for the material foundation for the yoyo field of the retailer to exist, while the location represents how conveniently the yoyo field can absorb necessary inputs (e.g., consumers). Only when these two elements coexist, the yoyo field of the retailer can possibly 'spin' and 'spin' viciously.

Evidently, it can be seen that collocating two randomly selected products and/or services might not naturally result in simultaneous consumer utility. For example, the attempt of Sears, Roebuck and Company to provide consumers a one-stop shop of hard goods, soft goods, insurance services, and financial services was unsuccessful (Sobel, 1999). So, a natural question is: Under what condition(s) will the collocation of two or more products and/or services result in simultaneous consumer utility, which in turn leads to consumer synergies? To this end, we have the following result.

Proposition 2. If all collocated products and/or services offered by a focal firm are necessary to consumers under the influence of a particular factor, such as location, circumstance, etc., and one of the products and/or services meets a competitive market demand while others provide convenience, then simultaneous consumer utilities will be produced by the collocated assortment of goods.

Because one of the collocated products and/or services is assumed to meet a competitive market demand, when a consumer decides to go with that particular focal firm to satisfy his/her need or demand, the customer's decision will be further strengthened and backed by all the other collocated products and/or services due to the convenience they provide. Hence, jointly this assortment of products and/or services results in simultaneous consumer utilities.

Next, let us use examples to illustrate how Proposition 2 can be employed practically, where in each case, we need to identify the products and/or services that are collocated, the group of consumers, that particular factor, a product or service that meets a competitive market demand, and what convenience other collocated products and/or services provide. First, let us look at successful collocations, where consumers receive simultaneous utilities and business firms capture values through pricing decisions designed to maximize profitability across product types collocated.

- For the previous case of collocated laundry/indoor tanning services, the tanning part serves as the service in Proposition 2 that meets a competitive market demand of mostly female college students, while the laundry service provides convenience – for both washing clothes and meeting opposite genders. The particular factor is the specific location – the vicinity of a large university campus of mostly unmarried undergraduate students.
- For the case of combined gasoline station and convenience store, the consumers are all drivers of automobiles and the particular factor is the fact that all cars need to be fueled regularly. Providing gasoline satisfies a competitive market demand, and the store provides convenience items which consumers can readily obtain when their vehicles are being filled with gasoline
- For the case of collocated coffee shop and bookstore, the group of consumers contains all coffee drinkers, the factor is the fact that a lot of people are addicted to coffee. In this case, the competitive market demand is coffee drinks, and the book store provides a convenience for consumers to avoid rough outdoor climates and a comfortable environment to enhance the enjoyment of drinking coffee, as well as staying update with current affairs,
- For the case of major car dealers, such as General Motors (GM), each of them collocates the service of selling cars with that of purchase financing. The group of consumers includes all potential drivers, and the particular factor is the reality that in America life can be quite difficult if a person does not have a car. The service of selling cars meets a competitive market demand, while the financing service provides convenience for car buyers and flexibility for the dealer to provide discounts on its automobiles.
- For the case of online retailers, such as amazon.com, the collocated assortment of products are those on sale through the internet, the group of consumers includes everybody who has internet access, and the particular factor is the fact that the majority of the population currently has connection to the internet. The competitive market demand is the retail of almost everything needed in life, and the convenience is that the internet connection eliminates all the travel costs and consumers can purchase a variety of needed items at the same time without stepping even one step out of his/her front door. (Note: amazon.com is only a case of one-stop shopping with nearly simultaneous consumer utility, because for cases of true simultaneous utilities the consumer saves time by performing two activities at the same time.)

Next, let us revisit the unsuccessful collocation attempt of Sears, Roebuck and Company, as mentioned earlier. In this case, the company collocated the retailing of hard and soft goods and the offer of insurance and financial services, while we cannot identify a clear core product(s) or service(s) that meet a competitive market demand with others providing convenience at the same time.

TWO-SIDED MARKETS AND CONSUMER SYNERGIES

In this section, we look at some fundamental properties of two-sided markets, created by a focal firm through offering a collocated assortment of products and/or services to consumers, where cross-market-segment externalities give rise to complementary increases in consumer utilities.

A market is two-sided provided that there are externalities across different participating segments of consumers (cf. Sun & Tse 2009). In other words, the participations on both sides of a two-sided market are either positively or negatively correlated to each other. For example, New York Stock Exchange (NYSE) is a positively (correlated) two-sided market, where the more stocks are listed, the more investors are drawn to the exchange; and the more investors frequent NYSE, the more companies list their stocks on the exchange. And, the interaction between consumers and advertisements might stand for a negatively (correlated) two-sided market depending on how consumers react to advertisements. On the other hand, not all markets are two-sided. For example, a typical product market is not two-sided, because increasing supply does not necessarily increase the demand, although increasing demand tends to result in rising supply.

Also, practical experiences indicate that collocating randomly selected products and/or services might not naturally result in a two-sided market effect. And many real-life cases support this conclusion. For example, pets.com tried to develop a two-sided market by linking pet owners and suppliers of pet products. However, its heavy investments did not create sufficient benefits for consumers to cover relevant costs. So, the expensive venture failed (Evans & Schmalensee, 2007). Hence, a natural question is: Under what condition(s) will the collocation of two or more products and/or services result in a two-sided market effect, which consequently leads to consumer synergies?

To potentially address this question, let us first look at the systemic structure of a two-sided market, Figure 2, where a focal firm establishes a ‘platform’ (the large, multi-layered spin field encompassing those of N and M) by offering two (or more) market segments of consumers, as indicated by N and M , its particularly collocated assortment of products and/or services. Through that platform, value is created by that firm through facilitating interactions between mutually interdependent market segments of customers, while that firm captures this value by collecting fees from at least some of the participating consumers. If the two sides of a two-sided market are positively correlated, then participants on either side of the market receive more value when membership increases on the other side (Rochet & Tirole, 2006). Based on this systemic intuition, we have the following result.

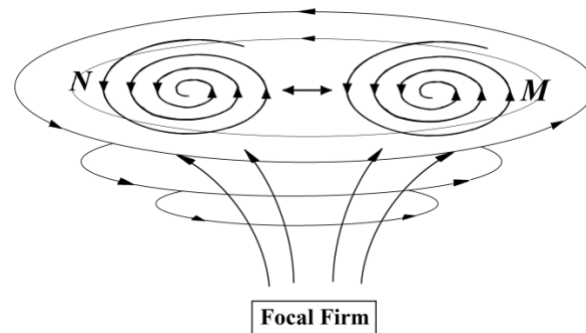


Figure 2. The systemic structure of a two-sided market

Proposition 3. If two of the products and/or services collocated by a focal firm facilitate either implicitly or explicitly beneficial interactions of two market segments of consumers while other collocated products and/or services make the interactions efficient or convenient, then that firm establishes a platform for a positively correlated two-sided or multi-sided market to form.

To see why this proposition holds true, let A and B be the two assumed products and/or services in the collocated assortment of goods that focal firm offers to consumers. Assume that the particular market segments of consumers between which A and B facilitate beneficial interactions are N and M . Then, as depicted in Figure 2, when all other collocated products and/or services help make these interactions efficient or convenient, a spin field (or platform) that encompasses the yoyo fields of N and M emerges. That means that the focal firm has successfully established a positively correlated two-sided market with N being one side and M the other. Note that in this systemic modeling, the fields of N and M must be converging fields that spin in the same direction; otherwise the platform field cannot be emerging as claimed above.

Next, let us use examples to illustrate how Proposition 3 can be employed practically, where in each case, we need to identify the products and/or services that are collocated, the two particular products and/or services and the corresponding market segments of consumers that will be stimulated to interact beneficially, and whether or not the rest of the collocated products and/or services are supportive.

- For the previous case of collocated laundry/indoor tanning services, evidently it is the laundry service and the indoor tanning that stimulate the following two market segments of consumers – female and male college students – to interact beneficially. In this case, the two particular services exert their functionalities only implicitly, where the focal firm only needs to attract as many female consumers to the indoor tanning service as possible and then the rest of the two-sided market will play out naturally with least amount of effort from the focal firm.
- For the case of online retailers, such as amazon.com, the collocated assortment of products and services are those on sale through the internet and an online platform. The online platform provides a means for sellers and buyers to interact beneficially so that the more sellers list the more buyers appear, and vice versa.
- Online dating services represent another case of two-sided markets, where a focal firm operates an online platform for the male and female sides of the dating market to join.
- Organizations, be they local, national or international, that work to develop community projects generally establish two-sided markets by offering such events as showcases, designed to join entrepreneurs and venture capitalists.

In the systemic structure of a two-sided market in Figure 2, the yoyo pools of N and M do not have to be similar sizes. Instead, in real life the general structure should look like the one depicted in Figure 3, where the pool of one side of the market is smaller than the other side due to the reason that customers on different sides may enjoy different marginal utilities from participating in the platform. In other words, the presence of an additional participant, say, on side M may have a much greater positive effect on the utility of the other side N . In such a case, participants, say, on side N with lower marginal utility for participation are called attractors, and those on the other side, say, M , with higher marginal utility are attractees (Ye et al., 2012). Such designation of participants of a two-sided market naturally leads to the following pricing strategy.

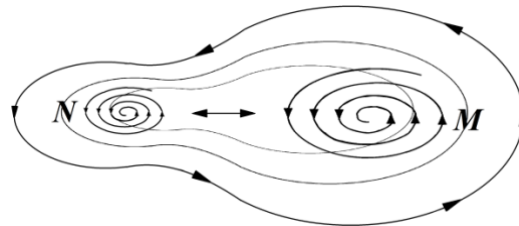


Figure 3. The general systemic structure of a two-sided market

Proposition 4. If a focal firm operates a two-sided market by offering a collocated assortment of products and/or services with the pool size of attractors a lot smaller than that of attractees, then that firm can offer a competitively discounted price offer to attractors and compensate at least some of the opportunity cost, caused by subsidizing attractors, by making attractees bear higher prices.

The marketing intuition behind this result is straightforward. When more attractors participate in a two-sided market with the said characteristics due to competitively discounted prices, a lot more attractees will be on board. That jointly generates increased demand for the platform. Therefore, more economic value for the focal firm that operates the two-sided market is captured. For related discussions, see Armstrong (2006), Rochet and Tirole (2003) and Jullien (2005).

OWNERSHIP AND SUSTAINABILITY

Discussions in the previous sections show that market-side strategic innovations, based on collocations of commonly available products and/or services that deliver simultaneous utilities and/or serves two-sided markets with mutual attraction of different market segments of consumers, can create value for consumers and capture value for the focal firm that offers a collocated assortment of goods. It is definitely the virtuosity of an entrepreneur who innovatively associates some seemingly unrelated assets into an assortment that produces for consumers novel synergistic benefits that accrue from consumer perceptions and needs. So, a natural question arises (Ye et al., 2012): Can the products and/or services in a collocated assortment, which provides consumer synergies through simultaneous utilities, two-sided markets, or both, be offered individually by different business firms?

Proposition 5. Assume that all firms exist for the purpose of satisfying a particular market niche through generating a positive cash flow from the marketplace, as assumed in Section 3. If a focal firm desires to provide simultaneous consumer utilities by operating a two-sided market through collocating commonly available products and services, then that firm needs to offer all the collocated assets by itself.

Without loss of generality, assume that only two products are collocated in this given situation. Then, the reason why this result holds true in general is the following: Let us reason by contradiction. Assume that these two collocated products are individually offered by two separate firms with N being one side of the imagined two-sided market and M the other (Figure 3). Because each of the separate firms has to generate a positive cash flow from the marketplace, the stability of the resultant platform – the large field encompassing the fields of N and M in Figure 3 – is not guaranteed as an operating organic whole or a connected system (Lin, 1999). That means that in practice the attraction between N and M does not exist steadily. In other words, the firm that attracts side N of the imagined two-sided market can easily join hands with another firm that has been attracting a consumer segment M' that is similar to M , because the products and/or services collocated are assumed to be commonly available. The systemic significance of common availability means that in the ocean of all the yoyo fields of the commonly available products and services each local

field X can readily find another local field Y to temporarily form for a platform for a short-lived two-sided market, because in that ocean of yoyo fields, each individual yoyo pool is constantly fighting for survival and growth.

In terms of the literature, various studies also suggest that common ownership is efficient in different contexts. In particular, Williamson (1979) argues that collocation requires investment to cover the sunk costs so that post-contract opportunism represents a real moral hazard for separate firms. Ye et al. (2012) see the need to determine what consumer subsidies one firm must offer so that the other firm can reap the rewards of greater overall willingness to pay and then a mutually agreeable procedure for settling relevant revenues and costs must be negotiated between the separate firms. And with the changing consumer preference renegotiation will become a constant issue of concern. That will lead most likely to moral hazards and recurring contracting costs, a resolution of which, based on Alchian and Woodward (1987) and Williamson (1979), is a common ownership. Even if opportunism and contracting costs are non-existent, common ownership may still be preferred over markets or contracting, because the acquired experiences through the sole ownership provides the knowledge for better coordination of value-creating assets (Conner & Prahalad, 1996). In short, the very concept of collocating products and/or services for the purpose of delivering consumer synergies implicitly indicates that both flexibility for what to collocate and responsiveness to changing market demands are the basics of success and are only afforded by a common ownership.

Considering the nature of the products and services – common availability – to be collocated to produce consumer synergies in a resultant two-sided market, another natural, yet also practically important question arises (Ye et al., 2012): Can a focal firm's innovative and successful collocation of commonly available products and/or services provide a sustainable advantage for that firm?

If we employ the resource-based theory (Kozlenkova et al., 2014) to look at this question, the answer does not look promising, because the following two conclusions have been developed by Barney and Hesterly (2012):

- If a firm possesses such resources that few other firms have due to various constraints, then it is likely for that firm to develop a sustainable competitive advantage. And
- If a resource(s) is simultaneously valuable, rare, and exploitable by a firm, then the resource(s) can generate a sustainable competitive advantage for that firm.

Here, the assumed common availability implies that the products and/or services to be collocated are neither rare nor difficult for any firm to acquire. So, when proven successful, imitators would possibly follow the already shown path to business success, leading to intensified competition and consequent competitive parity (Powell, 1992). However, the key technical detail in this reasoning is that the statement that if condition A holds true, then conclusion B follows does not implies anything about what happens to A if B holds true. In the context of our current discussion, this means that although the products and/or services to be collocated are commonly available, it does not necessarily mean that the established consumer synergies and two-sided markets cannot be sustainable.

So, to address our question just given above, let us next turn our attention to the concept of managers' willingness to compete (Madhok et al., 2010) in their strategic decision-making, the essence of which is a choice about how to effectively allocate the limited resources (Grant, 2008; Lin, 2009). Indeed in real life, beyond the ability to enter a market, no firm actually has the willingness and necessary resources to enter every market or most markets it is technically able to due to various reasons, such as that of forbearance (Bernheim & Whinston, 1990). In particular, firms yield their competition against their stronger competitors in those markets where they are less efficient, while in exchange the latter do the same in markets where the former are more efficient (Li & Greenwood, 2004). For example, Madhok et al. (2010) analyze a two-firm, two-product case and show that when one firm with limited resources has a comparative advantage for both products compared with the other firm, the former chooses to manufacture the product where it has the greater advantage while voluntarily abandoning the other market to the latter. In other words, many firms that have the ability to compete in multiple markets choose to do so in only one or a few while avoiding others so that their competitive advantages may actually be sustainable due to the choices of whom to compete with. Or speaking differently, a focal firm with limited resources generally abandons less attractive markets and chooses to compete in such market(s) that allows it to capture the greatest value (Adner & Snow 2010).

Proposition 6. A demand-side advantage established by a focal firm through collocating commonly available products and/or services and operating a resultant multiple-sided market can be sustainable, if the firm conducts its business

within a saturated market and the margin of profits due to the advantage is not more than the entry cost of a new competitor.

In fact, in a saturated market (Wagner et al., 2007), there is not much consumer movement; and incumbent firms provide an over-abundant supply of goods to a stable consumer base of a whole spectrum of heterogeneous preferences. That generally means that the margin of profit for the incumbent firms is thin (Forrest et al., 2017). Therefore, if a focal firm's collocation of commonly available products and/or services indeed provides a demand-side advantage in a saturated market, then that firm must have attracted people away from the established consumer base of the incumbent firms due to these people's simultaneous enjoyment/need of the other products and/or services within the collocated assortment. Such a group of consumers can only be a portion of the saturated market. And once the consumer segment of the focal firm, as the first mover, is well served, the cost of entering that segment is drastically increased for potential competitors up to the new entry deterrence price (Lieberman & Montgomery, 1988). That is, in this case, the first mover can obtain better margin of profits compared to other incumbent firms. Secondly, the assumed multiple-sided market the focal firm is operating serves as an isolating mechanism that benefits that firm as the first mover. The cross-segment externalities of the multiple-sided market within the saturated market are especially difficult for a competitor to penetrate, because the potential competitor must entice a critical mass of participants away from the established platform in order to be profitable.

Systemically speaking, the conditions that the firm conducts its business within a saturated market and that the margin of profits due to the advantage is not more than the entry cost of a new competitor, as assumed in Proposition 6, are necessary for this conclusion to hold true, as the following theorem, which is rigorously established, indicates:

Theorem 1 (Forrest et al., 2017). In an oligopoly market that satisfies the conditions below, if the number of those consumers who make purchase decisions based on which firm's price is most competitive is greater than the size of the loyal consumers of any of the incumbent firms, then at least one new enterprise would enter the market profitably. This said market consists of m incumbent firms, $m = 1, 2, \dots$, which provide consumers with mutually substitutable products such that

- Each of the incumbent firms has developed its respective share of loyal consumers who purchase the products from their respective firms only as long as the price is not more than their reservation price;
- The incumbent firms compete over the switchers with adjustable prices charged to their consumers; and
- The managements of these incumbent firms are well aware of the pricing strategies employed by the firms and have established their best responses by playing the Nash equilibrium through pure self-analyses.

A MECHANICAL PROCEDURE THAT LEADS TO SYNERGISTIC INNOVATIONS

Continuing our discussions in the previous sections, this section focuses on introducing a mechanical procedure by following which synergistic innovations, either on the producer side or the demand side, will most likely emerge without waiting for particular talents to suddenly and randomly hit on some bright ideas (Ridley, 2016). To limit the length of our present, the following discussions will be focused on the demand side only. For the producer side, the relevant ideas are similar.

To derive new ideas, as consequences of logic reasoning and abstract computation, let us first develop a formal representation for a good, an affair (or event) or a relationship as a formal system, written as an ordered triplet $T = (X, Y, Z)$, where, respectively, T stands for the targeted good or affair or relationship, X describes what the good is or what the affair is for or what the relationship is about, Y the characteristics and Z the value of the targeted thing. For example, for such a product P that has a market value of \$100, whose quality is ranked A, and whose brand name is excellent, we can formally described product P as follows:

$$P = \begin{bmatrix} \text{Product P} & \text{Price} & 100 \\ & \text{Quality rank} & A \\ & \text{Brand name} & \text{Excellent} \end{bmatrix}$$

And if John needs something that can provide a source of light in his home, we can describe this affair as

$$N = \begin{bmatrix} \text{Fulfill} & \text{Need} & \text{light source} \\ & \text{Location} & \text{Home} \\ & \text{Receiver} & \text{John} \end{bmatrix}$$

And if we look at the relative positions of the parts – base, light bulb, and the brightness – of a table lamp, we can write

$$L = \begin{bmatrix} \text{up/down relationship} & \text{on top} & \text{lamp holder} \\ & \text{on bottom} & \text{Light bulb} \\ & \text{brightness} & \text{100 w} \end{bmatrix}$$

When the target is an object (thing), affair or relationship, the formal representation is respectively referred to as an objective element, a situation element and relation element.

Secondly, associative thinking is the key for developing new ideas (Lockwood & Papke, 2017). In other words, after having formally described products, services, demands, and relationships, we need to somehow associate these formal expressions one way or another to generate ideas for new things, be they products, services, demands, or relationships. To this end, assume that two formal elements $E_1 = (X_1, Y_1, Z_1)$ and $E_2 = (X_2, Y_2, Z_2)$ are given. Then their logic AND operation is defined as follows:

$$E_1 \wedge E_2 = (X_1 \wedge X_2, Y_1 \wedge Y_2, Z_1 \wedge Z_2)$$

$$= \begin{cases} (X, Y, Z_1 \wedge Z_2), & \text{if } X_1 = X_2 = X, Y_1 = Y_2 = Y, Z_1 \neq Z_2 \\ (X_1 \wedge X_2, Y, Z_1 \wedge Z_2), & \text{if } X_1 \neq X_2, Y_1 = Y_2 = Y, Z_1 \neq Z_2 \\ \begin{bmatrix} X & Y_1 & Z_1 \\ & Y_2 & Z_2 \end{bmatrix}, & \text{if } X_1 = X_2 = X, Y_1 \neq Y_2, Z_1 \neq Z_2 \\ \begin{bmatrix} X_1 \wedge X_2 & Y_1 & Z_1 \wedge Z_{21} \\ & Y_2 & Z_{12} \wedge Z_2 \end{bmatrix}, & \text{if } X_1 \neq X_2, Y_1 \neq Y_2, Z_1 \neq Z_2 \end{cases}$$

where Z_{21} stands for the value of X_2 with respect to Y_1 and Z_{12} the value of X_1 with respect to Y_2 . And the logic OR operation of E_1 and E_2 is defined by

$$E_1 \vee E_2 = (X_1 \vee X_2, Y_1 \vee Y_2, Z_1 \vee Z_2)$$

$$= \begin{cases} (X, Y, Z_1 \vee Z_2), & \text{if } X_1 = X_2 = X, Y_1 = Y_2 = Y, Z_1 \neq Z_2 \\ (X_1 \vee X_2, Y, Z_1 \vee Z_2), & \text{if } X_1 \neq X_2, Y_1 = Y_2 = Y, Z_1 \neq Z_2 \\ (X, Y_1 \vee Y_2, Z_1 \vee Z_2), & \text{if } X_1 = X_2 = X, Y_1 \neq Y_2, Z_1 \neq Z_2 \\ \begin{bmatrix} X_1 \vee X_2 & Y_1 & Z_1 \vee Z_{21} \\ & Y_2 & Z_{12} \vee Z_2 \end{bmatrix}, & \text{if } X_1 \neq X_2, Y_1 \neq Y_2, Z_1 \neq Z_2 \end{cases}$$

where both Z_{21} and Z_{12} are defined in the same way as above. Lastly, the logic NOT operation of an element $E = (X, Y, Z)$ includes either the X -negation or the Z -negation, written respectively as $\bar{E}_X = (\bar{X}, Y, Z)$ and $\bar{E}_Z = (X, Y, \bar{Z})$. For details on relevant discussions, see (Yang & Cai, 2013).

To understand these logic operations within our current context, they mean synergistic innovations on the producer side, demand side, and market expansion. In particular, when the productions of different products are combined by using these logic operations, ideas of different products emerge; when the demands for different products and/or services are operated on by using these logic operations, potential new demands can be discovered even when consumers are still unaware of them; and when relationships between different consumer segments are jointly studied through these logic operations, two-side or even multi-sided markets can be possibly created. In the rest of this section, as an example, let us look at how to generate the synergistically innovative collocation of indoor tanning service and coin-operated laundromat as described earlier.

First, the laundry service can be formally expressed as follows:

$$L = \begin{bmatrix} \text{wash clothes} & \text{need} & \text{laundry machines} \\ & \text{location} & \text{near university campus} \\ & \text{who needs} & \text{students on tight budget} \\ & \text{activity} & \text{participative} \\ & \text{multi tasking} & \text{yes} \\ & \text{sequential tasking} & \text{yes} \end{bmatrix}$$

the indoor tanning salon can be written as follows:

$$T = \begin{bmatrix} \text{develop desirable appearance} & \text{need} & \text{indoor tanning salon} \\ & \text{location} & \text{near university campus} \\ & \text{who needs} & \text{mostly young females} \\ & \text{activity} & \text{participative} \\ & \text{multi tasking} & \text{no} \\ & \text{sequential tasking} & \text{yes} \end{bmatrix}$$

and the relationship between college males and females can be expressed formally by

$$R = \begin{bmatrix} \text{develop relationship w opposite sex} & \text{need} & \text{an indoor meeing place} \\ & \text{location} & \text{near university campus} \\ & \text{who needs} & \text{mostly males} \\ & \text{activity} & \text{participative} \\ & \text{multi tasking} & \text{yes} \\ & \text{sequential tasking} & \text{yes} \end{bmatrix}$$

Before we go on with this example, let us add some notes to explain a few details used in the previous formal expressions. First, being indoor needs to be required for everything because for this particular case, the student population is located in a northern U.S. city, where the winter is long and cold. Second, the reason why everything has to be near the university campus is because most of the students served by the laundromat and the indoor tanning salon live on very tight budgets; distance travel will inevitably put a dent on the already tight budgets. Third, washing clothes using coin-operated machines is participative with the need of changing loads and moving washed clothes into dryers, etc., and can be done with multiple tasks simultaneously, such as chatting with others, doing homework, among many other activities. Fourth, the reason why mostly young females use the tanning service is because way more women than men believe that suntanned skin enhances their appearance. So, living within a location and climate of long and cold winters makes female students more likely maintain their desired, tanned appearance year-round by using tanning booths or beds.

For the development of relationships, the reason why most males need an opportunity and a potential meeting place is supported by the facts that for many people, college is a time for exploring relationships and university-age males are more likely than females to seek and initiate a relationship with the opposite sex (Clark et al., 1999). Developing a relationship with the opposite sex can be worked on jointly with other tasks simultaneously as long as the latter do not demand too much attention away from the effort of the former.

Second, let us compute the following joint elements $L \wedge R$, $T \wedge R$ and $L \wedge T$, and obtain

$$L \wedge R = \begin{bmatrix} \text{wash clothes \& develop relationship} & \text{need} & \text{laundry machines \& meeting place} \\ & \text{location} & \text{near university campus} \\ & \text{who needs} & \text{mostly males on tight budget} \\ & \text{activity} & \text{participative} \\ & \text{multi tasking} & \text{yes} \\ & \text{sequential tasking} & \text{yes} \end{bmatrix}$$

$$T \wedge R = \left[\begin{array}{ll} \text{develop appearance \& relationship} & \text{need} \\ & \text{location} \\ & \text{who needs} \\ & \text{activity} \\ \text{multi tasking} & \text{no} \\ \text{sequential tasking} & \text{yes} \end{array} \right]$$

and

$$L \wedge T = \left[\begin{array}{ll} \text{wash clothes \& develop appearance} & \text{need} \\ & \text{location} \\ & \text{who needs} \\ & \text{activity} \\ \text{multi tasking} & \text{no} \\ \text{sequential tasking} & \text{yes} \end{array} \right]$$

Now, if we compare the matching cells between $L \wedge R$ and $L \wedge T \wedge R (= (T \wedge R) \wedge (L \wedge R))$, we have the following correspondences when the matching cells are different:

- (i) $L \wedge R(1,1) \sim L \wedge T \wedge R(1,1) \Leftrightarrow$
wash clothes & develop relationship
 \sim wash clothes & develop appearance & relationship
- (ii) $L \wedge R(3,3) \sim L \wedge T \wedge R(3,3) \Leftrightarrow$
mostly males on tight budget \sim mostly females on tight budget
- (iii) $L \wedge R(3,5) \sim L \wedge T \wedge R(3,5) \Leftrightarrow$
yes, multi-tasking \sim no multi-tasking
- (vi) $L \wedge R(3,6) \sim L \wedge T \wedge R(3,6) \Leftrightarrow$
yes, sequential tasking \sim yes, sequential tasking

All these correspondences are consistent except (iii) that can be overcome by (vi). So, these computational reasoning provides an explanation for why the previously given laundry/tanning collocation can successfully create simultaneous consumer utilities and a two-sided market effect.

What is discussed above is of course a 20-20 hindsight. In real-life applications, the relevant formal computations are carried out for all existing and potential business activities near the university campus. After deriving a whole collection of all possible collocation ideas, a detailed evaluation needs to be done in order to determine which possibilities represent true potentials for entrepreneurs to embark on in their efforts of creating value for consumers and capturing value for their enterprises. For the sake of communication convenience, we will call the method presented in this section for generating innovative ideas as extenic methodology (for innovation) (Yang & Cai, 2013).

CONCLUSIONS

To survive and grow in the turbulent world of business, each successful firm has to continuously implement different competitive advantages (McGrath, 2013). Diversification at either the producer side (Porter 1985; Santalo and Becerra, 2008) or the demand side (Ye et al., 2012) or both represents one possible way to accomplish this desperate need. However, adopting such an approach means that a firm has to generate innovative ideas for diversification. To ease the severity of this challenge, this paper establishes a series of 6 propositions of general conclusions that are both theoretically and practically significant. And, undoubtedly, the extenic methodology introduced in Section 7 will help reduce the practical effect of the heterogeneity existing in managers' abilities to determine how to intelligently collocate what are available to generate synergies, consumer utilities, and beneficial multi-sided markets, an issue that drastically separate managers, entrepreneurs and retailers based on the outcomes of their decisions (e.g., Holcomb et al., 2009; Sirmon et al., 2008; Thomas, 1988).

Because of the particular approach taken here, this work provides respectively generally applicable recommendations for entrepreneurs, managers and retailers. For example, for entrepreneurs, this paper shows that other than employing

pure entrepreneurial judgment (Kirzner, 1973) that is mostly based on entrepreneurs' intimate knowledge of available resources and considerable creativity, there are some quite definite factors and a mechanical procedure that can be utilized to uncover novel diversification opportunities through looking around the entire market both inside and outside their firms for complementarities of consumers' preferences.

Our results provide a completely different approach to business success from what is suggested by Baker and Nelson (2005) – apply combinations of available resources to new problems and opportunities. In particular, this paper provides quite specific ways to organically collocate commonly available products and/or services by targeting different segments of consumers, while sufficiently consider how the served segments of consumers could potentially interact with each other to produce simultaneous consumer utilities (Proposition 2) and two-sided market effects (Proposition 3). For example, it is found that when the magnitudes of the sides of a two-sided market are significantly different, offering competitive marketing strategies on the attractors can greatly increase the overall consumer participation in the two-sided market, while the costs of marketing can be at least partially compensated by the attractees (Proposition 4).

For managers and entrepreneurs who focus on the demand side by considering collocating commonly available products and/or services, this paper shows that other than an intimate understanding of consumers' needs and the creativity to envision a novel collocation of commonly available resources (Ye et al., 2012), superior consumer benefits can still be created by offering consumer groups utilities that they were not previously aware of through employing confirmed demands and systemic scanning of the market. In particular, this paper shows why all the commonly available products and/or services in a collocated assortment need to be offered by the same ownership (Proposition 5).

Beyond theoretical results, this paper provides general recommendations that are practically applicable. For example, when strategically planning for collocations of commonly available products and/or services, a manager/entrepreneur should always keep in mind the potential of complementary consumer benefits (Proposition 2), where consumer interactions can create another dimension of growth and satisfaction and where a two-sided or even multi-sided market can emerge (Propositions 3 – 5). And when a two- or multi-sided market is established, appropriate pricings can be introduced to target attractors and attractees (Proposition 4) in order to help with value capture. Additionally, the demand-side advantage can actually be sustained, providing a real-life support of the concept of first-mover advantage (Lieberman & Montgomery, 1988). To summarize, our overall recommendation is the following.

An intimate knowledge of available resources and consumer preferences is not always practically available, although it is important for success (e.g., Kor et al., 2007; Augier & Teece, 2008). So, to effectively generate new business ideas and desirable corporate growth and performance from the producer side, or the demand side, or both, a manager/entrepreneur needs to regularly scan the market by utilizing the extenic methodology and by going beyond the boundaries of his/her firm's current or prior activities, as opposed to what is suggested by Penrose (1959).

For retailers, this paper shows why their locations and the depths and breadths of their assortments of products/services are important for their success. However, when determining particular locations and the depths and breadths of their assortments, these three variables need to be considered holistically, because they are also interrelated and define each other (Proposition 1).

And for all managers and entrepreneurs who like to promote their corporate growth and performance through economies of scope, they need to be aware of when new competitions will appear (Proposition 6), and how they can constantly scan the market for the appearance of new products/services, potentially different ways to collocate commonly available products and services emerging out of forever changing consumer preferences by employing the extenic methodology.

As for the limitations of this work, one stems from the assumption on why a firm exists. In the business world, firms conduct their business very differently from each other contingent upon why/how they are established. That means that conclusions derived in this paper do not universally apply to every actual situation. Although our attention in this paper is on how both conceptually and practically a focal firm can synergistically collocate commonly available products and/or services in its effort to create economies of scope, we did not consider the limitations that firm is

subject to. These limitations and related issues surely help point to future research problems in order to develop additional, more in-depth practically useful conclusions and recommendations beyond what is presented here in this paper.

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EXAMINING STUDENT SUCCESS THROUGH ENGAGEMENT AND EXPERIENTIAL LEARNING: A CASE STUDY

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ABSTRACT

This case-study presents students' success through engagement and experiential learning by aligning with their Professor's goal to offer all learners opportunities to transition from ordinary to extraordinary students. The study employed a qualitative research design, to explore meaning making and students navigating entrepreneurial leadership. Results from this case study exemplify the enabling role of a professor- students engagement to learn beyond the classroom to achieve their highest potential. The students observed that *"At a point, I felt that I was not learning the maximum amount possible by solely attending class. By engaging in entrepreneurial activities, I was able to better grasp concepts in class, and think from more of an application lens, rather than an academic lens". "My colleague and I were treated as professionals and were consulted about every decision made."* The process and outcomes of this project affirm that prior experience does not deter identification of new learning goals and academic achievement.

INTRODUCTION

This Case study sought to examine how student engagement and experiential learning influence their transition from ordinary to extraordinary students. The case study sampled two undergraduate students who trace their entrepreneurial skills back to their childhood experiences, navigating their education through small businesses at home and in school. Kefa and Dito (pseudo names) both undergraduate students entered college on different career path goals but by engaging cognitive learning and 'thinking outside the box' (interview with Kefa, 2019), they find their once diverse dreams converge to a historical entrepreneurial engagement in more than a hundred years of existence of their university. Studies in entrepreneurship emphasize that students are in the process of becoming something they previously were not (Welsh, et al., 2016).

THE CONTEXT

Taotain, et al. (2017) emphasize the role of context and the process of entrepreneurial learning provided by more than one contributor to student success. This is also found in the intersection between role models (Welsh et al., 2016), pedagogies, programs offered and the place of the learning institution itself, in order to see things in a holistic way (Ghina, 2014). At Marywood University, learning is both an engagement and experiential with hands on practice in entrepreneurial activities as the one illustrated in this case study. Welsh et al., (2016) incorporate the age factor as a contributor to the learning of students, where students between ages 17 through 19 are in their transition and a time when students find new ways on how they look at things. The students in this case study fit in within this theorized framework of learning, where they engage in critical thinking not just acquisition of knowledge (Linton & Klinton, 2019). Student B exemplifies this when he states "At a point I felt that I was not learning the maximum amount possible by solely attending class. By engaging in entrepreneurial activities, I was able to better grasp concepts in class and think from more of an application lens rather than an academic lens" (interview with Dito, 2019). Due to the size of the University, student to student interaction is easy, and access to professors is available for small groups and one to one mentorship. This affirms the view that social interaction contributes to entrepreneurial learning (Ferreira et al., 2017), by integrating the environment, motivations, opportunity identification, innovation and encouragement provided to learners and trainers (Ghina, 2014; Welch, et al., 2017). Student A looks at this shift from one goal to a way of looking at things holistically, "I once had a dream of working with athletes and helping them recover from the injuries. I realized that there wasn't much room to grow in athletic training and decided early to make a career change" (interview with Kefa, 2019).

PERSONAL INTEREST

The researchers of this study are doctoral students who have been taught and guided through academic engagement in entrepreneurial leadership, and consultancy courses by the same mentor professor associated with the success story

of the undergraduate students. Additionally, this study adds to the illustration of first-hand experiential learning outcomes among students. The researchers have seen other class presentations popularly known as ‘the rocket pitch’ session in this course and how engagement of all students begin to build their ideas first as a course requirement. Thereafter, some students pursue their ideas to implementation, as long as it takes, while others end their project at the course requirement stage. For the researchers this was not only a learning experience but also a research opportunity.

THE CASE STUDY

This case study focused on three participants, a professor in the study of entrepreneurship and two students. Dr. Trainer (pseudo name) has been engaged with student learning and pitching ideas for entrepreneurship for the last 12 years at Marywood University. In this study the researchers sought to understand the cues that enable the Professor post very successful outcomes each year in his teaching and mentoring methodology. The professor responded, “I strive to mentor students to seek opportunities that would enable them transition from ordinary to extraordinary students by the end of training” (interview with Dr. Trainer, 2019). The professor’s experience with former students has revealed over that students learn best by engagement of the entrepreneurial leadership model, to merge theory and practice in learning (Benešová, 2015, Kubberoed & Hagen, 2015). This view is also affirmed by other scholars and presented as an opportunity-oriented problem learning model (Oganisjana & Laizans, 2015). This enables students learn by an evaluation of input-process-outcome (Ghina, 2014), as well as a self-discovery of personal attitudes, satisfaction and readiness to learn by doing, learning from mistakes and their own experiences (Figueiredo & Loiola, 2017; Oganisjana & Laizans, 2015).

These previous outcomes at Marywood University have not been given an academic approach or attention over the years, which creates the need to study the students as a ‘unique case’ or ‘revelatory’ as presented in this case study (Creswell & Poth, 2018). The researchers also sought to establish if first-hand experience with student engagement and experiential learning matches the findings of the other studies. Some scholars seek to determine whether success in entrepreneurship is about process, the method or both? (Ghina, 2014; Welsh, et al., 2016). Also, this qualitative case study seeks to establish the role and relationship between the mentor and the learner.

Kefa and Dito, are young African American undergraduate students who graduated with their Bachelor of Business Administration, Marketing & Entrepreneurship in Management in May 2019. They are aged 24 and 22 years respectively, born and raised in New York. Kefa and Dito, also referred to as Student A and Student B joined Marywood University in 2015. Marywood is a small liberal arts college in Northeast Pennsylvania, offering more than 60 undergraduate and a variety of graduate programs to choose from, and admissions are both national and international (<http://www.marywood.edu/admissions/>).

Kefa traces his interest in entrepreneurship back to his childhood “my parents have always had side businesses and growing up seeing that became normality for me.” When I was in third grade, I would buy pencils in bulk and sell them to my classmates for profit, later I would buy cases of water and sell to people on the highway for profit.” Responding to the question on how this accomplishment has impacted his entrepreneurial skills, Kefa says “my experiences have thus far helped me to gain confidence as a young professional. I believe that now I have the necessary skills to start my own business...and operate on a high level...I now have a very clear vision of what industry I would be in professionally (interview with Kefa, 2019).

Dito on the other hand traces his entrepreneurial skills to his elementary school “my cousin and I would sell sodas and snacks to our fellow students during lunch” “when I got to college, I saw many opportunities in which innovation could change some things”....“This accomplishment has made me realize my talents professionally....I have realized that I possess the ability to achieve my professional goals within a group or individually.... it has given me a what next mentality, in that I truly do not think there is anything I cannot accomplish if my mind is set to it” (Interview with Dito, 2019).

During their study at Marywood they have participated in several entrepreneurial engagements leading the duo to the realization that “entrepreneurship isn’t for everyone, but if you are interested it definitely gives you a sense of satisfaction to see your work of art grow from merely an idea to a physical business” (interview with Kefa, 2019). The second view is that “you can learn a tremendous amount about theories/concepts of business though textbooks” “However, the best teacher in my opinion is the experience, I would encourage all students to go for that idea they

may have” (interview with Dito, 2019). A view affirmed by Kefa who posits that “if you have an idea do not let it fester and just be merely an idea, allow your thoughts to become reality (Kefa, 2019).

RESEARCH QUESTIONS

What are the experiences of undergraduate students navigating entrepreneurial leadership skills from ordinary to extraordinary students?

To answer this broad question, the students were asked the following sub-questions.

What was the problem?

What was the opportunity?

What was the solution?

What steps did you take to arrive to this solution?

What were the challenges and how did you navigate them?

How did the outcome of this project impact your entrepreneurial skills?

PURPOSE STATEMENT

The purpose of this case study was to study how student success is achieved and the intersection of engagement and experiential learning by aligning with their Professor’s goal. The Professor strives to offer all students opportunities to exploit and maximize on their highest potential transitioning from ordinary to extraordinary students.

THEORETICAL FRAMEWORK

The teaching ideals and goal of the professor in this case study point towards a theory of change in personal and professional development. Transformational theory appeals to the researchers as it is incorporating in transactional and transformational characteristics. This theory was first developed by Burns in 1978 as transforming leadership, and in 1985 Bass introduced the term transformational leadership in replacing the term transforming (Bass, 1995). According to Bass (1995), the leader is the first measure in terms of influence on the followers. The qualities that are exhibited by the followers are a feeling of trust, admiration, loyalty and respect. As a result of the qualities of their transformational leader followers are willing to work harder than originally expected (Bass 1995).

Student B in this study affirms this view by asserting that “the greatest contribution resulted from our supportive mentor - Dr. Trainer and our work ethic”. “I knew some things in the class however, the vast majority I had to learn on the fly and adapt in an ever-changing landscape in which business is” (Interview with Student B, 2019). Transformational leaders give followers an identity by looking beyond their self-gain, a view supported by the experience of Student A who asserts that “I have grown into a young professional who can think outside the box to make things happen”. Bass also suggested that leadership can display both transformational and transactional leadership. “When we ran into roadblocks, we contacted those who could help us to quickly move the process along and reach our end goal (interview with Student B, 2019). “Ultimately, I know that someday I will be business owner and without these experiences I am not sure I can say that I would be in the position to speak so highly of myself/skill set” (interview with Student A, 2019).

SIGNIFICANCE TO AUDIENCES

There are several benefits of this study that include helping students and instructors realize the role of mentorship and experiential learning in developing entrepreneurial leaders. This case study exemplifies the role of open-door policy for students and the role it plays in actualizing and maximizing students’ potential. It helps to exemplify for other student that believing in oneself can lead to great accomplishment on personal and professional goals. It also exemplifies that student capabilities are not limited to their level of learning whether undergraduate or graduate level. Also, from this case study prior experience is not a prerequisite for success (Ferreira et al, 2017). Individual students can make major contributions to their learning environment and communities as these undergraduate students have demonstrated through this college-community project.

METHODS OF DATA COLLECTION

This case study utilized a holistic design qualitative research methodology for its potential to capture the entire case compared to other designs (Creswell & Poth, 2018). Data was collected through personal interviews with the two students and the professor. During the face to face interviews, participants were informed of the purpose of the study and were asked if they were willing to participate. Participants were allowed to ask questions and after providing them with the rationale and significance of the study, they accepted to participate in the study. They were asked if they wanted to complete the interviews in person or in writing and they preferred to provide written answers to all the questions in order to reflect on how comprehensive they could be in responding to each question. They also mentioned it was an important opportunity to reflect through the process as they had not given it much thought outside of the launch and implementation of the project, after which they had embarked on new ventures at the time of this interview.

Methods of Analysis

Data in the study utilized two approaches, cross-case analysis, which involved analyzing responses extrapolated from the two participants' responses to identify common themes, similarities and differences (Creswell & Poth, 2018). This was followed by analyzing the responses within case for each individual to identify unique responses which were provided by Kefa and not Dito. This was used to ensure that all information had attained saturation and no more themes seemed to emerge from the memos, observations and interview responses (Creswell & Poth, 2018).

Validity Issues

Through the steps of cross-case analysis and within case analysis, self-reflection survey can provide vital information from participants responses were considered authentic. There was potential fear and power differential that could have raised validity issue on the respondents given that they were undergraduate students and answering questions from doctoral students. However, this fear was assuaged by emphasizing that the doctoral students wanted to retell the participants story of success and accomplishment. The interview was not related in anyway with their academic performance. The students also understood this interview would not impact them negatively or their relationship with their professor, because they had already completed the course in previous semesters. The participants cited the availability of their professor was a great motivation and contributor to their success in this project, therefore validity of their information is assumed to be authentic and free of coercion. The participants had also gained significant confidence to respond to interviews as the process of creating networks through to the implementation of the project involved interviews at all levels of their engagement. Their anonymity was protected by using pseudo names and further presented as Student A and Student B in their direct quotes not their names in this study. Participants were purposively sampled as the two students behind the university shuttle project. They answered the self-assessment survey on paper forms individually, at their own convenience after which they submitted the responses to the researchers via e-mail.

Ethical Issues

This study did not cause more than minimum risks than experienced in everyday life, therefore application to conduct responsible research with human subjects was submitted to the Institutional Review Board (IRB). Approval was processed through the Exempt Review Committee (ERC). Participants provided their informed consent and availability to participate in the interview face to face to complete their written responses. All their responses were kept under password protected folders. Preparation of the report for presentation was done in consultation with participants to ensure the report was representative of their responses to the researchers.

FINDINGS OF THE STUDY

The realization of the college shuttle services was achieved. The overall process took the students ten months to complete. Although implementation was envisaged to take place in the early part of the Fall Semester 2018, a few challenges delayed the launch of the shuttle services until later in the month of October 2018. Since this was close to the end of the semester data collected and analyzed in this study is taken from the Spring Semester of 2019 only, a time during which the shuttle was fully operational and gaining more publicity at the University and the surrounding. While not the only means of transportation available to students without vehicles on campus, the shuttle is the most flexible and affordable to all students, faculty and staff. It is free and the schedule is more flexible compared to the

public transportation for instance, which is also free, but limited to hours during the day and closing day's schedule at 6:45 pm. The shuttle services can be scheduled up to 10:00 pm for pick up from the designated area. This also contributes to some peace of mind and security to the students when they need to go out for an activity that runs later than 7:00 pm.

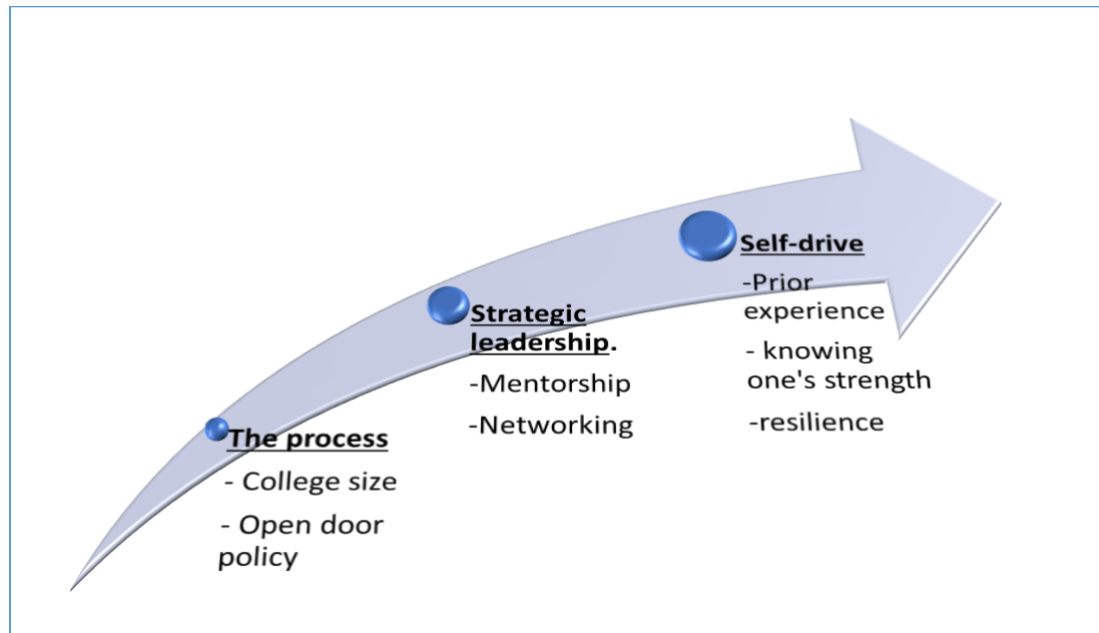


Figure 1. Emerging Themes from this case study.

Both participants referred the process as a great take away and their learning environment cited as necessary conditions for creating successful entrepreneurs (Ferreira, et al., 2017; Ghina, 201; Welsh, et al., 2016). Strategic leadership emerged as another theme and chain of command, as it involved planning and coordinating management meetings, creating working coalitions, participants own work ethic from the moment they experienced a problem as a personal need to expanding it to the situation for their fellow students (Figueiredo & Loiola, 2017; Oganisajana & Laizans, 2015). Lastly, participants saw their self-drive as identifiable with their resilience to succeed or self-actualize as important for their success (Ferreira et al., 2017). These qualities emerged as pivotal factors that played a role in attainment of their goal supported by their presenting opportunity to learn and the skills to solve a problem (Ghina, 2014; Oganisjana & Laizans, 2015).

Student A said “the problem arose for us fundamentally in not having a personal way of transportation. We realized that we may not be alone in this, other students may have been feeling the same way.”

For Student B, it was the thought that “many underclass students who did not have vehicles were limited to activities on campus and had not opportunity to experience Scranton area”.

It was the outcome of resilience and believing in the viability of the project anchored on the college's open-door policy the students enjoy from the President, whom the students describe as “falling in love with the idea immediately and advised them to go for their dream, and not to take no for an answer” ... “from that time it was all about bringing the shuttle to life” (Student A, 2019).

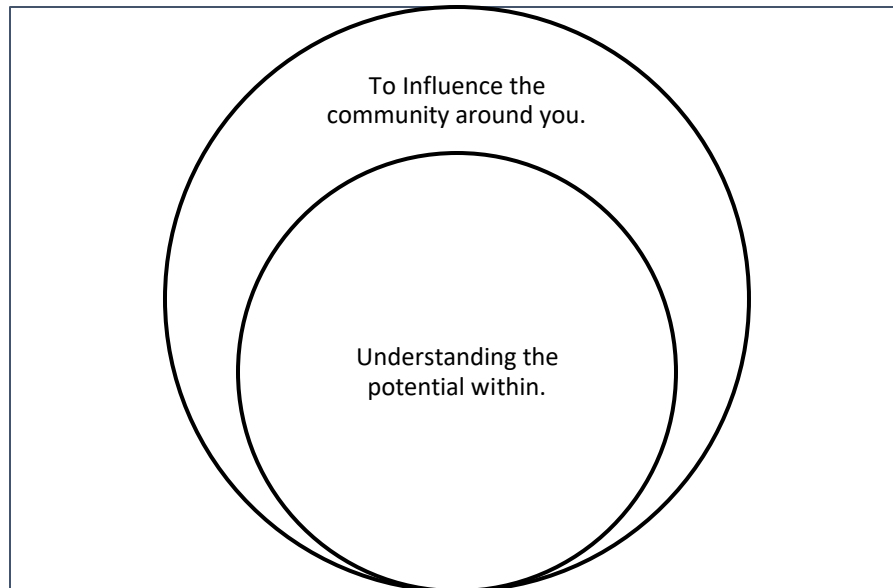


Figure 2. The potential within to influence change.

To arrive at this outcome, the process in this project involved engagement of research where participants revealed, “to arrive at this solution we first did research in the summer of 2018” (interview with Student B, 2019). This research strategy was intended to lay the groundwork on logistical steps that were required to create the shuttle service, building a network of stakeholders which included the Chief Financial Officer (CFO) of the University and other members of the Executive Management of the university. The students fulfilled a necessary condition in attainment of the goal by engaging in a comprehensive research as a predictor of their product development and anticipated outcome (Figueiredo, P. S., & Loiola, E. 2017). Ghina (2014) posits that entrepreneurship research is not highly engaged even though necessary to build on theory.

This engagement was also transactional in that even though the students cited lack of prior experience in this endeavor, they managed to secure funding from the N-Net Credit Union amount to \$10,000. This resulted to learning the skill of writing proformas and proposals, eventually leading to the realization and launch of the shuttle project as advertised above.

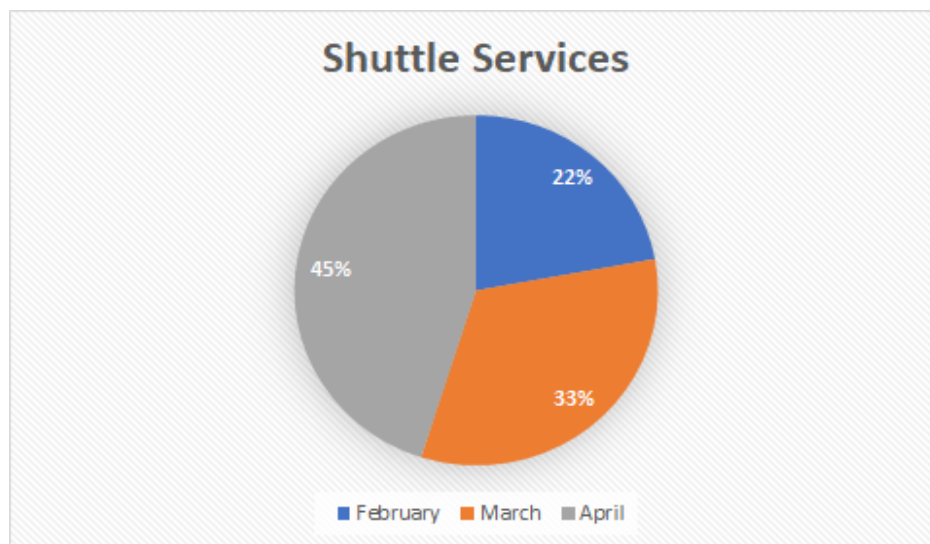


Figure 3. Shuttle Services in Spring Semester alone 2019

This study found that after launching the shuttle late in the Fall Semester 2018, in the Spring Semester of 2019, the services increased each month by more than ten percent according to the shuttle log for that semester alone.

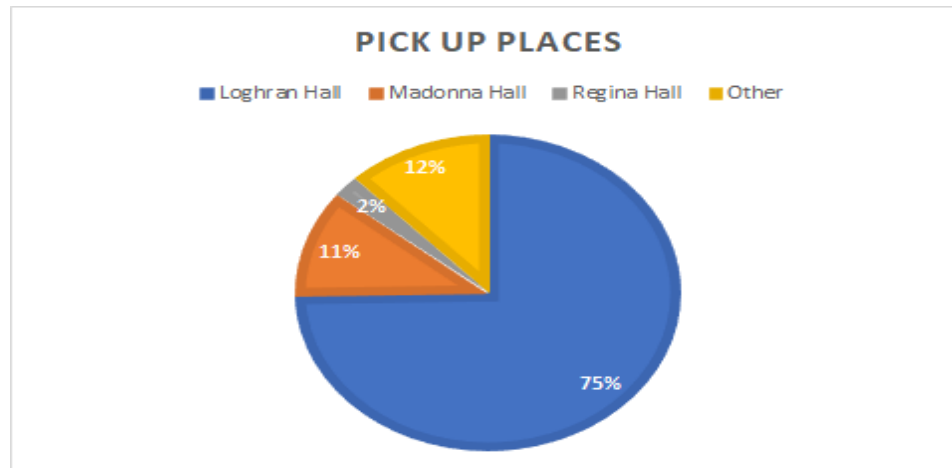


Figure 4. Pick up places at the University.

From the data presented above, all residence halls benefit from the shuttle project with the largest majority coming from Loughran Hall which is primarily residence to first year students. Their most visited destination is to the city center and followed by the other shopping centers in the area. This outcome affirms the views of Student B who observed that most students without means of transport would not have convenient means to access activities or experience the city center here in referred to as downtown which is the most visited destination 31% of rides.

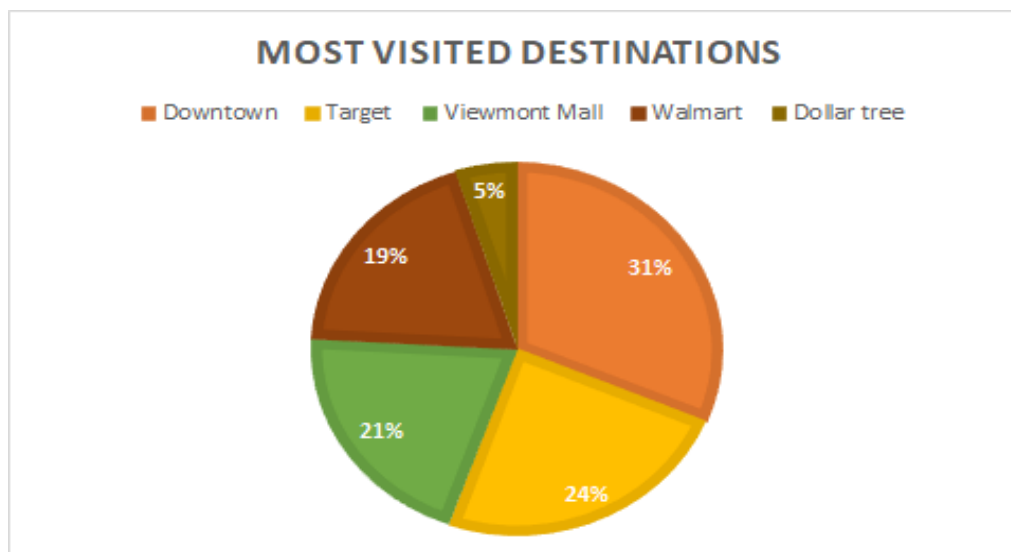


Figure 5. Most Visited Destinations in Spring 2019

IMPLICATION FOR PRACTICE AND CONCLUSION

Data from this project suggests that individual needs when well-articulated have far reaching influence on students and implications for practice. Affirming that student skills and mindsets develop as they strive to solve real-life problems (Oganisjana & Laizans, 2015). Student-Professor interactions beyond the classroom are more enabling to augment the limited course interaction confined to a semester. Academic engagement correlates with the findings that there is a positive relationship between entrepreneurship education, intentions and entrepreneur role models for learners and instructors (Welsh et al., 2016). Identifying students' needs may not always surface, the school environment might offer better learning experiences for students when they diversify engagement in formal and nonformal interactions. Inability to access activities within or outside of a college environment systematically cuts

off needy students who would like to but are limited in geographical advantage of designated locations or affordable means to get there.

An open-door policy for students removes barriers with administration as is exemplified in this case study that neither the President nor the Professor was difficult to find or to reach with needs that could improve the learning experience and campus environment for students. Informal engagement and follow up mentorship could help students who are struggling with choosing a career path or academic major as it happened in this case study. An accomplishment by undergraduate students in this study affirm the findings of other scholars who found that students without prior experience were more likely to do better than those who had experience in business plans (Ferreira, et al., 2017). The students in this case study found their major lesson to have come from the process and particularly when they mention that they started the implementation from scratch.

Some of their takeaway lessons are characterized by words like “learning on the fly, to writing proformas and proposals to donors, engaging management teams in meetings and finally the joy of being consulted as the experts (Student B, 2019). They were consulted on every decision from the moment the idea was embraced by the university coalition/network involved in this project to its implementation. This affirms the recommendation from studies that postulate, to make successful entrepreneurs, studies should be problem oriented (Oganisjana & Laizans, 2015). This allows students to generate knowledge and skills that inform effective learning and qualifications (Ghina, 2014). Such learning also provides opportunities for students and role models to form the right attitudes, motives and grit to meet failure and determination, to learn new ways of attaining desired goals (Welsh, et al., 2016).

REFLEXIVITY

As research instruments the graduate students sought to give voice to participants through an academic engagement by highlighting unique achievements by undergraduate students. This study also aims to disseminate knowledge on a research-based practices. Outcomes of entrepreneurial leadership among young adults, has been shown not to be limited to and/or by academic level of education.

From the view of Student, A, who demonstrates the need for early intervention in determining a course major and development of professional goals, it would be interesting if the university could engage the effectiveness of using online assessment. Such online assessment tools have been proposed to examine entrepreneurship student traits (Hayes & Richmond, 2017). Student A had a different major as a freshman, only later to change the career path and professional goal. This says, “I decided early on to make a career change” (interview with Kefa, 2019).

It is probably true that more undergraduate students could be facing similar decision-making challenges. Early assessment could alleviate student confusion and lapse of time when deciding on a major if utilization of online assessment is availed to measure and improve the impact of entrepreneurship education (Hayes & Richmond, 2017). The participants in this case study have provided a precedence for other upcoming entrepreneurial leaders to self-search and tap deep into their potential to attain their desired goals in engagements that connect deeply with their passion for growth personally and professionally.

RECOMMENDATION FOR FUTURE RESEARCH

Further studies could focus on quantitative research to examine the experiences and engagement of students in large universities and colleges as a comparative study. Another approach could be to test the hypotheses as advanced by one study that ‘college grades do not correlate with entrepreneurial success (Welsh, et al., 2016). The outcomes could inform practices and expose other factors that instructors and students could tap into and nurture for students who may not be academically gifted but talented in other aspects of life.

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IMPACTS OF DISTRIBUTORS AND GROUP PURCHASING ORGANIZATIONS ON HOSPITAL PERFORMANCE

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James Langdo, Central Connecticut State University
David Hwang, Shippensburg University of Pennsylvania
Vanda Marques, Central Connecticut State University

ABSTRACT

This research investigates the use of distributors & group purchasing organizations (GPOs) and examine how they affect hospital efficiency and profitability. The data was obtained from the 2015 Annual Hospital Survey (AHA) of which 6,251 hospitals participated. These hospitals were separated by those who purchased supplies through a distributor and those who did not. Likewise, the same was performed for those hospitals which used GPO and those which did not. This study employs the DEA-Solver software to develop four types of bilateral DEA models. The results of the DEA model use a ranking variable (Rank Sum) to rank the variables within the two groups (distributor and no distributor) to determine if there is a significant difference between distributor and non-distributor. The same is performed for GPO and non-GPO. T-test for operating margin was used to determine if hospitals with distributors and GPOs are more profitable than non-distributors and non-GPO hospitals, respectively. Nonparametric Binomial Spearman Correlation is used to determine the relationship between rank sum and each input and output, to determine which input and outputs are correlated with rank. Finally, a Mann-Whitney test to analyze the differences between two groups in terms of the ranks. We examined the several control variables to examine for statistical significance between these variables and with distributor and without distributor and with group purchasing organizations and without group purchasing organizations. Results indicate that the control variables (teaching and metro hospitals) made a significant difference for hospitals that used a distributor and those that use a GPO.

INTRODUCTION

Health care costs have risen substantially in the U.S. In 2015, health costs were \$3.2 trillion in comparison to \$27.2 billion in 1960 (Amadeo, 2018). Hospitals have struggled to keep up with the rapid rise. Labor costs comprise most of a hospital's operating budget and hospitals are always looking for means to reduce costs while increasing efficiency (Grajewski, 2015). Second to labor costs, hospital supplies are the largest expense for health systems. Hospitals continue to work with distributors to find more cost-effective means to distribute and store PPI (physician preference items) inventory. Devices and supplies are often shipped by courier, accompanied by hefty shipping and handling fees associated with distribution. The procurement of hospital supplies and the related distribution costs remains a challenge, with the goal of reducing available inventory while increasing inventory efficiency.

There are many different factors and variables that can impact hospital operating efficiencies. Engaging a Group Purchasing Organization (GPO) is one method to influence efficiency throughout the entire supply chain. In many cases, GPOs have a direct impact on the profit margins of both medical supply manufacturers and the hospitals that use them. This topic and how it influences cost is becoming increasingly important as medical care in the United States continues to be at the front of many policy and professional conversations. It is important to understand the impact of GPOs on medical supply logistics to make the best decisions for the hospitals and manufacturers involved and to ensure profitability (Callender & Grasman, 2010; Cleverley & Nutt, 1984).

Through this research we have found that while there are many studies (Jha et al., 2009; Kamal et al., 2017; Khushalani & Ozcan, 2017) that use various measures to capture hospital efficiency, there are very few studies which attempt to measure the impact of distributors on hospital efficiency. The purpose of this research is to examine the increase in efficiency, that the use of a distributor can provide. Our method of research consists of the use an AHA Annual Hospital Survey data composed of 6,251 hospitals in a DEA approach to separate these hospitals into two groups (distributor and non-distributor) and rank inputs and output variables and determine statistical significance between the two groups. To determine correlation between the ranking and these variables, we ran a nonparametric binomial spearman correlation analysis. Mann-Whitney test is then used to analyze the t-test to determine significance between our control variables and distributor and no distributor.

The reason for our study on GPOs is to better understand their place in the medical supply chain and if GPOs do maximize profitability and impact the ranking efficiency of a hospital. Previous studies have shown conflicting results when it comes to the value of GPOs based on the method of study. Some researchers have built their models with

assumptions that other researchers neglected to include. Reviewing the influence of these assumptions on the overall outcome of the study could provide some insight into the complexity of the GPO business model and how it adds value to the hospital's business model. These studies lack the research of Group Purchasing Organizations impacting the rank sum of efficiency of hospitals. This research and data from 2015 will provide a new insight of this topic. (Burns & Lee, 2008; Carr & Pearson, 2002).

An empirical study was conducted to identify the relationship of GPOs and hospital efficiency using a dataset of hospital records as a guide to address the following question: Does the use of Group Purchasing Organizations impact the efficiency ranking of the hospitals in the data collected for this research? The research Hypothesis is there is a strong statistical significance between the two groups (GPO and Non-GPO), which means GPO status does make a difference in ranking efficiency of hospitals. The null hypothesis is there is no statistical significance between the two groups, which means GPOs do not make a difference in ranking. We will employ data envelopment analysis (DEA) to measure the relative efficiency of hospitals who use GPOs.

This paper provides an extensive review of literature on hospital supply-chain as it pertains to distributors and group purchasing organizations well as include previous studies on efficiency and distributors impact on hospital efficiency. Subsequently, the methodology, results and conclusion include managerial implications, significance and recommendations for future studies.

LITERATURE REVIEW AND HYPOTHESES

Distributor and Healthcare Efficiency

According to Leleu et al. (2017), high levels of hospital physician integration might be instrumental in ensuring that hospitals achieve their efficiency goals. Ferrier & Trivitt (2012) conducted tests that account for quality and how it influences efficiency, using the samples of 1074 hospitals. They found that controlling quality and better cost attainment lead to more impactful efficiency analysis. Khushalani & Ozcan (2017) examined efficiency of producing quality in hospitals between 2009 and 2013 and found that efficiency of quality production improved significantly between 2009 and 2013, with no trade-off between efficiency of producing quality outputs and efficiency of producing medical care. Varabyova & Schreyögg (2013) conducted a comparison study of the technical efficiency of the hospital sector. The results of the study show that hospital technical efficiency is greater in countries with higher health care expenditure per capita.

In their research, Kumar et al. (2005) describes how distributors have tried to reduce the overall costs by implementing Just-In-Time practices and managing the supplier and hospital inventory levels. By instituting supplier-managed inventory and stockless systems, the distributors attempt to control the flow of materials through the supply chain. Manufacturers would prefer the distributor to hold more of its inventory and to push product to the hospitals; however, hospitals have limited room for storage. Rivard-Royer et al. (2002) discusses a hybrid stockless medical supplies system which the distributor supplied high-volume products for the patient care unit in case quantities, leaving the institution's central stores to break down bulk purchases of low-volume products. The study reveals marginal benefits from the hybrid method for both the institution and the distributor, but the efficiency in packaging of supplies and storage organization can reduce costs for health care providers. Lee et al. (2011) examines supply chain (SC) innovation, supplier cooperation, SC efficiency, and quality management (QM) to measure organizational performance. The result of the study supported that the organizational performance is positively associated with the supply chain (SC) innovation factor from the standpoint that it improved SC efficiency through better cooperation with suppliers and encouragement of Quality Management practices. Khani et al. (2012) measures the relative efficiency of hospitals using data envelopment analysis, using a model with four types of employee, namely specialists, physicians, technicians, and other staffs as input parameters. The model also uses the number of surgeries, hospitalizations, and radiography as the outputs of the proposed model. DEA was used to measure the relative efficiency.

Distributors offer hospitals a medical supply system that supplies high-volume products for the patient care units in case quantities which translate into lower cost for healthcare providers (Rivard-Royer et al., 2002). Distributors can reduce overall cost and increase efficiency and savings for hospitals by implementing just-in-time practices and managing the supplier and hospital inventory levels (Kumar et al., 2005). The manufactures prefer that the distributors become more involved for overall efficiency and hold more inventory, but hospitals have limited room for storage.

An innovative supply chain design, which includes distributors, supplier, and hospitals among others, can significantly improve supply chain efficiency and overall quality management and organizational performance (Lee, 2011). Health care efficiency is used as a basis for rating hospitals and physicians (Jha et al., 2009). Hospital efficiency will increase due to the cost-reducing efforts in terms of quantity of treated patients (Biorn et al., 2003) Therefore, this study hypothesizes that hospitals, who use distributor are significantly more efficient than hospitals that don't use a distributor:

Hypothesis H1a: Hospitals with distributor are significantly more efficient than hospitals without distributor.

Lall et al. (2012) cites Ozcan and McCue (1996), which uses operating margin as an output variable in a DEA study on hospital profitability. Min et al. (2006) defines operating margin as operating profit as a percentage of revenue. Dolin et al. (2017) in a healthcare study of hospice and palliative care hospitals also uses the operating margin variable, which they describe as a common measure of profitability and can be defined as operating revenues minus operating expenses, divided by operating revenues. The study used multiple regression models and operating margin as a variable in the study, showing a positive relationship between total and operating margins and rate of live discharges. Büchner et al. (2016) uses a regression model with dependent variable operating margin as a ratio to measure hospital profitability. The study finds a significant in hospital profitability with an increase of 2.6% in operating margin for hospitals in health systems as opposed to independent hospitals. Sear (1992) investigated the profitability of investor-owned, multihospital systems and used operating margin as the dependent variable as a measure of profitability. Du et al. (2014) found that 22 out of the 31 efficient hospitals could afford to increase operating expenses or lower revenue and remain efficient, indicating that their operating margin is better than their peers and a good measure of profitability. Therefore, this study uses operating margin to measure hospital profitability and hypothesizes that hospitals which use a distributor are significantly more profitable than hospitals that don't use a distributor.

Hypothesis H2a: Hospitals with distributor are significantly more profitable than hospitals without distributor.

In summary, there are many studies (Khani et al., 2012; Lee, 2014) that focus on physical measures of hospital efficiency, measures of financial and quality efficiency measures. However, no study was found to encompass all these variables into hospital efficiency. In addition, no study has used the DEA method to incorporate inputs: total expenses, beds set up and staffed, full-time physicians and dentists, full-time registered nurses, and supply expenses, with output variables inpatient days and total outpatient visits. This study aims to discover how these input and output variables together can determine hospital efficiency for distributors. For this research, these 4 inputs and 4 output variables will be combined to measure the relative efficiency of several different hospitals. Furthermore, we want to determine if distributors matter when considering various types of hospitals. The control variables which we use include teaching/non-teaching, and census bureau area hospitals (metro/micro/rural).

Group Purchasing Organizations and Healthcare efficiency

Jayaraman et al. (2014) explains the role GPO's play within the healthcare supply chain, which consists of product manufacturers, distributors, third party logistics, GPOs, and healthcare providers. Manufacturers develop and commercialize medical products and devices. The distributor is a wholesaler between the manufacturer and provider. The provider can buy products through the distributor using a GPO contract or directly from the manufacturer without the involvement of a distributor or GPO. Providers pay an annual membership fee to become part of a GPO and members can then purchase products through the distributor for product delivery at the contract price. Distributors can buy products from the manufacturer directly but will pay the distributor price which is higher than the GPO price. Profit margin for distributors comes from the manufacturer rebates and delivery fees. GPO's operating expenses services through CAF (Contract Administration Fees) and membership fees to join a GPO.

Lee (2014) discusses the potential impact of unreported GPO administrative-fees and how they may impact the reporting of Medicare costs and the supply-chain in general. GPO's are thought to help hospitals reduce cost of medical supplies and other products, so a federal safe harbor ruling in 1986 allows GPO's to take administrative-fees of 1 to 3% from medical suppliers and vendors without violating the federal anti-kickback law. Medical suppliers and vendors criticize safe harbor because it means they must pay GPOs a fee to work with them. Administrative fees generate the majority of GPOs operating revenue and without these fees, GPOs would go out of business. 90% of hospitals use

one of the five national GPOs in this study. 70% of the \$2.3 billion in fees received by the five largest GPOs in 2012 went back to hospitals. Fees generated 92% of revenue for the five GPOs in 2012. The Government Accountability Office reported that repealing the safe harbor could eliminate the effects GPOs have on Medicare payment rates but might be disruptive to the supply-chain in the near term. The GAO stated there was not much empirical data to explain GPO models impact on healthcare costs but also lacked enough empirical data to make a case for repealing the safe harbor laws.

Schmidt & Ward (2018) provide a case study demonstrating the need for continuous improvement through prioritized evaluation and review for the quality and safety of patients and reduction in risk for the organization. Health organizations haven't optimized their supply chain costs to achieve savings. The importance of the supply/chain and review of the contractual changes in GPO activity protects the patient, advises physicians, and has an impact on continued patient safety and overall risk. Choosing safer medical devices and more costs effective devices will help reduce the overall cost of quality care and decrease risk to patients and the organization.

GPOs provide increased hospital performance efficiencies by aggregating purchase volume, increasing communication, and using leverage to negotiate discounts and achieve economies of scale with manufacturers, distributors, other vendors (Weinstein, 2006; Callender & Grasman, 2010; Nollet & Beaulieu, 2005; Malloch, 2001). GPO has a positive impact on strategic purchasing which in turn has a positive impact on the firm's financial performance (Carr & Pearson, 2002). Hunt & Dedrick (2007) make the case that hospitals which join a GPO gain greater efficiency by obtaining the best prices, identify opportunity costs, and access information to improve performance that would be more difficult to achieve outside the purchasing power and negotiations afforded by a GPO. GPOs do lower prices for providers and manufacturers by lowering transaction costs which increase efficiency (Hu & Schwarz, 2011).

Several other sources describe GPO efficiency and performance gains in terms of increased bargaining ability and negotiation with suppliers, lower prices, better service, increased operating efficiency, product standardization, price discounts and cost control, improved patient treatment outcomes, greater service quality, patient safety, and satisfaction (Klein, 2015; Kim & Kwon, 2015; Jayaraman et al., 2014; Nyaga et al., 2015). An efficient GPO is the best option to make informed decisions since they continually evaluates current or potential GPO relationships through a formal evaluation process, choosing safer but more cost effective medical devices, reducing the overall cost of quality care and decreasing patient risk but increasing overall organizational efficiency (Schmidt & Ward, 2018; Rego et al., 2014). Therefore, this study hypothesizes that hospitals, which use a group purchasing organization (GPO) are significantly more efficient than hospitals that do not use a GPO:

Hypothesis H1b: Hospitals that use a Group Purchasing Organization (GPO) are significantly more efficient than hospitals without GPO.

Likewise, this study hypothesizes that hospitals which use a GPO are significantly more profitable than hospitals that don't use a GPO:

Hypothesis H2b: Hospitals with GPO are significantly more profitable than hospitals without GPO.

Control variables

Khushalani & Ozcan (2017) used DEA to examine efficiency of producing quality in hospitals between 2009 and 2013 and found that urban and teaching hospitals were less likely to improve efficiency of quality production. O'Neill et al. (1998) used DEA technique to measure the performance of 27 large, urban hospital including 13 teaching hospitals. Nyaga et al. (2015) identify factors that influence supply chain efficiency in hospitals. The study used control variables which are related to supply chain efficiency including teaching status as well as hospital-controlled GPO, market competition, urban-rural location, hospital size, occupancy rate, case mix, type of ownership, and year. McKone-Sweet et al. (2005) surveyed regional, national, and worldwide distributors, regional and national GPOs with varying numbers of sites and hospitals, non-profit hospitals, teaching, and general hospitals, with different types of hospitals and services resulting in varies levels of hospital efficiency. Mutter et al. (2010) found hospitals that were more efficient had lower total expenditures, lower occupancy rate, spent less capital per bed, and were less likely to be COTH (teaching) hospitals. Choi et al. (2017) grouped hospitals by control variable teaching and non-teaching hospitals to analyze hospital efficiency. Teaching and non-teaching hospitals were found to have statistically different

efficiency scores. Choi cites other studies that also found that non-teaching hospitals to be more efficient (Lee & Hadley, 1985; Hollingsworth, 2008; Grosskopf et al., 2004). Choi et al. (2017) found a statistically significant difference between teaching and non-teaching hospitals, with teaching status negatively associated with hospital efficiency but positively related to quality of care. Therefore, this study hypothesizes that teaching hospital membership make an impact on hospital efficiency:

Hypothesis H3a: Teaching hospitals may make an impact on hospital efficiency for hospitals that use a distributor.

Hypothesis H3b: Teaching hospital may make an impact on hospital efficiency for hospitals that belong to a GPO.

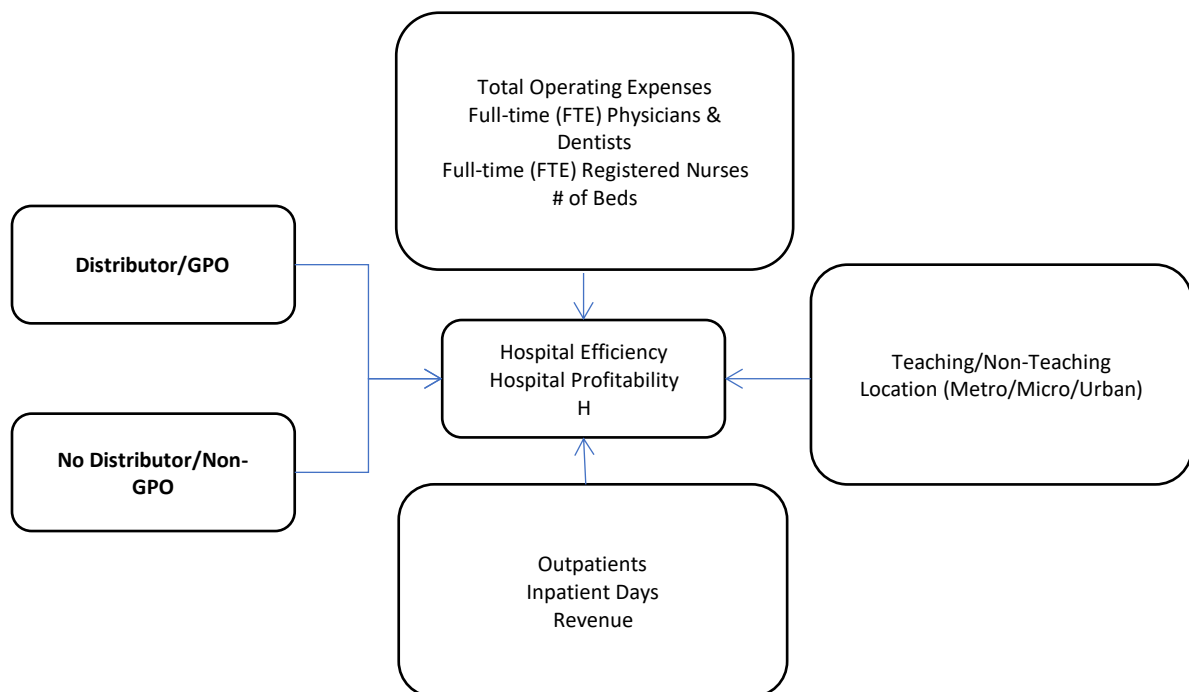
Nyaga et al. (2015) identify factors that influence supply chain efficiency in hospitals used control variables relating to supply chain efficiency including hospital urban-rural location. Hunt & Dedrick (2007) provides a counter argument that not all hospitals might benefit from GPO participation depending on certain factors like volume and location, some hospitals can act as their own GPO's by leveraging regional influence and reputation, maximizing software and collaboration techniques. McKone-Sweet et al. (2005) identified the effectiveness of GPOs in terms of pricing, greater contracted products, and economies of scale. The study identified that small rural hospitals benefit most from GPO relationships to negotiate lower prices but cites physician preference items (PPI) pricing as less than optimal. Therefore, this study hypothesizes that hospital location may make an impact on hospital efficiency:

Hypothesis H4a: Hospital location may make an impact on hospital efficiency for hospitals that use a distributor.

Hypothesis H4b: Hospital location may make an impact on hospital efficiency for hospitals that belong to a GPO.

Below is the hypothesized research framework.

Figure 2.
Distributor/GPO Hypothesized Research Framework



METHODOLOGY

We employ data envelopment analysis (DEA) for measuring the comparative efficiencies of hospitals using variables related to hospital distributors. As a useful comparative analysis tool, DEA is a type of linear programming from Farrell (1957) used to measure relative efficiency of similar objects, called decision-making units (DMU). DEA identifies relative efficiencies among many DMUs. In this study, involving comparative measures of hospital operational efficiencies for DMUs, a Charnes-Cooper-Rhodes (CCR-I) model, a Banker, Charnes, and Cooper (BCC-I) model, and a slack-based measure of efficiency (SBM-C and SBM-V) are employed. These 4 Bilateral DEA models are run using DEA-Solver software. The DMUs are grouped by hospitals that use a distributor and those that do not use a distributor and hospitals that use a group purchasing organization and those that do not. A DEA efficiency score and rank (rank sum) are calculated for each DMU based on the input and output variables.

Sampling (Data Collection) Plan

AHA 2015 Annual Hospital Survey data from the American Hospital Association (AHA) consisting of survey responses from 6,251 hospitals was used for this study. For the Distributor (SUPLY) and GPO (GROUP) variables, hospitals that reported missing, blank, or zero values are excluded from the data set.

Distributor

A survey question asked if the hospital purchases supplies directly through a distributor (SUPLY variable = 1-No Distributor and 2-Distributor). If the respondent didn't answer the question (i.e., blank), these data points (2,037) were dropped. This resulted in 3,402 hospitals that use a distributor and 812 hospitals that do not, a total of 4,214 hospitals remaining (N=6251-2037). Blanks and 0 values were also dropped from the 4 input variables (FY1-Total Operating Expenses, FTEMD, FTERN, and BDTOT) and 3 output variables (VTOT, IPDTOT, and FY1-Total Patient Revenue) selected from the AHA survey questions and financial data file based on our research of hospital efficiency and distributors.

Input Variables:

FY1-Total Operating Expenses contained 161 hospitals with blanks, zero (0) values, NA, and missing values. These values were assumed to be incorrectly recorded and dropped, reducing our sample size to 4,053 (N=4,214-161).

FTEMD (full-time equivalent doctors) contained no blanks but 1,572 zero values were dropped. Hospitals with no full-time doctors were excluded to avoid the biased effect from extreme values, reducing our sample size to 2,481 (N=4,053-1,572).

FTERN (full-time equivalent RNs) contained no blanks, no zero values, and all full-time equivalent RN values were correctly recorded. The sample size was not reduced and remained at 2,481.

BDTOT (total # of beds) contained no blanks, no zero values, and all were correctly recorded. The total number of beds field for all records were correctly recorded. The sample size was not reduced and remained at 2,481.

Output Variables:

VTOT (total outpatient visits) contained no blanks but 111 hospitals with no outpatient visits were excluded from the sample size (N=2,481-111), reducing the sample to 2,370.

IPDTOT (inpatient days) contained no blanks and no zero values. The sample size was not reduced and remained at 2,370.

FY1-Total Patient Revenue contained no blanks but 31 hospitals with \$0 revenue were excluded from the sample size (N=2,370-31), reducing the sample to a final sample size of 2,339.

Group Purchasing Organization (GPO)

A survey question asked if the hospital purchases supplies directly through a group purchasing organization (GROUP variable = 1-No GPO and 2-GPO). If the respondent didn't answer the question (i.e., blank), these data points (1,922) were dropped. This resulted in 3,982 hospitals that use a GPO and 347 hospitals that do not, a total of 4,329 hospitals remaining (N=6251-1922). Blanks and 0 values were also dropped from the 4 input variables (FY1-Total Operating Expenses, FTEMD, FTERN, and BDTOT) and 3 output variables (VTOT, IPDTOT, and FY1-Total Patient Revenue) selected from the AHA survey questions and financial data file based on our research of hospital efficiency and group purchasing organizations.

Input Variables:

FY1-Total Operating Expenses contained 163 hospitals with blanks, zero (0) values, NA, and missing values. These values were assumed to be incorrectly recorded and dropped, reducing our sample size to 4,166 (N=4,214-163).

FTEMD (full-time equivalent doctors) contained no blanks but 1,614 zero values were dropped. Hospitals with no full-time doctors were excluded to avoid the biased effect from extreme values, reducing our sample size to 2,552 (N=4,166-1,614).

FTERN (full-time equivalent RNs) contained no blanks, no zero values, and all full-time equivalent RN values were correctly recorded. The sample size was not reduced and remained at 2,552.

BDTOT (total # of beds) contained no blanks, no zero values, and all were correctly recorded. The total number of beds field for all records were correctly recorded. The sample size was not reduced and remained at 2,552.

Output Variables:

VTOT (total outpatient visits) contained no blanks but 124 hospitals with no outpatient visits were excluded from the sample size (N=2,552-124), reducing the sample to 2,428.

IPDTOT (inpatient days) contained no blanks and no zero values. The sample size was not reduced and remained at 2,428.

FY1-Total Patient Revenue contained no blanks but 32 hospitals with \$0 revenue were excluded from the sample size (N=2,428-32), reducing the sample to a final sample size of 2,396.

Control Variables:

For each of our control variables, we require the data to be ordinal, independent, populations are equal (for null hypothesis H0), and distributions are not equal for (alternative hypothesis H1) to run a Mann-Whitney test, a nonparametric test of the null hypothesis that a randomly selected value from one sample will be less than or greater than a randomly selected value from a second sample. Kruskal-Wallis (K-S) test is used for variables containing more than two variables. We re-coded the control variables to have ordinal data:

MAPP8 was re-coded for two groups: Teaching hospitals (1) and Non-Teaching hospitals (2).

CBSATYPE (census bureau area type) was re-coded for three groups: Rural (1), Micro (2), and Metro (3).

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MORE QUALITY, LESS QUANTITY: DIVERSIFICATION AND RISK REDUCTION IN QUALITY PORTFOLIOS

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ABSTRACT

The research presented in this paper aims to construct Warren Buffett-style, concentrated portfolios based on two main criteria, size and quality, in order to investigate the diversification and risk reduction in concentrated, quality portfolios. We construct the concentrated index portfolios with companies that are leaders in quality following the method of Asness, Frazzini, & Pedersen (2018). Our research indicates that for any number of stocks in a portfolio, quality portfolios have less risk than portfolios constructed with random stocks. Consistent with the prior literature on the quality factor and the low volatility effect, we find that our low-risk, quality portfolios have higher risk adjusted mean returns than the diversified market portfolio. Finally, we show that the risk of a portfolio constructed based on quality, does not decrease monotonically as the number of quality stocks is increased. Instead, we find that the risk of quality portfolios is minimized at about 10 stocks and that increasing the number of stocks in the quality portfolio actually increases the standard deviation and beta risk. We refer to this increase in risk of the quality portfolios with an increasing number of stocks as the quality dilution effect. While Buffett has long argued that holding a large number of stocks about which he knows nothing seems risky to him, we believe that our research is the first to provide empirical evidence for Buffett's assertion.

INTRODUCTION

Warren Buffett's success over the past decades has sparked a wave of research, which has sought to explain his success and find ways to duplicate it. While researchers praise Buffett's ability to predict future returns and pick stocks accordingly, they can trace some of his success to following a strict investment discipline. For instance, the stocks Buffett buys tend to be rather mature and large-cap companies. In addition, they display higher levels of safety and appear to have certain quality attributes (Frazzini, Kabiller, & Pedersen, 2018). Since the number of stocks that fit into these criteria is limited and too many companies would dilute the quality aspect, Buffett chooses to invest in only a small number of companies. Benello, Van Biema, & Carlisle (2016) quote Buffett saying that "if it's your game, diversification doesn't make sense. It's crazy to put money in your twentieth choice rather than your first choice. . . . [Berkshire vice-chairman] Charlie [Munger] and I operated mostly with five positions." Therefore, in order to mimic Buffett's performance, the portfolio construction would need to match two criteria. The portfolio would need to be a concentrated portfolio of large company stocks that are of high quality. DeAngelo, & Skinner (2004) show that earnings, as well as dividends concentrate in fewer, large companies, which further supports the selection of such for a concentrated portfolio.

The second criteria a stock has to meet in order to be considered a feasible option for a Buffett-type portfolio is high quality. Many papers have been written on the definition of a quality stock. Some assume that quality simply equals profitability. However, a more complex quality model (Asness, Frazzini, & Pedersen, 2018) has found a quality factor that seems to explain Buffett's excess returns. This quality factor consists of profitability but also includes measures of growth, as well as the safety of the company. A portfolio built on this quality factor has shown to earn excess returns over the Fama and French five-factor model and a six-factor model that also includes the momentum factor (Asness, Frazzini, & Pedersen, 2018). Using his concentrated portfolio of quality stocks, Buffett has produced market-beating returns avoiding "over-diversification".

In contrast to Buffett's concentrated investment strategy, traditional portfolio theory advocates a diversified portfolio with a large number of stocks to eliminate unsystematic risk. While the prior literature shows that a significant portion of the risk reduction occurs within the first 20-50 stocks [depending on the study], virtually all of the prior research indicates a monotonic decline in portfolio risk as the number of stocks in the portfolio approaches the market portfolio. Another key foundation of the diversification effect is the random selection of stocks to minimize the covariance between stocks in the portfolio.

The research presented in this paper aims to construct a Buffett-style portfolio based on the two main criteria discussed above – size and quality. Only the largest companies in an S&P sector are considered for the concentrated portfolios. In addition, we construct the portfolio with companies that are leaders in quality. Our research indicates that for any

number of stocks in a portfolio, quality portfolios have less risk than portfolios constructed in the prior research with random stocks. Consistent with the prior literature on the quality factor and the low volatility effect, we find that our low-risk, quality portfolios have higher risk adjusted mean returns than the diversified market portfolio. Finally, we show that the risk of a portfolio constructed based on quality, does not decrease monotonically as the number of quality stocks is increased. Instead, we find that the risk of quality portfolios is minimized at about 10 stocks and that increasing the number of stocks in the quality portfolio actually increases the standard deviation risk. We refer to this increase in risk of the quality portfolios with an increasing number of stocks as the quality dilution effect. While Buffett has long argued that holding a large number of stocks about which he knows nothing seems risky to him, we believe that our research is the first to provide evidence for Buffett's assertion.

LITERATURE REVIEW AND HYPOTHESES

Concentrated Portfolio Strategy

One of the hypotheses of this paper is that a smaller number of shares, selected for a Buffett-style quality portfolio, can provide less risk than a randomly selected diverse portfolio. The large-company stocks in Buffett's portfolio are safe (measured by low beta and low return volatility) and of high quality. Quality companies are often defined as profitable, stable, growing, and dividend paying. This tells us that while 80% of Buffett's portfolio remains in private companies, the publicly traded companies held by Buffett are larger, older, and more mature companies. According to findings in the dividend literature (Baker, 2009), older, more mature firms are cheaper (in terms of market-to-book), safer (less return volatility), and more likely to pay a dividend than younger firms. This premise leads to our first hypothesis:

H1: The Buffett-style portfolios constructed in this paper, which are based on a concentrated quality strategy, have less total return volatility than portfolios constructed of randomly selected stocks.

Factor Investing and Quality Factor

Piotroski (2000) argues that less than 44% of large, mature companies actually earn a positive return in any given year; therefore, it is not enough to find mature, large companies. Instead, one has to separate "winners," those companies which will have a positive return, from "losers," those which will not have positive returns. By using a binary score and buying the companies with higher scores, Piotroski demonstrates that one can increase returns. Consequently, academic research supports Buffett's success- that is one can obtain high returns by selecting stocks of large mature companies, when such companies are of higher quality (or those considered winners). The issue then becomes defining quality.

Wang & Yu (2013), Liu (2015), and Novy-Marx (2013) all report the ability of profitability to predict future stock returns. Novy-Marx (2013) finds that profitability has roughly the same predictive power as the book-to-market, or the HML factor described by Fama & French (1993). If profitability provides a return premium while having lower risk levels than other factors, then it can be considered a sorting method to separate "winners" from "losers" and to identify quality. Bouchaud, Ciliberti, Landier, Simon, & Thesmar (2016) found that quality measures based on profitability alone are under-utilized in stock price forecasting. Asness, et al. (2018) identify a more evolved quality factor. Similar to Bouchaud, et al. (2016), they use profitability to identify quality, but they also enhance the quality factor with a growth and a safety component. Asness, et al. (2018) combine profitability measures, growth rates, and safety measures to rank stocks from highest to lowest quality. A portfolio buying the high-quality stocks and shorting those of lower quality shows excess returns even with a six-factor model. The success of Buffett and the success of portfolios based on the quality factor in the prior literature suggests our next hypothesis:

H2: The concentrated, large cap portfolios based on a quality strategy constructed in this research will earn an excess return for the levels of risk taken.

Diversification and Risk Reduction

Since the objective of this paper is to investigate the risk reduction in concentrated Buffett style portfolios, we seek to develop two key features of the research – (1) the randomly selected, diversified portfolio as a benchmark and (2) a quality index portfolio where the number of quality firms in the portfolio can be simulated. Evans and Archer (1968)

developed the basis for the methodology and definitions for most investigations between the risk of a portfolio and the number of securities in that portfolio. Evans and Archer's (1968) results indicate the standard portfolio theory relationship that risk decreases asymptotically with an increasing number of randomly selected firms. Elton and Gruber (1977) provide an analytical expression for the relationship between portfolio risk and the number of securities (which are randomly selected). Statman (1987) converts the Elton and Gruber(1977) results to standard deviations of annual returns which serves as a benchmark for our simulations. Although researchers vary in the optimal number of securities in a portfolio based on somewhat different portfolio marginal analysis, nearly all studies agree that increasing the number of randomly selected securities in a portfolio decreases the portfolio risk.

In contrast Asness et al.,(2018) rank stocks by quality and find the characteristics of the high quality stocks differ from the low quality stocks to the point where they refer to the low quality stocks as "junk". Given the quality definition and ranking by Asness et al.,(2018) low quality stocks are less profitable, less safe, and have slower growth. In a ranked quality portfolio, increasing the number of securities in the portfolio *reduces* the quality of the overall portfolio. Our premise is that at some point, the benefits of eliminating the unsystematic risks will be lost to the reduction in quality by the "junk" firms. We refer to this reduction in quality with increasing firms in a quality ranked portfolio as the quality dilution effect. Contradictory to a randomly generated portfolio that achieves risk reduction (albeit at a diminishing rate), we propose that increasing the number of firms in a quality portfolio at some point actually increases the risk of the portfolio. Our final hypothesis then is:

H3: Due to the quality dilution effect, the total risk of the ranked quality index portfolios does not decline asymptotically with an increasing number of lower ranked firms.

DATA AND METHODOLOGY

Variables and Data

To study the effect of increasing the number of securities in a quality-ranked index portfolio and test our quality dilution hypothesis, we developed a quality index portfolio, which we refer to as the Makowski-Hauser Quality Index [herein the MHQI]. To construct the MHQI, we essentially follow the method of Asness et al. (2018) to construct a quality factor and a quality score. The MHQI portfolio of n stocks is constructed from the n stocks with the highest quality scores. Statman (1987) conversion of the Elton and Gruber(1977) results to standard deviations of annual returns serves as a randomly selected portfolio benchmark for our simulations. We retrieved the annual historical financial data and total return data from FactSet Research Systems Inc.'s database for the 2005 -2018 time period, although earnings data dated back to 2000 for computation of the 5-year growth rate. Table 1 lists the variables and definitions for the raw data measures retrieved and the corresponding computed quality measures.

Table 1.
Variables and Definitions

| <i>Variables</i> | <i>Definitions</i> |
|---|---|
| <i>Data Retrieved from FactSet</i> | |
| Profitability Factor Measures | |
| <i>Asset Turnover</i> | Sales / Total Assets |
| <i>ROA</i> | Return on Assets |
| Safety Factor Measure | |
| <i>Leverage</i> | Total Liabilities / Total Assets |
| Growth Factor Measure | |
| <i>Growth in Earnings</i> | 5-Year Growth in Net Income |
| <i>Annual Returns</i> | Annual Return for Company X in year t+1 |
| <i>Computed Variables</i> | |
| <i>zProf</i> | z-Score of Profitability, Profitability Score |
| <i>zGrowth</i> | z-Score of Growth, Growth Score |
| <i>zSafety</i> | z-Score of Safety, Safety Score |
| <i>Quality Score</i> | z-score of (zProf + zGrowth + zSafety) |

Factors

The quality factor consists, as suggested by Asness, et al. (2018), of three components: Profitability, growth, and safety. For this investigation, sales over total assets and return on assets are the profitability measures used in the quality score calculations. We follow the measure of growth applied by Asness, et al. (2018) and use a five-year growth rate of earnings, where the growth rate considers the total growth of earnings over the five-year time span. We utilize a function of leverage for the safety factor.

Quality Score

The factors then need to be standardized in order to allow a ranking of the companies. The formula for the standardization of any measure is given as

$$z = \frac{x_i - \mu}{\sigma}$$

where X_i is the value of the factor for company x in a given year, μ is the mean of the factor in the sample for a given year, and σ is the standard deviation of the factor in the sample for a given year. Following Asness et al., (2018) the standardized scores for each component of the quality score are combined for each considered company. Company X 's quality score is calculated by summing the z -scores of each component and once again, standardizing the sum using the following formula

$$Quality(x, n) = \frac{\sum\{zProf(x, n), zGrowth(x, n), zSafety(x, n)\} - \mu\{\sum[zProf(n), zGrowth(n), zSafety(n)]\}}{\sigma\{\sum[zProf(n), zGrowth(n), zSafety(n)]\}}$$

where $Quality(x, n)$ is the quality score for company x in year n , $zProf(x, n)$ is the profitability-score of company x in year n , $zGrowth(x, n)$ is the growth-score of company x in year n , and $zSafety(x, n)$ is the safety-score for company x in year n ,

$\mu\{\sum[zProf(n), zGrowth(n), zSafety(n)]\}$ is the mean of the sum of the profitability, growth, and safety-scores in year n , and

$\sigma\{\sum[zProf(n), zGrowth(n), zSafety(n)]\}$ is the standard deviation of the sum of the profitability, growth, and safety scores in year n .

Quality Index

The quality factor allows us to rank the companies in each year by quality. The portfolio simulation ranks the top quality companies per year regardless of sector, where the highest n quality ranked stocks become the n -stock quality index portfolio. Following the method of Archer and Evans (1968), the securities in the MHQI portfolio are equal weighted. The portfolios are rebalanced at market open on July 1st of every year. Financial data of companies with a fiscal year end date before the 31st of March of the year is used in the portfolio construction. Any data of companies with a fiscal year end data past March 31st is used in the following year quality score calculation. In doing so, we avoid the construction of an explanatory model and mitigate endogeneity (since we are evaluating future returns based on past financial quality data). Ensuring that all data is available at the time of quality score calculation avoids any information bias. The companies in consideration, as well as the quality score for each company is re-evaluated annually. Thus, the emerging portfolio is rebalanced on an annual basis. Finding the annual returns for the holdings in the portfolio for the year $t+1$, we are able to calculate a portfolio return. From the simulated portfolio returns, we compute the portfolio risk measures, which enables us to test the research hypotheses.

Investible Quality Index Portfolios

It is advantageous to consider existing, investible portfolios that follow a quality index strategy. One such portfolio is the iShares Edge MSCI USA Quality Factor ETF – QUAL. This portfolio tracks the MSCI Quality Index. As of September 2019, the portfolio has 125 holdings (Morningstar, Inc., a). The index calculates the quality score based on three variables: return on equity, debt-to-equity and earnings variability (MSCI Index Methodology, 2013). A company with the highest return on equity, while simultaneously having the lowest debt-to-equity ratio and the lowest earnings variability is assigned the highest quality score in this index. Following Asness, et al. (2018), the three variables are standardized in order to make them comparable. Contradicting the work of Asness, et al., the MSCI index assigns the overall quality score by averaging the z-scores of the three variables. Finally, portfolio weights are assigned by multiplying quality scores with the market capitalizations of the stocks. The ETF was started in 2013 and over the last five years, QUAL has shown a lower standard deviation than the S&P 500. (Morningstar, Inc., c).

Another portfolio based on a quality index strategy is the Invesco S&P500 Quality ETF – SPHQ, which tracks the S&P 500 Quality Index (USD). Quality scores are calculated using return on equity, an accruals ratio, and the financial leverage of the company. The overall quality score is calculated by averaging the standardized values of the three components. The values are winsorized at 4 and -4 and finally the quality score is computed by transforming the new values into a scalable version of the data. The highest 100 quality scores make it into the portfolio and weights are assigned by multiplying the quality score and the float-adjusted market capitalization (S&P Dow Jones Indices, 2018). Over the 10 years ending in September 2019, SPHQ has outperformed the S&P 500 with a lower standard deviation and higher Sharpe ratio (Morningstar, Inc., b). After reviewing the two investible quality index portfolios with the longest histories, we believe that our MHQI methodology is sufficiently comparable to other quality index portfolios.

EMPIRICAL RESULTS

Portfolio Concentration

Portfolio Simulation Risk

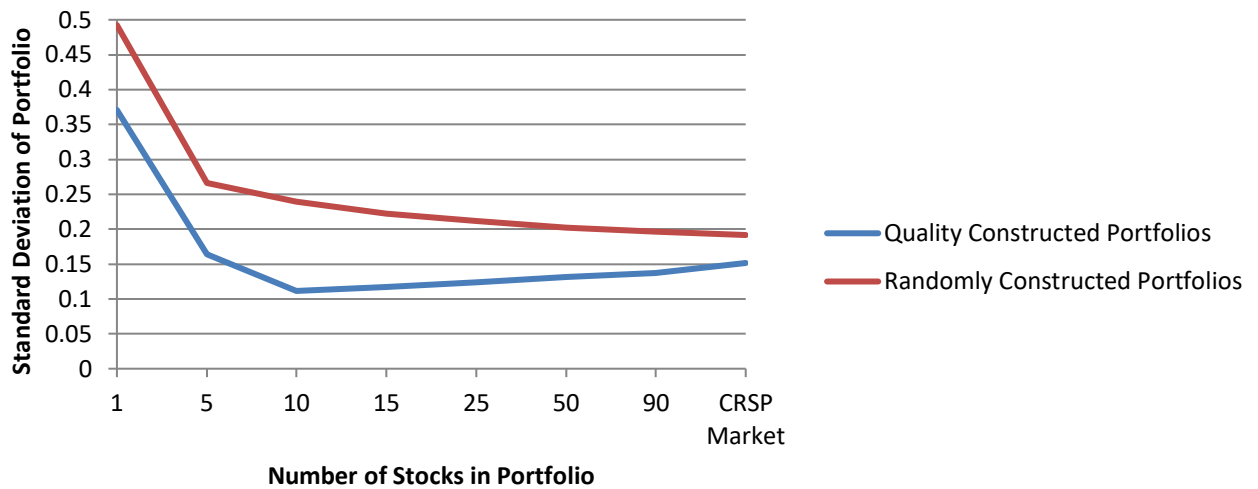
Table 2
Simulation results for increasing the number of firms in the quality index portfolios.

| Number of Stocks in portfolio | Benchmark Portfolio Constructed by Adding Random Stocks | | Quality Portfolio Constructed by Adding Ranked Quality Stocks | | |
|-------------------------------|---|--|---|---|---|
| | Standard Deviation of Annual Portfolio Returns ¹ | Ratio of Portfolio Standard Deviation to Standard Deviation of a Single Stock ¹ | Standard Deviation of Annual Portfolio Returns | Ratio of Portfolio Standard Deviation to Standard Deviation of a Single Stock | Ratio of Quality Portfolio Standard Deviation to Random Portfolio |
| 1 | 49.236 | 1.00 | 37.1 | 1.00 | 0.75 |
| 5 | 28.165 | 0.57 | 16.4 | 0.44 | 0.58 |
| 10 | 23.932 | 0.49 | 11.1 | 0.30 | 0.46 |
| 15 | 22.466 | 0.46 | 11.7 | 0.32 | 0.52 |
| 25 | 21.196 | 0.43 | 12.4 | 0.33 | 0.59 |
| 50 | 20.203 | 0.41 | 13.1 | 0.35 | 0.65 |
| 90 | 19.742 | 0.40 | 13.8 | 0.37 | 0.70 |

¹ Source: Statman from Elton and Gruber. Statman converted Elton and Gruber weekly variances to standard deviation of annual returns. We interpolated Statman's table for results at 5, 15, 25, and 90 firms.

Table 2 indicates that our simulation does show that the Buffett-style portfolios constructed in this research, which are based on a concentrated quality strategy, have less total return volatility than cocentrated portfolios constructed of randomly selected stocks, which supports hypothesis H1. The simulation results show that the concentrated quality index portfolios have about 50 – 75% of the standard deviation of annual returns as the concentrated portfolios constructed of randomly selected stocks. Figure 1 presents the standard deviation results in the format similar to Evans and Archer (1968).

Figure 1. Standard Deviation of Portfolio with Increasing Number of Stocks



Our results are consistent with the prior dividend policy literature, which shows that higher-quality, dividend paying stocks have lower volatility than non-paying stocks. Table 3 details the simulation results for increasing the number of firms in the quality index portfolios.

Table 3
Simulation Results for Increasing the Number of Firms in the Quality Index Portfolios

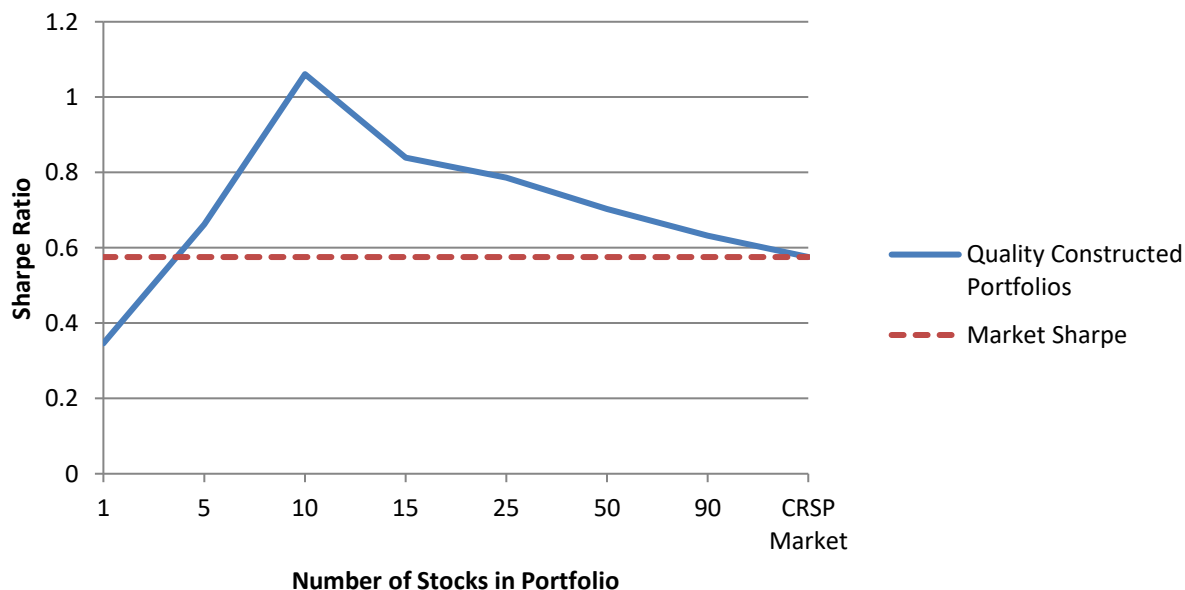
| | Market | Makowski-Hauser Quality Index Portfolios | | | | | | |
|-----------------|-------------|--|--------|--------|--------|--------|--------|--------|
| Year | CRSP Market | 90 | 50 | 25 | 15 | 10 | 5 | 1 |
| 2005 | 0.094 | 0.116 | 0.137 | 0.087 | 0.039 | 0.050 | 0.060 | 0.171 |
| 2006 | 0.195 | 0.212 | 0.196 | 0.184 | 0.172 | 0.196 | 0.224 | 0.263 |
| 2007 | -0.124 | -0.063 | -0.022 | -0.016 | 0.061 | 0.115 | 0.127 | -0.436 |
| 2008 | -0.251 | -0.244 | -0.241 | -0.209 | -0.204 | -0.196 | -0.296 | -0.513 |
| 2009 | 0.154 | 0.147 | 0.156 | 0.155 | 0.111 | 0.102 | 0.160 | 0.766 |
| 2010 | 0.319 | 0.309 | 0.296 | 0.325 | 0.327 | 0.313 | 0.429 | 0.335 |
| 2011 | 0.037 | 0.055 | 0.116 | 0.134 | 0.174 | 0.164 | -0.001 | 0.117 |
| 2012 | 0.221 | 0.212 | 0.201 | 0.192 | 0.187 | 0.144 | 0.027 | 0.128 |
| 2013 | 0.251 | 0.238 | 0.229 | 0.218 | 0.167 | 0.181 | 0.301 | 0.672 |
| 2014 | 0.074 | 0.045 | 0.016 | 0.063 | 0.058 | 0.106 | 0.126 | 0.027 |
| 2015 | 0.015 | 0.049 | 0.053 | 0.070 | 0.124 | 0.177 | 0.149 | -0.040 |
| 2016 | 0.197 | 0.141 | 0.158 | 0.132 | 0.154 | 0.175 | 0.160 | -0.159 |
| 2017 | 0.158 | 0.098 | 0.093 | 0.134 | 0.074 | 0.132 | 0.054 | 0.086 |
| 2018 | 0.044 | 0.065 | 0.070 | 0.058 | 0.093 | 0.160 | 0.166 | 0.544 |
| Mean | 0.099 | 0.099 | 0.104 | 0.109 | 0.110 | 0.130 | 0.120 | 0.140 |
| St.Dev | 0.151 | 0.138 | 0.131 | 0.124 | 0.117 | 0.111 | 0.164 | 0.371 |
| Geomean | 0.088 | 0.090 | 0.096 | 0.102 | 0.104 | 0.124 | 0.108 | 0.077 |
| Return/St.Dev | 0.653 | 0.717 | 0.793 | 0.882 | 0.941 | 1.167 | 0.733 | 0.378 |
| Number of Firms | ~ 4000 | 90 | 50 | 25 | 15 | 10 | 5 | 1 |
| Avg. Qual Score | - | 0 | 0.657 | 1.212 | 1.591 | 1.886 | 2.322 | 3.145 |
| Beta | 1 | 0.883 | 0.864 | 0.840 | 0.828 | 0.807 | 1.205 | 1.726 |
| | | | | | | | | |

Portfolio Returns

Portfolio Return Results

Table 3 presents the risk and return characteristics for the concentrated MHQI portfolios. Confirming hypothesis H2, our results show that increasing the number of firms reduces the mean return of the quality index portfolios monotonically until the full sample return converges to the mean CRSP market return for the period. Without adjusting for risk, the concentrated quality index portfolios have as much as 60% higher mean return than the CRSP market mean return. Due to the lower risk of the MHQI portfolios, the risk adjusted return is as much as 80% higher than the CRSP market risk adjusted return. Figure 2 below shows the MHQI portfolio Sharpe Ratios against the Sharpe Ratio of the CRSP Market.

Figure 2. Portfolio Sharpe Ratio with Increasing Number of Stocks



From Figure 2, we can see that any MHQI portfolio with 5 – 50 stocks has a higher Sharpe ratio than the CRSP market. These results confirm the prior literature on the excess returns with the quality factor as well as the prior literature on the low volatility effect. The key insight here is that a concentrated (between 5 and 50 securities), quality portfolio with less risk actually has a greater risk adjusted mean return than the fully diversified CRSP market. Since the focus of this research is to investigate the risk reduction of the Buffett-style, quality portfolios, we will return the focus of the discussion to portfolio risk. Our point here was only to demonstrate that the concentrated quality portfolios did not sacrifice return for risk reduction.

Portfolio Return Factor Regressions

Since examination of total risk via standard deviation is only one risk measure, we investigated the beta of the portfolios. The portfolio return factor-regressions are considered with both single-factor regression and six-factor regression and the regression results are summarized in Table 4 below. Given the better fit of the six-factor regression model (as determined by the adjusted R^2), we utilize the market betas from the six-factor regression model for subsequent calculations. On a market risk basis, we find that concentrated MHQI portfolios have a beta lower than the diversified market for portfolios of more than 5 stocks, with a minimum market beta of 0.81. Figure 3 displays the declining beta in the quality portfolios as well. To demonstrate again that returns are not sacrificed for the lower

beta risk, we present the quality portfolio Treynor ratios in Figure 4. The Treynor ratio plot follows the results for the beta, with the quality portfolios having greater Treynor Ratios than the diversified market for quality portfolios of more than 5 stocks.

Table 4.
Multi-factor and Single-Factor Regression Results for the Annual Quality Index Portfolio Returns

| Regression Coefficients with p-values in parentheses | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|
| Panel A. Multi-Factor Regression Results | | | | | | | |
| | 90 | 50 | 25 | 15 | 10 | 5 | 1 |
| MktRF | 0.883 | 0.864 | 0.840 | 0.828 | 0.807 | 1.205 | 1.726 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.002) | (0.118) |
| SMB | -0.175 | -0.223 | -0.056 | -0.388 | -0.606 | -0.502 | -1.236 |
| | (0.175) | (0.177) | (0.548) | (0.095) | (0.007) | (0.324) | (0.525) |
| HML | 0.084 | 0.279 | -0.098 | -0.081 | -0.125 | -0.102 | -0.003 |
| | (0.490) | (0.100) | (0.303) | (0.696) | (0.458) | (0.834) | (0.999) |
| RMW | 0.168 | 0.554 | 0.383 | 0.789 | 0.757 | 1.433 | 0.146 |
| | (0.426) | (0.065) | (0.040) | (0.056) | (0.028) | (0.120) | (0.964) |
| CMA | 0.282 | 0.236 | 0.501 | 0.580 | 0.232 | -0.155 | 1.460 |
| | (0.113) | (0.275) | (0.004) | (0.069) | (0.318) | (0.814) | (0.575) |
| MOM | 0.073 | 0.111 | 0.125 | 0.141 | 0.131 | 0.157 | -0.238 |
| | (0.111) | (0.068) | (0.005) | (0.083) | (0.050) | (0.369) | (0.721) |
| Cons | 0.007 | 0.007 | 0.011 | 0.004 | 0.028 | -0.035 | -0.016 |
| | (0.512) | (0.593) | (0.229) | (0.840) | (0.096) | (0.434) | (0.927) |
| Adj R-Squared | 0.976 | 0.957 | 0.983 | 0.904 | 0.932 | 0.718 | 0.165 |

| Panel B. Single Factor (CAPM) Regression Results | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|
| | 90 | 50 | 25 | 15 | 10 | 5 | 1 |
| MktRF | 0.882 | 0.819 | 0.785 | 0.657 | 0.577 | 0.807 | 1.636 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.001) | (0.002) | (0.008) |
| Cons | 0.010 | 0.021 | 0.029 | 0.041 | 0.068 | 0.038 | -0.014 |
| | (0.289) | (0.129) | (0.031) | (0.073) | (0.011) | (0.292) | (0.875) |
| Adj R-Squared | 0.956 | 0.903 | 0.910 | 0.688 | 0.582 | 0.537 | 0.413 |

Figure 3. Portfolio Beta with Increasing Number of Stocks

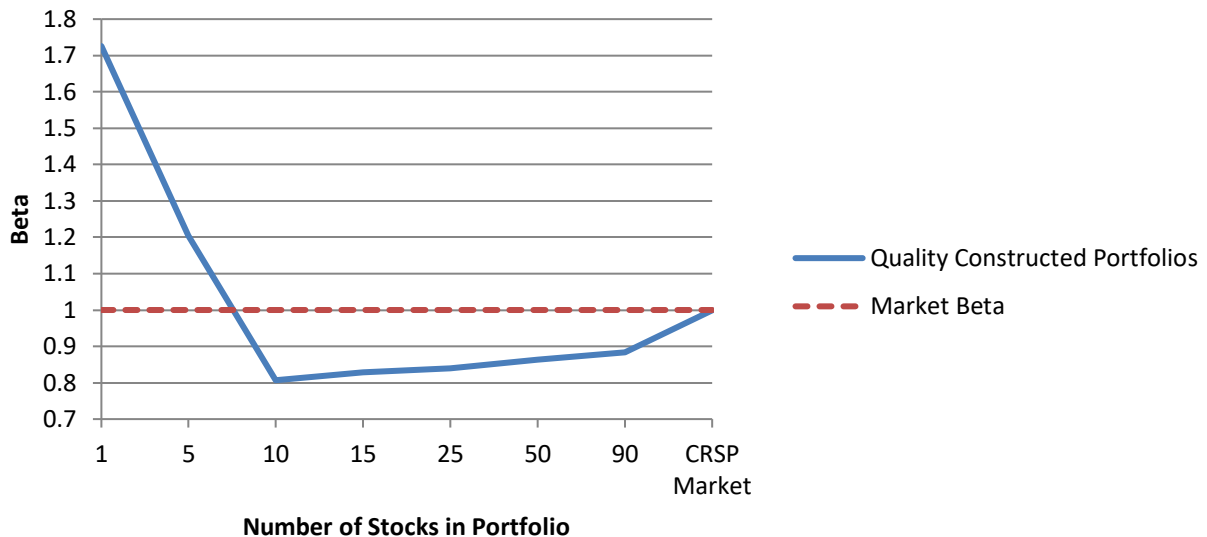
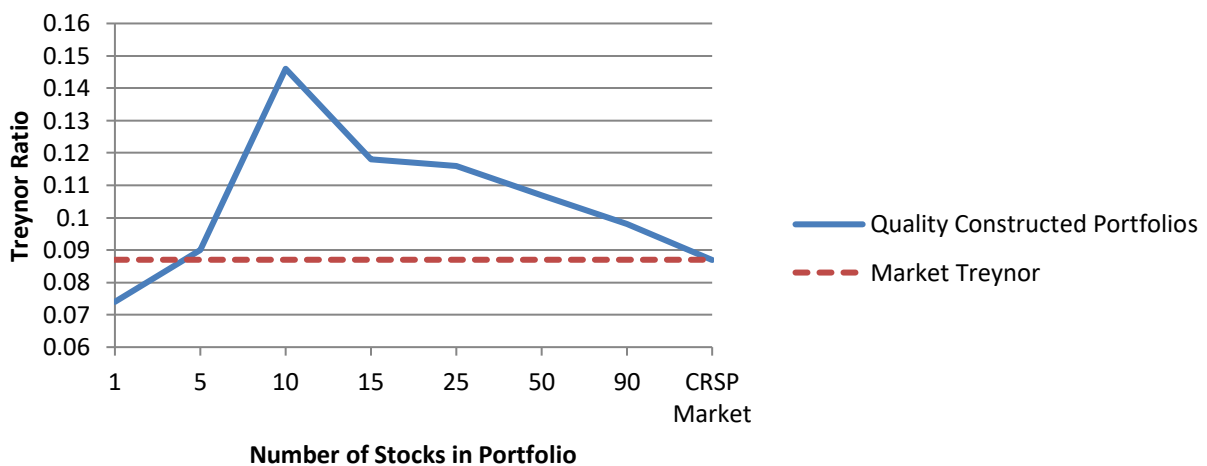


Figure 4. Treynor Ratio for Portfolios with Increasing Number of Stocks



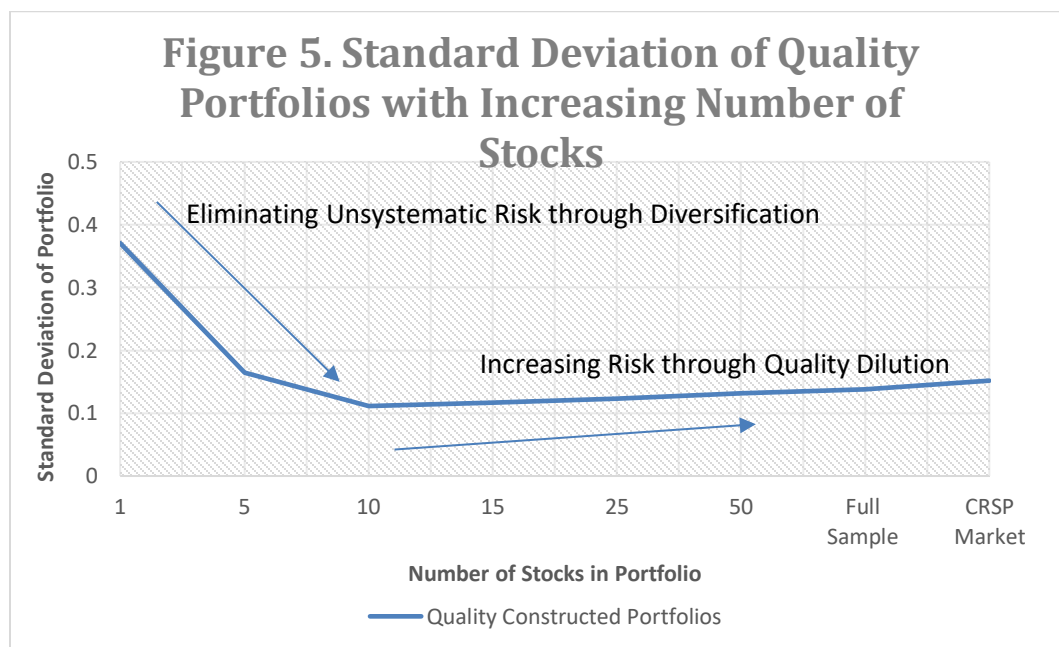
The multi-factor regression allows us to test for a six-factor alpha, and also gives insight on the additional risk loadings of the portfolio. The MHQI portfolio with 10 stocks is able to generate a six-factor alpha, which is significant at the 90% confidence interval. The MHQI portfolio with 10 stocks indeed beats the market significantly in terms of average returns with lower standard deviation and lower beta. As a result, the MHQI 10 stock portfolio generates a CAPM and a six-factor model alpha, which confirms H1 and H2. Since the sample population for the portfolio construction is built using the biggest companies in each of the industry sectors, it comes as no surprise that the portfolio shows

highly significant positive loading on the market, and highly significant negative loading on small capitalization stocks. The MHQI 10 stock portfolio also weighs heavily on profitable companies. A high positive load in the robust minus weak (RMW) factor acts as assurance that the quality factor, which relies heavily on profitability metrics, actually loads a risk premium from profitable companies.

Quality Dilution Effect

To summarize the results at this point, we have extended the existing literature on the quality factor and the low volatility effect to show that these phenomena also occur in concentrated quality index portfolios. However, the most significant finding of this research is the empirical evidence for the quality dilution effect. From the data previously presented in Tables 2 and 3, as well as Figures 1 and 3, it is clear that after about 10 quality stocks adding additional stocks to the quality portfolio increases the risk. Whether we measure the risk as standard deviation of annual returns or the portfolio beta, the conclusion remains that we find a point where further diversification of the quality portfolio actually *increases risk*. Furthermore, with the increase in risk after about 10 quality stocks, the risk adjusted return declines. Table 3 as well as Figures 2 and 4 show a clear optimal risk adjusted return at about 10 quality stocks and then risk adjusted return performance declines toward the CRSP market risk adjusted returns. The fact that we see a minimum risk (or corresponding maximum risk adjusted mean return) for a quality constructed index portfolio supports H3.

The premise for a minimum risk with a quality index portfolio can be seen graphically in Figure 5. When the quality index portfolio has less than 10 stocks, the standard principle of diversification works and unsystematic risk is eliminated. However, as ranked quality stocks are further added to the portfolio, each additional stock has a lower quality ranking, reducing the overall quality score as can be seen in Table 3. With the reduced overall quality score, the portfolio loses the characteristics of high quality stocks, namely lower risk. In the limit as the number of stocks is increased in the quality portfolio, the risk reverts to the asymptotic limit of the CRSP market risk. We refer to this effect of increasing risk with additional quality ranked stocks as the quality dilution effect. Note in Figure 5, that the tradeoff between the risk reduction with increasing diversification and risk increase with quality dilution leads to a minimum risk in the quality constructed index portfolios, with the minimum risk occurring at about 10 stocks. This minimum risk furthermore sets the optimal number of stocks in a quality constructed index. At the optimal number of about 10 quality stocks, the total risk of the quality index portfolio is 46% of the risk of a randomly selected portfolio of 10 stocks. Moreover, the beta of the 10 stock quality portfolio is 20% lower than the fully diversified market beta.



CONCLUSION AND IMPLICATIONS

The research set out to investigate three hypotheses related to the diversification and risk reduction of quality-constructed portfolios. The results show that portfolios made up large-company, high-quality stocks *have less total return volatility than portfolios constructed of randomly selected stocks*. In addition, the research also confirms that the concentrated large-cap quality index portfolios constructed in this paper *outperform the market and earn an excess return for the levels of risk taken*. With these results, we have extended the existing literature on the quality factor and the low volatility effect to show that these phenomena also occur in concentrated quality index portfolios.

However, the most significant finding of this research is the empirical evidence for the quality dilution effect, which refers to the effect of *increasing risk* as the number of quality ranked stocks is added to the portfolio. The tradeoff between the risk reduction with increasing diversification and risk increase with quality dilution leads to a minimum risk in the quality constructed index portfolios, with the minimum risk occurring at about 10 stocks. This minimum risk inflection point furthermore sets the optimal number of stocks in a quality-constructed index. The minimum risk inflection point occurs [with a significant reduction in risk over the diversified market portfolio] whether we define risk in terms of standard deviation or beta.

The implications of this research are profound on the understanding of concentrated quality portfolios. Our research shows that quality constructed portfolios can actually have too much diversification. Although Warren Buffett has asserted “over-diversification” for years, our research offers empirical support to Buffett’s claim. However, even beyond the construction of quality index portfolios, most portfolio managers do not randomly add stocks to a portfolio. While it is outside the scope of this research, this “dilution” effect may occur in actively managed portfolios where a portfolio manager adds stocks in a “ranked” fashion. This research may lead to further investigations to determine if adding “junk” to a portfolio truly achieves the diversification and risk reduction desired. Not surprising, Buffett being the “Oracle of Omaha” has had it correct all this time.

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GETTING LOCAL: EXPANDING MISSION RELATED INVESTMENTS IN AFFORDABLE HOUSING TO LOCAL COMMUNITIES

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ABSTRACT

Affordable housing programs are dominated by two large government programs- Section 8 and the Low-Income Housing Tax Credit program. While these programs have private, market-based components, ultimately, they are funded largely through tax dollars and are not designed specifically to help residents build financial or social capital. This paper describes that the Mission Related Investments approach used by charitable foundations and non-profits can be expanded to make an impact in the affordable housing area by smaller local groups. This financing approach is discussed within the context of the Housing Model, a privately funded, non-profit housing model that allows residents to accumulate savings (or a 'Dividend') over time as they pay rent and participate in the operation of the community. Working together, faith communities, social service non-profits and community banks can play an important role in expanding the availability of affordable housing.

INTRODUCTION

There is no end to the affordable housing crisis in America. According to a recent study by the Harvard University Joint Center for Housing Research, median rents have increased by 11% between 2001-2016, while incomes fell by 2% (Richardson, 2019). And, a study by the Pew Foundation found that "the share of renter households that were "severely rent burdened- spending 50% or more of monthly income on rent- increased by 42 percent between 2001 and 2015, to 17 percent" (Pew, 2018). Clearly, housing affordability and access continues to be an unresolved problem in the US. While government housing programs continue to grow, only a fraction of those who are eligible for programs can participate.

Governmental programs (like Section 8) and quasi-governmental programs (including private sector loans made as part of Community Reinvestment Act) are central components of the existing affordable housing infrastructure; additional sources of funding are needed to fill the gap left by existing programs. This paper describes how Mission Related Investments can help charitable foundations and non-profits expand their impact in the affordable housing area through the direct investment in real estate. Instead of focusing exclusively on donations and grants, a mission related investment approach encourages non-profits and foundations to expand investment beyond traditional stock funds, to include other types of investments that are aligned with the organization's mission. While a stock market fund provides a financial return, mission investing provides both social and financial returns.

Paired with innovative affordable housing models, mission investing can help expand housing options and support very local solutions. One such approach is the Dividend Housing Model. Conceived of in 1999, the model began with the creation of the Cornerstone Renter Equity community. The model has been extended and is now known as Dividend Housing. A Dividend Housing apartment is run as a non-profit, offers below-market rents and allows residents to accumulate 'equity' over time as they pay rent on time, participate in community meetings, and do assigned work tasks.

Local partnerships already exist, for example, between local faith congregations and area social service non-profits. Local community members have a deep understanding of community needs, and in many cases are already working together to address local needs. Through a partnered housing model, backed by financial and social capital of local residents, faith communities and non-profits, we believe that local residents can make a real impact on the affordable housing crisis in their communities.

THE HISTORY OF GOVERNMENT SOLUTIONS

Large-scale government involvement in the affordable housing problem traces back to the Great Society movement of the 1960's. President Kennedy's War On Poverty in the rural south eventually led the Johnson Administration's creation of the Department of Housing and Urban Development in 1965, and the passage of the Fair Housing Act in 1968. Initially, these programs led to the construction of large scale 'projects', often located in blighted neighborhoods that were poor to begin with. While these programs were well-intentioned, they were criticized because they tended to segregate the low-income residents the programs were designed to help. And, because 'the projects' were usually

not located in economically prosperous neighborhoods, the availability of jobs (and a pathway out of poverty) were limited.

In the mid-1970's, policy began to shift toward public support of private sector housing. With the passage of the Housing and Community Development Act of 1974, more government money started to flow through the Section 8 program. The Section 8 program was designed to encourage low income residents to be integrated into surrounding communities, rather than segregated into low-income developments. The program provides rental assistance that is paid directly to private landlords, ensuring that landlords receive timely payment, and are more likely to allow residents to live in neighborhoods with resources and jobs. Because tenant rents are scaled by their ability to pay, Section 8 helps ensure that people can both pay rent and keep food on the table.

Despite the promise, Section 8 programs have been a partial solution to the problem. According to a Frontline report, only about 1 in 4 people who are eligible for Section 8 vouchers receive the benefit, and it is widely reported that voucher recipients often fail to find qualifying housing within the designated redemption window. Currently, approximately 4.6 million families receive Section 8 or other HUD subsidy assistance (Kingsley, 2017).

An additional problem with Section 8 is that rents are limited by Fair Market Rents published by the Department of Housing and Urban Development (Housing and Urban Development, 2017). The idea of market-based rent caps is a reasonable device for providing housing in both San Francisco and rural Ohio, but the way these Fair Market Rents are calculated again effectively segregates low income housing in the poorest communities. For example, HUD calculates a single Fair Market Rent for the five county Philadelphia region, that includes a broad range of communities. As of 2017, the fair market rent for an efficiency apartment in the Philadelphia region was \$845, but there are few neighborhoods with housing available at this price. Unfortunately, Section 8 Fair Market Rents cover the market rents in only the poorest neighborhoods.

More recently, government policy has shifted toward the Low Income Housing Tax Credit program. This program, created by President Reagan and Congress in the Tax Reform Act of 1986 was designed to encourage private sector investment in the new construction, acquisition, and rehabilitation of rental housing affordable to low-income households. The idea is to provide stronger incentives for developers to profitably build housing communities that include a mix of 'market' and 'affordable' housing. Tax credit monies are channeled to states, through Community Development Block Grants, which give local control over where and how program monies are spent.

Yet the Low Income Tax Credit Program has not proven to be an adequate solution to the affordable housing crisis either. While the stock of affordable housing has increased, these developments tend not to be located in areas of economic opportunity; thus, some residents face similar challenges of not being located near jobs and resources. A recent investigation by Frontline and Pro Publica (Frontline, 2017) revealed that while spending has increased, the average construction costs are increasing even faster. Federal money is buying less housing than it used to buy. In addition, the reporting found fraudulent activity and inadequate monitoring of programs at the state and local level.

Despite annual federal spending of about \$50 Billion, there continue to be approximately 11 million households that spend more than 50% of their income on rent (Frontline, 2017).

FAITH-BASED, COMMUNITY AND PRIVATE SECTOR SOLUTIONS

There are many affordable housing approaches that exist outside of the big government programs. Perhaps the best-known private sector solution to the housing affordability problem is Habitat for Humanity. Since 1976, Habitat has "helped more than 29 million people achieve strength, stability and independence through safe, decent and affordable shelter" (Habitat History, n.d., para. 4). Habitat works through a network of independent affiliates that serve about 1,400 communities throughout the US.

Habitat has been successful, in part, because it provides a replicable faith-based model that empowers faith congregations and local communities to serve together to meet local needs. Despite their broad success, Habitat meets a small portion of the need. For example, the Habitat affiliate in Montgomery County PA (in suburban Philadelphia) has constructed just 63 houses over the past 28 years and has a backlog of about 50 families who have been approved for the program (Przybylowicz, 2018). Funding is a continual limitation. While Habitat affiliates do benefit from different government financing programs, according to the most recently available 990 forms, Habitat received over

90% of its revenue from Contributions and Grants and benefitted from the volunteer efforts of about 1.4 million people. Despite this broad and sustained success, Habitat represents just a ‘drop in the bucket’.

Another category of approach is the Community Land Trust (or CLT). In a CLT, a non-profit entity buys up property in a specific neighborhood, whether contiguous or not, and signs very long-term leases with others who build homes. Because the community owns the land and sets the rules of ownership and building transfer, the CLT model offers the promise of community control and perpetual affordability. For example, the Community Justice Land Trust (<https://www.wcrpphila.org/cjlt>) was established to provide permanently affordable housing in North Philadelphia. Initially building 36 rent-to-own townhomes in the Port Richmond section, the trust now has plans to secure property and build in two other neighborhoods. Importantly, in addition to providing permanently affordable housing, CLT’s provide a hedge against gentrification, and secure a community voice in neighborhood development.

Related to CLT’s, housing cooperatives provide another avenue for communities to secure permanently affordable housing in a particular neighborhood. In cooperative models, a member-run organization buys and manages property in a specific area. Residents buy into the coop, securing housing and building ownership. Residents play an active role in decision making. Coops are typically run by residential boards which create their own rules (see <https://coophousing.org/>). For example, the LCA Cooperative (<http://www.lca.coop/about.html>) and Friends Housing Cooperatives (<http://www.friendshousingcooperative.com/>) have been providing quality affordable housing in Philadelphia for decades. While the cooperative model has proven successful and sustainable, the movement has not grown big enough to make a significant impact on the housing crisis. Again, funding is a limiting factor, since someone needs to fund the initial purchase of the property.

Within the for-profit sector, Real Estate Investment Trusts (REIT) and other crowdsourcing platforms are allowing smaller investors to participate in affordable housing development. REITs allow investors to participate in affordable housing initiatives without being responsible for day-to-day management. While these efforts include many types of development, companies such as Equity Apartments (<https://www.equityapartments.com>) have created a niche by allowing households in very high-rent areas the opportunity to build ‘equity’ that can be transferred to other types of housing over times.

BEYOND GRANTS - MISSION RELATED INVESTING

Mission Related Investing, Impact Investing, and Program-related Investments (or PRIs) are three names for a relatively new investment approach that allow foundations to make below-market loans to non-profit organizations that are aligned with the mission of the foundation. Organizations like the McArthur Foundation are promoting the use of PRI’s to expand impact (Chernoff, 2005). Private Foundations are required to spend 5% of income on charitable purposes; PRI’s allow foundations to credit the difference between market and non-market returns as charitable spending provided that loans are made to non-profit organizations to fund activities that are consistent with the foundation’s mission.

While not all potential funders will need to meet the same IRS requirements as private foundations, the framework of PRI’s is likely to appeal more broadly to social investors. By loaning (not giving) money to a non-profit, supporting an important social mission and backed by the value of real estate, the PRI framework provides a promising structure for future financing.

The Gates Foundation has become a leader in the PRIs. Since 2006, the Gates Foundation has committed \$1.5 billion in this type of investment. Utilizing program teams staffed by experts in specific areas, the Foundation is able to identify potential investments that are aligned with internal goals and evaluate risk and potential. The Foundation evaluates investments using three criteria: whether the desired impact was achieved, whether capital would have been accessible through traditional markets, and whether the organization would provide goods or services at affordable prices to people in need (Brest, 2016).

Throughout the country, more organizations are adopting Mission Related Investing approaches in affordable housing. For example, the California State Pension Fund invested in BRIDGE Housing, an affordable housing nonprofit in the state. While some investment occurs directly, other foundations invest money indirectly through Community Development Financial Institutions (CDFIs). The Kind Family Foundation, a Philadelphia-area social services foundation, keeps 100% of its assets in mission-aligned investment, including community development investments

placed through CDFIs (Kind McKenna, 2019). Organizations like the Mission Investors Exchange help promote the growth of these types of investments, including through regional collaborations of organizations like the Philadelphia Foundation and The Reinvestment Fund (Blank & Price, 2018).

GETTING LOCAL

While the growth of Mission Investing is promising, there is still an opportunity to expand the approach significantly. Foundations like Gates resemble large venture capital firms, employing area experts that have a deep knowledge in a particular industry. And, many local and regional foundations reasonably look for investment opportunities that spread risk among many investment partners, pooling investments through organizations like CDFIs. Foundations typically employ investment managers who are responsible for evaluating funds, and have the time, effort and motivation to do so.

But what about smaller organizations, or modestly affluent individuals? Is there the ability for these types of organizations and individuals to invest their assets with ‘impact’? For example, according to data from the National Congregation Study (ARDA, 2019) churches in the US have about \$1.1 trillion dollars in endowment savings, averaging about \$480,000 per church. And in aggregate, congregation members have large amounts of both financial and social capital that they may be willing to invest in worthy causes.

Yet under what circumstances are smaller organizations likely to invest? Figure 1 shows different common types of investments in ‘diversification-knowledge’ space. Small investors (whether they are individuals or smaller organizations) typically invest money in diversified portfolios (such as an index fund) that requires no specific investment knowledge and relies on diversification to manage risk. At the other end of the spectrum, large foundations undertake investments that require significant investor knowledge.

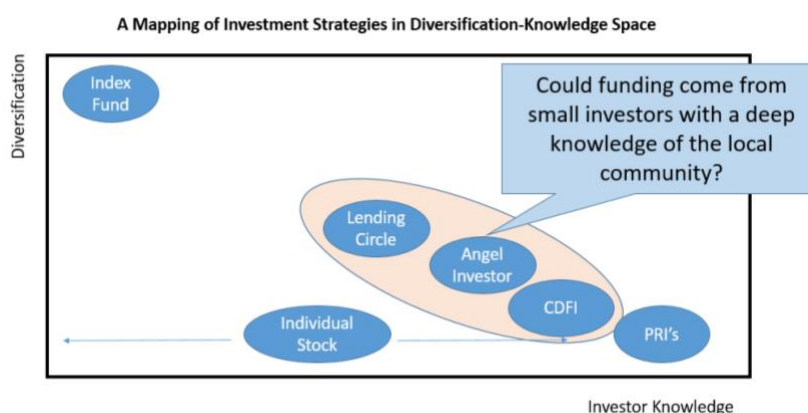


Figure 1. A Mapping of Investment Strategies in Diversification Knowledge Space

CDFIs represent an approach of pooling assets at the local level, allowing the effort of evaluating investments to be ‘shared’, along with sharing investment risk. Within the broader investment community, Angel Investors represent relatively wealthy individuals with some knowledge of an industry to invest, typically along with a group of other ‘Angels’. At an even smaller scale, we observe Lending Circles (even in developing countries) in which groups of women loan small amounts of money to women ‘in the circle’. These women investors typically have a moderate level of knowledge about who they are lending to and can observe borrower behavior. Similar models have been deployed successfully by groups like the Mission Asset Fund (Mission Asset Fund, 2018).

THE DIVIDEND HOUSING MODEL

A relatively new approach to affordable housing was developed in 1999 by Margery Spinney and Carol Smith. The initial Renter Equity concept was enhanced to increase resident control and is now known as Dividend Housing. The Dividend Housing model is focused on permanent affordability, wealth creation, and community building. Residents in Dividend Housing have the opportunity to accumulate Equity Credits as they pay rent on time, participate in regular

community meetings, and complete assigned work tasks. Table 1 shows some key aspects of the model. Control and shared responsibility are key components. Unlike an apartment rental, where the landlord has primary control over decisions, residents work with a Resident Manager to collaboratively operate the property. In regular meetings, community members resolve issues and make operational decisions from what to plant in the garden to paint colors or maintenance priorities. Community members decide on work that needs to be done, and work responsibility is shared among the residents.

| Table 1 | | |
|--|-----------------------------------|--------------------------------|
| <i>Key Elements of Dividend Housing</i> | | |
| Rent | Dividend Housing | Own |
| Lease | Ownership by the 'commons' | Purchase |
| No control over sale or management | Share decision making | Control of sale and management |
| No maintenance responsibility | Shared maintenance responsibility | All maintenance responsibility |
| No savings | Equity Credits | Home equity |
| <i>Note: Adapted from Spinney, 2019.</i> | | |

Residents in Dividend Housing make a long-term commitment to living in the community. Turnover and vacancies are costly. Dividend Housing residents benefit financially from their long-term commitments to the community, accumulate Equity Credits that can be translated into cash after a multi-year vesting period. Dividend Housing communities are intended to be long-term, permanently affordable homes. Unlike rental properties that may be 'flipped' as a neighborhood gentrifies, the idea here is for residents to have a stake in the long-term success of a neighborhood.

The model includes three key documents- a Renter's Agreement, Resident Association Agreement and House Rules. The Resident Association Agreement and House Rules are similar in concept to those governing a housing cooperative. In the Co-Op context, a resident association agreement creates the formal context for the community. Residents work together to create the rules that govern life in the community. As each community is different, rules and structures will vary to reflect the goals of those living in the community. The Renter's Agreement, however, is different than in a Co-Op. Here, the Renter's Agreement includes a schedule describing how Equity Credits are accumulated, when they vest, and how they can be used.

The first community that was founded using these principles and structures was the Cornerstone Equity community in Cincinnati, Ohio. According to a study of the Cornerstone community prepared for the Ohio Housing Finance Agency, "although residents expressed appreciation for the opportunity to build equity, survey respondents indicated that what they valued most about Cornerstone was the opportunity to live at an affordable, safe, attractive and convenient property; the support of a close community; a responsive property manager; and a voice in decisions affecting their homes" (Drever, 2013, p 26).

At the time of the evaluation report, just 14% of people left the community prior to the 5-year vesting requirement. Those who departed after vesting had accumulated an average of \$3,497 in equity; those who have vested and were still living at Cornerstone had an average equity of \$2,600 (Drever, 2013). While survey respondents reported the aspirational goals of using accumulated equity to buy a house or car, in practice, residents more often used equity to pay medical or other bills.

An additional aspect of the Cornerstone program was the ability of residents to borrow money to cover short-term expenses. Over a 10-year period, 53% of Cornerstone residents took out between one and three loans, often to cover rent or to pay for a car repair, and 78% reported that the availability of the loans contributed to their sense of financial security (Drever, 2013, p. 27). The loan program provided an important alternative to payday loans.

While the Dividend Housing model has been successful for residents and the surrounding community, the model has been slow to scale. The current model relies upon initial external funding to purchase and renovate the buildings. In the case of Cornerstone, the initial funding of the property came from several sources. In the case of the Renting Partnerships community in Avondale, the building was made available through a master lease agreement for a building owned by a community organization. Grant funding has been sought to purchase other sites, but this funding is difficult to obtain. In order for the model to grow, more scalable solutions must be found.

FAITH BASED SOCIAL SERVICE PARTNERSHIPS AND PROGRAM RELATED INVESTMENTS: A POSSIBLE SOLUTION?

In 2017, members of a small (Quaker) faith congregation, Norristown Friends Meeting, began exploring possible ways to address the affordable housing issue in their immediate community. The median income in Norristown is \$41,856, compared to a county average of \$80,675. Yet median rents in Norristown are \$1,011, compared to the county average of \$1,158. Members of the Meeting community began to explore alternative solutions, including cooperative models.

In conversation with neighbors, they discovered that a Mennonite couple had been quietly operating an affordable housing building, called Swede Street Home Apartments, for over 20 years. While the building was originally established to provide affordable housing for people re-entering the community from prison, it now serves a broader mix of residents. The owners offer below market rents, allowing people to live affordably and save for the future.

They also met with the Executive Director of a local social service agency, a domestic violence agency, that was located on their street. The Executive Director spoke of the difficulty they faced securing safe, affordable housing for the women going through their program. She even suggested that a county program that provided short-term housing subsidies was having the adverse effect of placing upward pressure on rents. To their surprise, the church members also learned that the non-profit owned a home directly across the street from the church that would likely be for sale in the near future.

Currently, the Norristown group is seeking funding from Social Investors to purchase and run a non-profit apartment building. The group hopes to secure investment from private individuals and organizations (including an investment from the church endowment and by congregation members), as well as utilizing Community Reinvestment Act (CRA) financing from a local bank.

The intention is to run the building using the Dividend Housing model. But, the partnership between the faith community and the social service non-profit provides several potential enhancements to the model. First, it is anticipated that a significant amount of funding will come from individuals and organizations involved in the partnership. This funding may come from organization endowments, or from individuals with a connection to the local community. Second, the intention is to seek housing referrals from the social service nonprofit and senior housing committee. It is hoped that these referrals will help to identify people who are well suited to living in a shared-living environment. It is also hoped that the partnership will help continue the personal support that both organizations provide. Third, it is expected that members of the church and social service communities will contribute social capital as well, helping support the people and mission of both organizations.

FINDING SCALABLE FINANCING SOLUTIONS

Dividend Housing has been shown to provide a viable and valuable solution to the affordable housing solution in local communities. Yet financing such efforts continues to be a challenge. An examination of current lending models suggests that neither the Index Fund (low knowledge-high diversification), nor the PRI approach (high knowledge, low diversification) will be able to ‘unlock’ the large sums of social and financial capital that local communities possess.

We believe that an expanded conversation about community lending and engagement may help create a scalable financing solution for small scale affordable housing. CDFIs and the CRA programs from local banks may provide core financing and a level of professional oversight that would make community member investors more comfortable. And the participation and endorsement of community members, in turn, provides a level of knowledge and security for the CDFI/CRA lenders.

The partnership approach between faith congregations, local social service agencies, and local CDFI/CRA lenders provides an alternative path to growth. There are faith communities, social service agencies, and community banks in every city and town. If successful, this local-level financing solution may provide an additional solution to the affordable housing problem.

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HOW STUDENT ENGAGEMENT IS PERCEIVED/PROMOTED/MEASURED IN THE US, EUROPE, AND CHINA

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ABSTRACT

US Indiana University proposes a survey instrument, called the *National Survey of Student Engagement* (NSSE), to monitor student engagement. Engagement is represented by the amount of time and effort students devote to their studies and other activities for educational purposes. NSSE provides results on six High-Impact practices (HIPs) that are duly noted for their positive outcomes on *student learning* and *retention*. For the last survey in 2018, 511 institutions (489 in the US, 16 in Canada, and 6 in other countries for the first time) participated in this survey. Some accrediting bodies, such as AACSB or ACBSP, have introduced student engagement indicators. Thus, student engagement seems to be attracting more and more attention to assess university quality. However, these developments are still mainly centered in universities from the US and Canada. Conceptually, the idea of student engagement might not be perceived the same way in other countries/cultures. This research wants to explore what is the understanding of student engagement in three US, European, and Chinese universities, what these universities do to promote it, and how they measure the outcomes. To do so, in-depth exploratory interviews have been conducted among key players in those three universities. Data reveal some unexpected results.

RATIONALE

Kuh, Cruce, Dhoup, and Kinzie (2008) analyze the relationship between academic commitment, success, and the trend to premature abandonment among 6,193 university freshmen. Results show that student commitment is positively related to academic results and that academic commitment is related to student persistence. In other words, commitment correlates negatively with the trend to abandon college education and positively with the probability of advancing in their curriculum. Likewise, Svanum and Bigatti (2009) analyze the relationship between commitment, academic success and the average time of completion of university studies in a sample of 259 European university students. The most committed students not only obtained better results but were 1.5 times more likely to graduate with a semester less than those with lower commitment levels. These findings underscore the predictive nature of commitment in relation to academic success.

Academic literature in relation to the items that generate engagement (teaching and learning, curriculum design, policies, research, external relations, social and cultural participation, partnerships with educational providers, economic participation and participation of students) is evidenced in different institutions (Bernardo, Butcher & Howard, 2012; Winter, Wiseman, & Muirhead, 2006). Maintaining that the community is integral to educational experiences, John Dewey (1916) believed that through experiential learning, or learning by doing within the everyday social community environment, individuals could be challenged to go beyond the bounds of traditional information transmission that was the norm in classrooms at that time (Wynsberghe, 2007). These personal development benefits are also obvious among students who develop learning and service projects, including self-understanding and self-efficacy (Beatty, 2016). An increase in the sense of responsibility about social problems, an improvement on empathy, political involvement, and a willingness to participate in the future in voluntary programs is also noted (Winston, 2015). Other researches show that these personal development benefits contribute significantly to students' communication, interpersonal and leadership skills (Fullerton, 2015; Wurr, 2012). However, Hytti and O'Gorman (2004) show that a teacher's competence is a key factor in the development of business education initiatives and influences students' commitment to undertake viable and feasible business plans. The teacher is a mediator and articulator of suitable environments to favor learning (López, Rodríguez, Cerveró, Félix, & Hervás, 2015). The teacher must have the vision and the ability to be open and attentive to new ideas and also to think laterally and critically about different aspects and problems (Peter, 2017). In this sense, the teacher must have the right training as well as the practical business experience (Shulman, 2004) to ensure the commitment and learning of the students. Technology, such as new eye-tracking (McKelvey & Chinchanchokchai, 2019) or ClassDojo (Rivera, 2019) can enhance student engagement and learning outcomes.

The role of universities has been evolving over the last 20 years, from a focus on teaching and research towards an enabling, partnership role with industry, government and communities in their proximate geographical spaces. Universities are increasingly linked to place (Gunasekara, 2004). Along these lines, it is worth highlighting that the university must generate not only teaching and learning activities, but also promote the civic and social participation of its students in their reference environment and with the appropriate social responsibility (Boyer, 1990; Ostrander, 2004; Winter, Wiseman and Muirhead, 2006). Universities have the potential to play a leading role in enabling communities to develop more sustainable ways of living and working; however, sustainable communities may only emerge with facilitation, community learning and continual efforts to build their capacities (Shiel et al., 2016). Additionally, universities can promote the material and social well-being of their communities (Boyer, 1990; Harkavy & Benson, 1998; Savan, 2004). The content of the curriculum provides a key way to meet the needs of local communities (Winter, Wiseman, & Muirhead, 2006). The entrepreneurship projects would relate to community service-learning projects in the environment in the sense of co-creating solutions between university and society at the local, national, and global levels (Fitzgerald, Bruns, Sonka, Furco & Swanson, 2016). These types of programs seem to prove the great benefits that they have for the students both at the intellectual, social, civic and personal levels (Jacoby, 2015).

On the other hand, with the complex interconnection between the economic, cultural and political influences of the institutions (Bernardo, Butcher, & Howard, 2012), the study carried out evidence that engagement in different institutions is understood and applied differently, and that in the changing environment of the university student participation is different. Students acquire a wide range of skills that include the ability to recognize and capitalize on new opportunities, as well as understand consumer needs, create business models and conduct market studies (Osorio, 2011). Cook et al. (2004) identify skills and attitudes that respond to the needs of the current economy, such as creativity, risk taking, change, persuasion, negotiation and critical thinking. Yet, they are not taught adequately, which creates the need to develop new training programs. The development of new competencies is achieved through the transformation of experience as part of a gradual and recursive process of learning by doing, and this is particularly relevant among those who do not have sufficient knowledge or experience (Aldrich, H.E. and Yang, 2014). Service-learning is also part of an experiential pedagogy that starts off with the solution of a community need, promoting the student's civic commitment (Waters, 2014) and starting from a critical reflection (Nghia, 2017).

In accordance with the findings of existing literature, we ask students to acquire the set of professional skills that contribute to their future work performance. The development of new competencies is achieved through the transformation of experience as part of a gradual and recursive process of learning by doing and this is particularly relevant among those who do not have sufficient knowledge or experience (Aldrich & Yang, 2014). Also, as suggested by Sekula et al. (2009), the practical learning of "*being as close as possible to the real world*" is key to the acquisition of valuable competences in the learning process (Wheadon et al., 2013). By encouraging students' experimentation and self-initiation, teachers can foster students' willingness to take on challenges, explore new ideas, persist at difficult activities, and feel good about themselves (Deci, 2002). According to the *World Economic Forum*, the main employability competencies for 2020 will be: solving complex problems, critical thinking, creativity, managing people, coordinating with others, emotional intelligence, critical decision-making, service orientation, negotiation and cognitive flexibility (World Economic Forum, 2016). In this sense, we are interested in identifying those curricular activities that contribute to the acquisition of employability skills at universities. Often, the student involvement in community projects that improve the surrounding society and contribute to learning is a key factor for acquisition of competences (Fitzgerald, Bruns, Sonka, Furco, & Swanson, 2016).

This research identifies those curricular activities in which the student is motivated and commits himself to offer the best of himself. When one is intrinsically motivated, one is absorbed by the activity, not easily distracted, and persists in the activity for a long period of time (Deci & Ryan, 2002). Proponents of theories about student involvement maintain that this favors performance, persistence, critical thinking, methodological competencies, and intra- and inter-personal competencies. Numerous investigations show that the time and energy that students use in educational activities is the best predictor of their learning and personal development (Korobova, 2015; Kuh, Kinzie, Schuh, & Whitt, 2005).

Student Engagement is now being seriously considered in the US. The University of Indiana has created a survey instrument, called *National Survey of Student Engagement* (NSSE), to monitor it. According to the NSSE, *Student Engagement* is represented by the amount of time and effort that students devote to their studies and other activities

for educational purposes. The NSSE provides results on six High-Impact practices (HIPs) that are duly noted for their positive outcomes on *student learning* and *retention*:

- Learning community or some other formal program where groups of students take two or more classes together
- Courses that included a community-based project (service-learning)
- Work with a faculty member on a research project
- Internship, co-op, field experience, student teaching, or clinical placement
- Study abroad
- Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)

These can be structured in three main categories: in-class activities, on campus ones, and outside campus ones. For the last survey in 2018, 511 institutions (489 in the US, 16 in Canada, and 6 in other countries for the first time) participated in this survey. Some accrediting bodies, such as AACSB or ACBSP, have introduced *Student Engagement* indicators.

The NSSE research shows how institutions deploy their resources, organize the curriculum, and offer other learning opportunities to get students to participate in activities called *high-value educational experiences*. According to Kuh (2008), the academic challenge, the enriching extracurricular experiences, the high interaction between students and teachers, the active and collaborative learning, plus the disposition of the campus to motivate and support the students, become the main factors for commitment. Along the same lines, Chickering and Gamson (1987) propose that contact with teachers, cooperation among students, active learning, immediate feedback, respect for different forms of learning, and activities promoted by students that make them feel part of a group with clear expectations are important challenges linked to good practices in university education.

A year ago, our research group used the NSSE survey instrument, with some minor adaptations, to gather information on *Student Engagement* practices in one university in Europe and compared the results with those from US students. However, the instrument that has been used to compare *Student Engagement* between different universities is based in the US. Despite the NSSE being distributed to some Canadian universities along with some subsidiaries of US universities in other countries, no evidence exists to confirm that the designed instrument works in diverse and culturally different settings.

The experiment failed. The main reason was that some concepts that are common to US students were not well understood by Europeans. At this point, we had the possibility to adapt even more the survey instrument or to take a step back to explore the *Student Engagement* concept in other settings so as to build a theoretical framework that could be validated later.

This second way was selected to address the research question. For that, a case study methodology based on in-depth interviews necessitated going to the places of those who are directly involved in promoting *Student Engagement*. Since some members of our research team are from European and US origin, we could organize the interviews in Europe and the US, while we had to travel to perform the ones in China.

With that in mind, the research question has been established as follows: “How do universities in Europe, US, and China understand *Student Engagement* and how do they behave around this concept?”

METHODOLOGY

As we could hardly base the research on the existing literature, it was crucial for us to explore what happens in real world in order to develop a global theory. The research must answer questions on the “how” and the “why” of the university understanding around *Student Engagement*. The methodology that allows this exploration and answering such questions in order to establish a theory is the case study. This methodology has been applied to measure the perceptions of the undergraduate medical students about the student engagement in curriculum development (Qazi et al., 2019).

To design a case study, our reference has been Yin (2009). With that, we had to find suitable universities and associated people who can provide the necessary information on what the university does around *Student Engagement*. Applying the methodology, a research problem, and a research question have been defined, theoretical propositions have been established, and the results have been analyzed in order to propose a contribution to the state of the art.

In order to maximize the results of the study, the case study structure has been built to fulfill four major conditions: the validity of its construction, its internal validity, its external validity and its reliability. Thus, in order to start the case study research design, we had to follow a logic that would guide us from the questions to be answered to the conclusions extracted from them. The researchers then tried to find an answer to the question of how universities behave on *Student Engagement* (Figure 1).

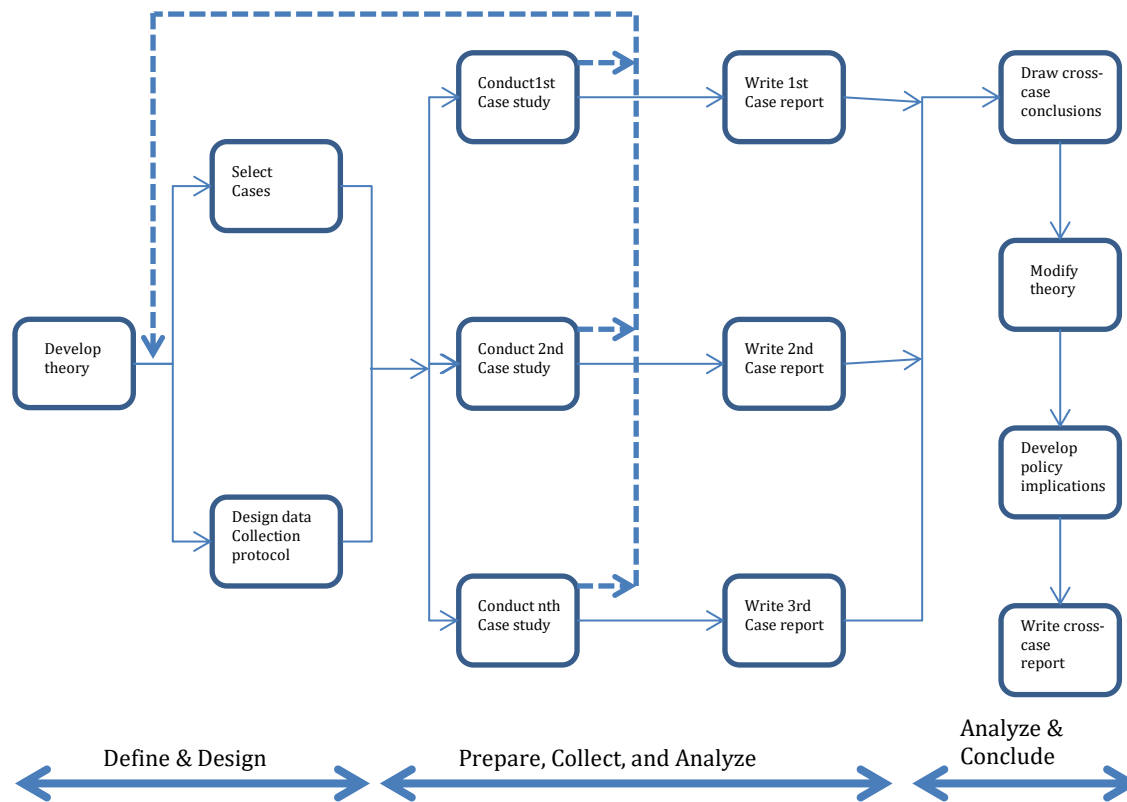


Figure 1. Case Study Methodology (Adapted from Yin, 2009)

This objective is addressed using three questions, which are the backbone of the study design:

- Proposition 1: *Universities do actively and consciously promote Student Engagement.*
- Proposition 2: *Universities promote Student Engagement on campus and outside campus.*
- Proposition 3: *Universities use High-value Educational Practices as a way to promote Student Engagement.*

The selection of the universities was carried out at the discretionary level in different continents and cultures to be able to contrast the state-of-the-art literature in the field. The accessibility derived from two factors: 1) the researchers from European and American universities had access to the direct managers of their institutions; 2) Asian universities agreed to provide access to the interviewees for research.

Therefore, the research focuses on four universities: Lock Haven University (LHU), University of Vic - Central University of Catalonia (UVic-UCC) in Vic (Spain), Fu Jen University in Taipei (Taiwan) and Lunghwa University of Science and Technology in Taoyuan (Taiwan).

Lock Haven University (LHU) is a public university in Lock Haven, Pennsylvania. LHU is one of the fourteen members of the Pennsylvania State System of Higher Education. It offers 69 undergraduate programs, 4 graduate programs, 49 majors, and certifications with 47 minors. Most popular majors include education, sport, and recreation management, health sciences, criminal justice, business, psychology, social work, communication media, and biology. Master's Programs are offered in education, counseling, sports studies, actuarial science, athletic training, physician assistant, and health sciences.

The University of Vic - Central University of Catalonia is a public owned university with private management and displays its public service activity in the fields of teaching, research, and knowledge transfer. UVic-UCC has 4 faculties: Business and Communication, Health, Education, and Technology. The personal relationship between teachers and students is the basis of teaching and the university focuses on the aptitudes and requirements of each student, their learning process, and their personal evolution.

Fu Jen Catholic University (天主教輔仁大學) is a top private university in Xinzhuang, New Taipei City, Taiwan. The university has been ranked as top 300 in arts and humanities and top 450 in medicine worldwide. It is the nation's first school with AACSB accreditation and also the earliest school to promote PBL as pedagogy for medical education. Furthermore, the transnational joint master's program "MGEM" was ranked 43rd globally by *Financial Times* in 2017. Currently, Fu Jen is Taiwan's 4th most popular university and 5th highest ranked business school.

Lunghwa University of Science and Technology (龍華科技大學) is a private university of science and technology in the Taiwanese vocational education system, originally based in Guishan District, Taoyuan City, Taiwan. LHU claims to provide HTC, TSMC, UMC and other famous firms with more engineering, computer science and business graduates than any other college or university, and philanthropic support of LHU is among the highest in the Taiwanese vocational education system and technical education system.

Primary data was gathered through semi-structured interviews. The interviews were 30-60 minutes in length and captured data from key organizational informants. The informants were selected on the basis of their involvement in promoting *Student Engagement* within their respective universities. Secondary data such as email, internal reports, strategic plans, presentations, and others were required to validate the interview information.

The UVic interviews were performed in March 2019, the Chinese interviews in July 2019, and LHU interviews distributed between Nov 2018 and Sept 2019. The interviews were transcribed using Happy Scribe software in September 2019. From Oct 2019 forward, the transcriptions were codified following the interview guide topics. That is, the sentences of the interviewee that were related to different topics in the interview guides were assigned to the corresponding topic. Once this was done, results were synthesized through a table containing all the interview topics and a summary of the findings for each of the universities. This same methodology was followed for the theoretical propositions. Every time the interviewee mentioned something relevant to a theoretical proposition, the finding was codified and appropriately assigned (Figure 2). Unexpected findings were added afterwards, followed by a university-by-university and proposition-by-proposition discussion of the results. The total project was finished by early November 2019.

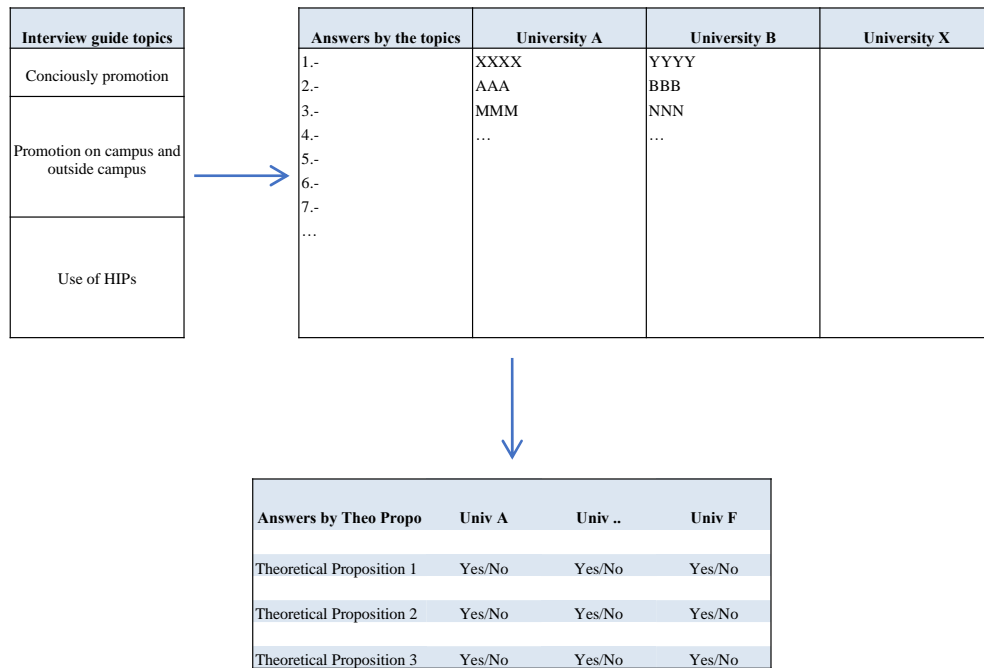


Figure 2. Interview guide structure and use

The treatment of the evidence followed a sequential protocol for the treatment of gathered evidence. The global sequence of the case study-adapted methodology can be seen in Figure 3.

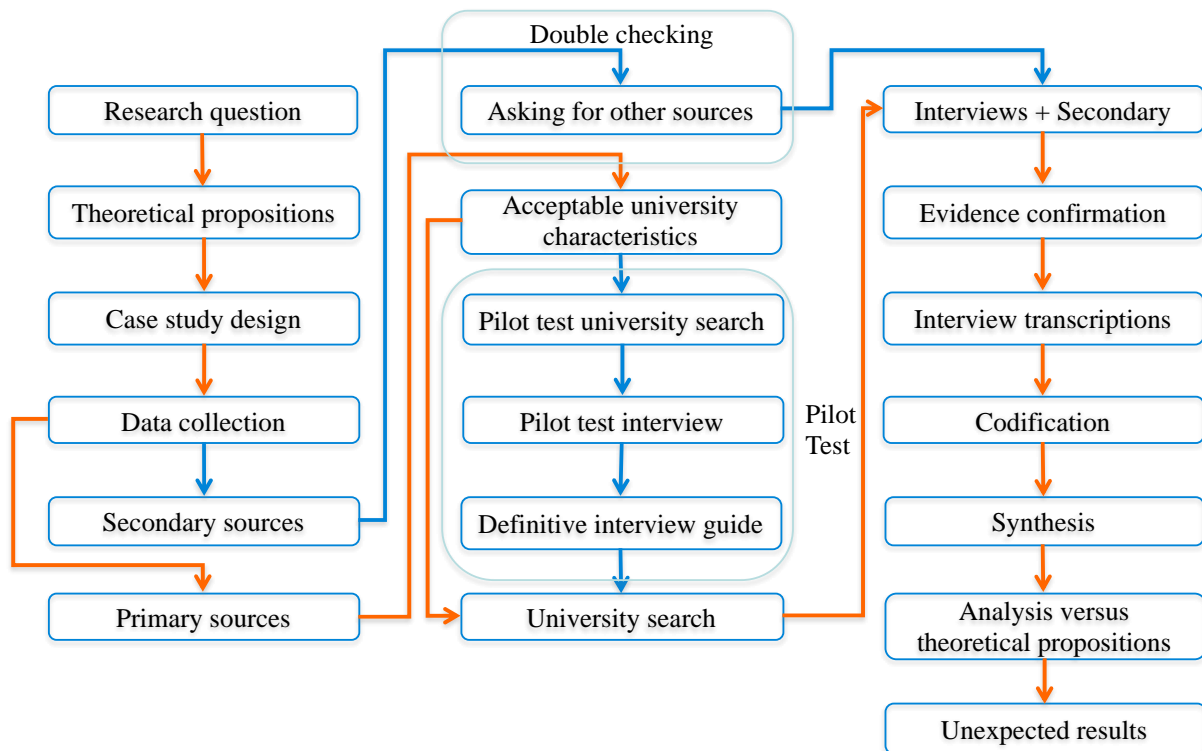


Figure 3. Sequence of the case study methodology

The semi-structured interview guideline was set after a first pilot test performed at LHU. Besides the basic information regarding date, name of the interviewee, university name, and interviewee position, the questions were structured as follows (Figure 4):

| Nb | Topic | Related |
|----|---|-------------------------|
| | | Theoretical Proposition |
| 1 | Understanding of Student Engagement | 1 |
| 2 | Understanding of what university is doing to promote SE | 1 |
| 3 | How activities are classified? | 2 |
| 4 | How many Credit per class hours? | |
| 5 | How many credits for a degree? | |
| 6 | Does the university promotes dual learning? | 1 - 2 - 3 |
| 7 | Internships promoted? Min/Max hours? Control? | 2 - 3 |
| 8 | How each activity is promoted? | 2 |
| 9 | How much time is dedicated to promoting SE activities? | |
| 10 | Who promotes each of the activities? | 2 |
| 11 | How university is measuring the impact of SE activities? | 1 - 2 |
| 12 | How the interviewee measures the impact of SE activities? | 2 |
| 13 | Who does this measurement? | 2 |
| 14 | Who has access to those measurements? | 1 - 2 |
| 15 | What is done with the results of those measurements? | 1 - 2 |

Figure 4. Interview questions related to the theoretical propositions

EVIDENCE

As mentioned in the methodology, once the interview guide was created, tested, and final version validated, suitable universities were found, and the interviews could take place. During the interviews, other sources of evidence were asked for in order to proceed to the planned triangulation. Once the interviews were recorded, a search for the validation of the sources started. The valid interviews were transcribed, codified and synthesized. The further sections describe the particular events of each valid university.

The summary of evidence for the four universities can be found in the following Figure 5:

Figure 5. Interview evidence by question and university

| Interview analysis By the Questions | Theoretical proposition | LHU | UVic | Fu Jen | Lunghwa |
|--|----------------------------|---|--|---|---|
| 1 Understanding of Student Engagement | 1 | Everyone understands SE in a slightly different way. None has a complete understanding according to NSSE theory | Concept only understood by some few faculty | Globally engage with society, industry, internships. Recent concept introduced because of AACSB accreditation | Relative understanding. Some spontaneously acceptable good definition. In class they try to motivate students to study |
| 2 Understanding of what university is doing to promote SE | 1 | Somehow all have some vision of what LHU is doing but only admission has a complete vision | Outside class, most of the activities are outside campus ones. Campus is very limited | University wants students to develop trust between students and faculty/society. Engagement not implemented as a system. It is a "Spirit" not a "Goal" | School things engagement is optional but has a budget for presenters/activities. He does not know what univ is doing for outside class engagement. Sport facilities |
| 3 How activities are classified? | 2, 3 | Only one uses Class, campus, and outside campus. Others use other ways to classify. One does not include class engagement | Culture, sports, community. Some conferences are coordinated with faculty. They select what they do. Can be on campus or outside | There is not really inside and outside class. The development of the relationships is in bedded in the process. Students must develop trust | Cases based on real cases (collaborates with industry/institutions). For him engagement is in class. Also changes class setting. Visits for small classes. |
| 4 How many Credit per class hours? | | 45h in class = 3 credits | 45h in class = 3 credits | 1 sem=18 wks. Prof teaches 9 credit/sem. For students 3 credit class is 3h/wk/18wks but in private Univ Teach 21h/wk (4 courses/sem). Degree = 130 credits | Course = 3 credits and students take 21-25 credits / sem = 7-8 courses/sem (flat tariff. Thus students take as much as possible) |
| 5 How many credits for a degree? | | 120 credits | 120 credits | Degree = 130 credits | Degree = 128 credits. But if they take 25 credits/sem as freshmen, senior year is much less. |
| 6 Does the university promotes dual learning? | 1, 2, 3 | One has not knowledge of this | Not actively promoted | Professors invite average 2-3 speakers / sem (alumni) + visits + biz cases | Use cases wrote by themselves. Bring 2 prof / sem (this costs \$, thus limited by the school). Also visits to firms for small classes |
| 7 Internships promoted? Min/Max hours? Control? | 2, 3 | They all know but none has a deep understanding to answer the question. Some are paid others are not. | Internships are promoted no deep understanding. In any case, rare are the ones that a paid | Internships are encouraged. Some course require internships but not so popular. Univ does not provide them. If contract = monitor, then credits | Students need to take 1 sem or 1 year internship and get credit for it |
| 8 How each activity is promoted? | 2 | A lot of different activities are promoted, some with \$ (Clubs). The reason is increases retention | Passive promotion: students need to ask. Have a budget to free or cheap activities outside campus | Ministry of education promotes social responsibility / teaching excellency. Univ has master plan-money. Freshmen course Ta Shi for clubs | In class students are asked to write proposals for real firms |
| 9 How much time is dedicated to promoting SE activities? | | Some only promote, others control, some do both | Not clear but daily administrative work swallows time | Nothing as engagement. One outlayer does it but no real support | Not much |
| 10 Who promotes each of the activities? | 2 | Each department promotes its owns. Some are promoted with \$ (clubs and sport teams' activities) | Students are the drivers for the activities. No real initial plan they knew this was going to happen. No real director for activities. No real strategy. | Each department decides | Each professor does it |
| 11 How university is measuring the impact of SE activities? | 1, 2 | University require some feedback and they believe there should be a global plan that relates their activities to SE but they are not sure | Management board that includes Student board, the city major (the boss) but she does not know how Uvic measures activities. Area qualit asks for nb activities | There is a plan at univ level: how many students, how many projects collected every sem but not that much engagement specific. AACSB requirement | KPI = how many outside presenters in class |
| 12 How the interviewee measures the impact of SE activities? | 2 | Measurements can be very different: how prospects through admin funnel, surveys, service hours, club activities, etc | Numbers of "Carnets", number of students + a survey to students every two years asking to value their services. Also have a look at social media | Some KPI are used to control to be provided to the univ. In class, engagement is measured in the projects | Number of presenters and other optional activities to motivate students to study |
| 13 Who does this measurement? | 2 | Each department measures its own but club reports are done by the clubs | Each department measures its own data | Each department uses different KPI. Globally, they are required to report some more "spiritual" KPI. For AACSB have to decide which are engagement | University requires results of the KPI but does not measure engagement outside campus |
| 14 Who has access to those measurements? | 1, 2 | Some are not clear. Sent to management - directors. Chairs and Deans receive the admin ones | Themselves. Quality area requires number of activities. No accreditation is requiring anything on this aspect | University and AACSB for reacreditaion | Ministry of education tried to implement a university performance system (ACCSP) but resistance. School prefer being in ranking (firm prefer it) |
| 15 What is done with the results of those measurements? | 1, 2 | Admin uses them to adjust carrier path to prospects. Others use them to calculate next year's budgets. Others simply do not know | Themselves but use the internal gathered date to convince the management to invest or provide the funds to do something specific | There is no specific metric for engagement but contacts with alumni to get some feedback. AACSB accreditation and reacreditation | Control budget and risk (insurance) |
| 16 Unexpected findings | | There not a clear consistency in the implementation of SE goals by LHU. A lot is done, some is coordinated but most is unknown. No benchmarking is communicated anywhere. | Sevices are outsources: gym, residences, etc. Have not invested in own campus because of the good relationship with the city/services | They do not follow text books except for an MBA class. Club enrolment is dropping because students join department union (parties, representative, etc). Students work (poorer). Nowadays 7-8 out of 10 go to college (before 2-3). That compesate less global kids | Some years ago visits to firms but required budget and insurance. Min number of students / class = 20. Under this cap, class is cancelled... Cannot ask students to visit firms on their own because of insurance. Students also work = not involved in school or school sports |

For the analysis of the evidence, we analyzed each question and then linked it to each theoretical proposition. Among the different aspects, we checked if the universities use some of the promoted HIPs. Figure 6 shows the evidence compared to the 6 HIPs.

| Interview analysis Use of HIPs | LHU | UVic | Fu Jen | Lunghwa |
|--|-----|------|--------|---------|
| Learning community or some other formal program where groups of students take two or more classes together | Y | N | N | N |
| Courses that included a community-based project (service-learning) | Y | N | N | Y |
| Work with a faculty member on a research project | N | N | N | Y |
| Internship, co-op, field experience, student teaching, or clinical placement | Y | Y | Y | Y |
| Study abroad | Y | Y | Y | Y |
| Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.) | Y | N | N | N |

Figure 6. Analysis of the use of High Impact Practices (HIPs)

In this table, we observe that two of the HIPs are used in all universities. These are 1). internships, field experiences, student teaching or clinical placement, and 2). study abroad. The other HIPs are not systematically used. Going a little deeper into the evidence, learning community HIPs and culminating senior experience HIPs are only used in the US university and not mentioned to be used elsewhere. Lunghwa University uses HIPs that are not used in the other universities. These involve students working with faculty on research. Service learning is only used at LHU and Lunghwa.

Once this comparison was done, we extracted conclusions by theoretical proposition (Figure 7).

| Interview analysis By the Theoretical Propositions | Conclusions |
|--|--|
| 1 Universities actively & consciously promote SE | SE is not a universally known concept and when it is understood, the majority of the interviewees did not pick the standard definition. Same happens at the university level. Thus, universities might be promoting SE but some do not do so consciously because it is not something that the official government or their nowadays accreditation body requires them to promote and monitor. Each department/faculty has its level of understanding and promotes what they think |
| 2 Universities promote SE on campus and outside campus | Some in class engagement is demanded everywhere. On campus and outside campus promotion is relatively different depending on the Campus configuration (UVic being very different to LHU and Fu Jen), some cultural/liability issues (UVic is very passive and Fu Jen behaves differently than the others), and budget allocated to on campus and outside campus activities. |
| 3 Universities use HIPs to promote SE | Two out of 6 HIP are universally used. These are Internships and Study abroad. However, in the case of Fu Jen the internship is encouraged but not mandatory. Most of the Chinese students works, Thus, do not need internship as much as universities students who do not work. In any case, all of them promote two HIP or more. |

Figure 7. Conclusions by the Theoretical Propositions

In order to summarize the evidence by the theoretical propositions, a table has been created to indicate if the particular theoretical proposition is confirmed for each of the universities (Figure 8). A “Yes” in the case, means that the above-mentioned theoretical proposition is confirmed. A “No” means it is not confirmed (challenged).

| Interview analysis By the Theoretical Propositions | LHU | UVic | Fu Jen | Lunghwa |
|--|-----|------|--------|---------|
| 1 Universities actively & consciously promote SE | Y | N | Y | N |
| 2 Universities promote SE on campus and outside campus | Y | Y | Y | Y |
| 3 Universities use HIPs to promote SE | Y | Y | Y | Y |

Figure 8. Theoretical Propositions confirmation or challenge

Looking at this table of results, we can say that theoretical propositions two and three were confirmed, while the first one was challenged in half of the cases.

As per the theoretical propositions, we see that two out of four universities have confirmed that universities actively & consciously promote *Student Engagement*. In the case of UVic, when the first question was asked during the

interview, the interviewee responded that she did not understand the question. That shows the lack of universal understanding of the *Student Engagement* concept among universities. At FuJen, the concept was understood, but only by the people in charge of the AACSB accreditation or those who have direct contact with US institutions. Thus, the concept was not really systematically understood by everyone.

For the second theoretical proposition on universities promoting *Student Engagement* inside and outside the campus, the confirmation was unanimous. However, the campus setting might have a significant impact on how this promotion takes place. UVic does not have sports facilities within the campus. Thus, the sport promotion is done by agreements with outside campus clubs. On the other hand, FuJen also promotes *Student Engagement* inside and outside campus but the fact that a majority of their students also work limits promotion capacities. Besides, the activities that are used to promote *Student Engagement* also vary. The use of clubs, funded with university funds is general but, on one side, LHU is promoting them actively, while at UVic, the administration behaves more passively, waiting for the students to ask for help.

The third theoretical proposition on universities using HIPs to promote *Student Engagement* has also been unanimously confirmed. That is, all studied universities use at least two HIPs to promote *Student Engagement*. However, UVic and Fu Jen only use two, while LHU uses them all with the exception of student working on research with faculty. Even this HIP is to be questioned because the interviewees were not from STEM departments. Thus, their answer might be biased. We can see that, in a more technical university such as Lunghwa, they do use this HIP. Also, internships at Fu Jen are encouraged but not mandatory. Their reasoning is that, as most of their students do have a job while studying, this activity is not perceived as being as critical as for universities whose students do not have one.

Unexpected evidence from the research includes the absence of spontaneous mention anywhere of study abroad as an engagement tool, despite all four universities listing such programs and partnership on their respective websites. That is, none of the interviewees considered study abroad as a source of *Student Engagement*. The same happened with working with faculty on research projects. Only one interviewee from Lunghwa mentioned it.

DISCUSSION

This study considers teaching and learning to be crucial as decisive engagement variables, since they have the potential to provide students with not only the skills to find a job, but also to obtain a greater probability of civic and social participation with a greater sense of the responsibility (Winter, Wiseman, & Muirhead, 2006). The study also highlights the engagement generated by curricula in line with literature (Winter, Wiseman, & Muirhead, 2006). Here results show that universities are more committed to community needs, regional problems and economic development through local research in line with the preceding literature (Boyer, 1990; Harkavy & Benson, 1998; Savan, 2004; Ostrander, 2004; Winter, Wiseman, & Muirhead, 2006).

Findings show that there are variations in the way higher education institutions understand and apply community participation in different countries. In addition, such variations relate in part to the complex interconnection between economic, cultural and political influences (Bernardo, Butcher, & Howard, 2012). Thus, culture and environment do seem to have an impact on how the universities behave and integrate themselves into the surrounding community. Thus, despite university willingness to change the environment, the environment is also changing the university and its behavior in response. This seems to explain the different approach the studied universities have toward *Student Engagement*.

Besides these cultural and environmental aspects, some structural aspects have to be added as possible factors to influence the universities' behavior. UVic and Lunghwa are universities whose campus is imbedded into urban areas. Their campus is thus significantly smaller than the FuJen and Lock Haven Universities. The difference in campus structure may play a role in how the universities behave and promote *Student Engagement*, especially the proportion between on campus and outside campus activities. In the case of Lock Haven, with a significant campus, the university proposes many activities on campus and has a grasp on what they are and how to measure them. On the other hand, UVic has almost no campus facilities in comparison. The university has many agreements with the environment so a student can perform different activities during their stay at the college. Thus, the UVic has many more interaction with the surrounding environment but globally less grasp and measurement capacity on what *Student Engagement* is outside the classroom because it is mostly in the hands of third parties.

CONCLUSION

As a conclusion, we may say that all studied universities do use some kind of activities to promote *Student Engagement*. For instance, some kind of in-class engagement from students is demanded everywhere. This is clearly mentioned in the US syllabi, while it is not that clear in those of other cultures one. However, in some cases, a real consciousness does not exist to relate those activities with the concept of *Student Engagement* as it is understood in the US/Canada. US-based accreditation bodies and university culture help to spread the concept and the need of systematic metrics to measure the impact of the activities on *Student Engagement*.

Thus, the main conclusions can be stated as follows:

1. The conceptualization of engagement is not universally understood by the institutions under study.
2. Universities promote *Student Engagement* on campus and off campus, in addition to using high-impact educational practices to promote student participation, with varying degrees of engagement in the universities analyzed.
3. In half of the universities, *Student Engagement* is not actively and consciously promoted.
4. Funding by the university on campus and off campus conditions *Student Engagement*.
5. Labor practices also condition engagement in the four universities.
6. There is no clear evidence regarding the engagement generated by studying abroad despite the fact that the four universities mention these programs on their website and participate in university research projects.
7. In the study, in tune with the literature, teaching and learning is considered crucial as decisive engagement variables along with the curricula of the institutions. The commitment to the environment and the community is also decisive. University dimension and its campus distance from urban areas also has an influence.
8. Accreditation bodies and university culture in the US encourage engagement, although more research is needed to assess the direct impact of these two items.

Finally, it should be noted that all the universities analyzed use some type of activities to promote student participation. In addition, the culture and specific environments of these analyzed areas affect the promotion of high-value educational practices that encourage engagement. Even so, we cannot identify a unique model for the four universities, since more research is needed to validate the level of HIP implementation in different countries and cultures.

The culture and the specific environments also have an impact on the promotion of some of the HIPs. Liabilities in China make it more difficult to ask students to interact with the environment. This aspect in China raises some doubts about how the liability topic is addressed in the US. More research is necessary to understand the legal impact on some of the HIPs.

Finally, there seems not to be a clear model that would explain their behavior around *Student Engagement* and that fits all four universities. Thus, more research is needed to see if a common validation tool can be developed to assess the level of implementation of HIPs in all settings/cultures. We would recommend proceeding with some changes in the exploratory tool, re-defining some of the theoretical propositions and being more directive in the questions around HIPs before proceeding to any validation process.

CONTRIBUTION

The accreditation bodies and the university culture in the United States seem to help to clearly and consciously promote *Student Engagement*. The development of world ranking and international accreditation bodies, mostly based in the US, seem to contribute to the spreading US born concepts. Further research is necessary to assess how important the expansion of US-based accreditation bodies is for the development of the *Student Engagement* concept. Further research is necessary to see if these conclusions can be found in other cultural settings. Also, local culture and university infrastructure seem to have an impact on how *Student Engagement* is promoted. Therefore, it might be interesting to assess the importance of those two aspects in relation to global *Student Engagement*. We might then know whether there is a university culture and/or a university infrastructure that could best suit *Student Engagement*.

LIMITATIONS

The number of universities that have been interviewed is limited. Furthermore, the chosen interviewees do not necessarily reflect the total amount of activities performed at the university to promote *Student Engagement*. With big universities such as FuJen, with over 25,000 students, many more interviews would be needed to understand the real scope of activities. In smaller universities such as LHU, with only 3,200 students, the overall perspective is easier to grasp. Despite this, we did not interview people from the STEM departments as we did for Lunghwa. As a consequence, we may have to consider this research limited to business colleges. Further research needs to be performed to confirm or challenge the evidence for other types of colleges.

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THE TECHNOLOGY OF GEN Z: PREPARING INFORMATION LITERACY SKILLS FOR THE WORKPLACE

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ABSTRACT

Members of Generation Z (Gen Z), one of the largest and most diverse generations, are now entering the workforce. To help their employers contend with the global landscape, they must possess various skills and technical knowledge. As individuals and companies face the barrage of data and information, they need to discern its usefulness, reliability, and relevancy. Gathering, evaluating, and effectively using data for key decision making has become a more discriminate and technical task. While the typical soft skills like leadership, communication, and collaboration are indispensable, other skills like critical thinking, information literacy, problem solving, and the perpetual ability to learn are needed for gaining and sustaining that competitive edge. This paper explores who Gen Zers are, how they learn, what they need for career success, and the technology (learning strategies) to help them become information literate, honing skills for the ethical use of information, critical thinking, problem solving, and lifelong learning needed in the workplace.

INTRODUCTION

Generation Z (Gen Z), one of the largest and most diverse generations, is entering the workforce. To help their employers contend with the global landscape, they must possess various skills and technical knowledge. As individuals and companies face the barrage of data and information, they need to discern its usefulness, reliability, and relevancy. Gathering, evaluating, and effectively using data for key decision making has become a more discriminate and technical task. While the typical soft skills like leadership, communication, and collaboration are indispensable, other skills like critical thinking, information literacy, problem solving, and the perpetual ability to learn are needed for gaining and sustaining that competitive edge. More than any other, members of this generation, called digital natives, know and are comfortable with technology having used it to establish and connect with their social network, aid learning in their formal education, and keep informed about the world around them. They will bring tech-savvy skills, initiative, and a desire to work for something beyond a paycheck -- as well as their own set of needs, behaviors, and attitudes. This paper explores who Gen Zers are, how they learn, what they need for career success, and technology (learning strategies) to help them become information literate, honing skills for the ethical use of information, critical thinking, problem solving, and lifelong learning needed in the workplace.

WHO ARE GENERATION ZERS?

While timelines vary in terms of defining exactly where Gen Z begins and ends, most agree that the generation starts about mid to late 1990s, which means this diverse generation (about 49% identifying as non-white) has begun to progress through the educational system to college and comprise a little more than 25% of the workforce (Desjardins, 2019; Scroth, 2019). Almost all own smartphones; at least half spend about 10 hours a day connected online; the majority prefer social media sites like Snapchat and Twitter over Facebook; and many have shifted to watching YouTube at least two hours a day (Desjardins, 2019; Selingo, 2018). Termed as mobile and digital natives, they are considered tech savvy, quick processors of information, and adaptable to change (Latham, 2019; Desjardins, 2019). Seemiller and Grace (2016) describe the generation as loyal and thoughtful showing concern and care for others and less likely to change jobs; compassionate from seeing via technologies the effects of events on people they know and others around the globe; open-minded with the ability to consider new ideas and perspectives, welcoming differences and diversity; and determined and driven to achieve. Scroth (2019) concurs that this generation aspires to achieve, but values education as a means to an end, to a job.

Different from the preceding millennial generation, Gen Zers grew up during an economic recession rather than an economic upswing and tend to be more pragmatic rather than idealistic (Desjardins, 2019; Selingo, 2018). Living through the Great Recession, this generation worries more about the relevance of education and a college degree; career development and getting a job; establishing a career path; taking on debt; and securing financial stability (Selingo, 2018; Kozinsky, 2017).

While the circumstances in which Gen Zers grew up may produce some desirable traits as learners and workers, other concerns have emerged. The stresses of the Great Recession and ongoing connectedness to the world have created anxieties, depression, and fear on issues of safety, stability, and security, including financial security (Tomasian, 2019; Seemiller & Grace, 2016). While they may be more sensitive to current events, show greater global awareness, work hard to achieve, and demonstrate more frugality, they also may suffer greater mental health issues and find workplace wellness a struggle. They tend to be marked by skepticism regarding their future which brings their focus to what is necessary for professional achievement and success. The increasing competition for admission to prestigious colleges has caused Gen Z to focus more on stacking credentials on their college application with extra-curricular activities, workshops, and summer courses and less on finding a summer or part-time job (Selingo, 2018).

Although members of Gen Z are considered to be entrepreneurial in creating revenue streams and starting their own businesses, statistics show that on average they are less likely to have work experience than previous generations. “In 1979, 60% of teens held a job, while in 2015, 34% of teens held a job, and it is expected to drop to 24% in 2024” (Scroth, 2019, p. 6). In addition to competing for entrance into college, Scroth (2019) suggests that some come from more affluent families, but also that less work experience has evolved from unemployed graduates and older workers filling the lower level jobs that part-time high school students traditionally occupied. Moreover, their overprotective parents are viewed as interfering with social, emotional, and intellectual development resulting in less opportunities to develop life skills and become independent adults.

While Gen Z recognizes the importance of critical skills (e.g., soft skills) beyond technology, they are not as confident in their abilities in this realm. This high-tech generation lives and grows in an overwhelmingly advanced digital environment; they do not know a world without Internet and often emphasize technological over non-tech skills. Gen Zers are concerned that they do not have the necessary soft skills that will make them ready to be fully participating members in today’s workplaces (Wood, 2018; Hora, 2017; Robles, 2012).

HOW DO THEY LEARN?

Many web pages, blogs, and articles clamor about how this generation learns much more differently than previous generations. However, much of what is outlined in these works, both scholarly and not, seem to point to the fact that the fundamentals of effective teaching as outlined in Chickering and Gamson’s (1987) *Seven Principles For Good Practice in Undergraduate Education*, now more than 30 years old, still provide sound guidance for educational design and delivery. They assert that good practice includes interaction between students and faculty, cooperation among students, active learning, prompt feedback, time on task, high expectations, and respect for diverse talents and ways of learning. Though some of these are emphasized more than others, many of these principles have provided the underlying current for how to teach previous generations which holds true for Gen Z as well.

Regardless of whom is being taught, the fundamentals of good learning strategies and curricular design with relevant, explicit learning objectives, sound content, and well-thought assignments serve all generations well. Members of Gen Z are characterized by wanting transparency, honesty, authenticity and relevancy with respect to their learning and work environment to help them understand why decisions are made (Selingo, 2018; Seemiller & Grace, 2016; Tomasian, 2019). Interaction and communication between students and faculty should include clear expectations about the purpose, relevancy, and importance of learning objectives and activities and how they lead to skill development, to business needs, to career development and advancement, and to daily living (Selingo, 2018; Scroth, 2019).

Yes, Gen Z (otherwise known as iGen) has touched technology all of their lives and will expect technology to be part of the learning process (Twenge, 2018). Selingo (2018) indicates that Gen Zers say technology can enhance learning, make it fun, and support studying, but do not prefer more technology (e.g., social media and ePortfolios) in courses and favor in-person advising and coaching. Harris Poll results on this generations’ learning preferences list the top five as in-person activities with classmates, in-person lecture, YouTube, books (in print), and interactive learning apps or games (“Beyond Millennials...”, 2018). Of course, technology will be an essential learning tool, but may not be preferred for some activities; can actually distract users and students around them; and impair the ability to effectively communicate in various circumstances (Scroth, 2019; Selingo, 2018).

While technology can engage students in the learning process, it can be used alongside of other active learning strategies. A blend of technological and traditional means of learning, individual (independent) and social learning,

and less fundamental lecture paired with greater emphasis on hands-on work can effectively promote application of skills and knowledge. Seemiller and Grace (2016) suggest options like flipped classrooms (focusing on applying content with peers during class time), hybrid learning (mixing face-to-face and online delivery), social learning (students learn from each other), collaborative learning that requires both independent and shared portions, think-pair-share (also requires independent work and reflection before group discussion), experiential learning, and integrating real-life stories tapping into social issues, entrepreneurial initiatives, and policy work, etc. Kozinsky (2017) affirms that students enjoy class discussion and an interactive classroom, social learning, hands-on learning, and experiential learning which are especially effective when they can make connections to the real world and their relevancy in it. These approaches embed active learning, interaction with the faculty member as facilitator, cooperative learning, time on task, and respect for diverse ways of learning while developing requisite skills in information literacy, teaming, communication, critical thinking, and problem solving.

Seemiller and Grace (2016) also suggest that instructors need to slow the “binging mentality” by breaking up requirements for large assignments into smaller pieces which creates a more steady involvement in the learning process, can deepen learning, and produce better quality work and outcomes (p. 206). Chickering and Gamson (1987) indicate that students need more opportunities to perform and coaching for improvement. Breaking up assignments permits more opportunities for faculty to provide feedback that can be used in subsequent parts of the assignment and promote learning. Gen Z desires quick feedback especially with their exposure to the immediacy of the internet and its search results. Effective learning strategies will include not only prompt, frequent feedback, but structured ways in which students will be expected to act and value feedback as a motivator for learning and achievement both in the educational process and on the job.

WHAT SHOULD THEY LEARN?

Many studies written on requisite workplace knowledge and skills converge on the fact that discipline specific skills and knowledge for a given occupation are important for employability, but so are other skills (i.e., soft skills, transferrable skills, and generic skills) and dispositions. Soft skills and like attributes might include integrity, communication, courtesy, responsibility, interpersonal skills, professionalism, positive attitude, teamwork skills, flexibility, and work ethic, and were ranked in a small executive survey in the order listed (Robles, 2012). Integrity, communication, courtesy, and responsibility, for example, were considered extremely important.

Bridgstock (2009) suggests that there are multiple skill sets necessary for employability and includes discipline specific skills (e.g., knowledge of occupation or field), but also self-management skills (e.g., ability to know self, values, abilities, and interests), career building skills (e.g., finding and using information about labor markets, job opportunities, and networking), generic skills (e.g., information literacy, technical proficiency, communication, and teaming), and underpinning traits and dispositions (e.g., openness, agreeableness, initiative, and self-confidence). Scroth (2019) indicates that students should possess a growth mindset that values learning and the ability to communicate effectively with multiple generations which may require various communication media including, but going well beyond, technology-mediated exchanges. Survey results gathered by the National Association of Colleges and Employers (NACE) indicate that written communication, problem-solving, teamwork, initiative, strong work ethic, analytical/quantitative skills, and verbal communication rank among the top attributes employers want (NACE Staff, 2018).

Hora’s (2017) study emphasizes the importance employers place on inter- and intra-personal competencies to fill the skills gap, which include skills and attitudes like communication (especially the ability to communicate effectively within the context of the specific occupation and work environment), problem solving (and related cognitive skills), teamwork, adaptability, strong work ethic, and lifelong learning. Various studies about the top skills employers seek were reviewed and aggregated by Schwieger and Ladwig (2018) to develop their model regarding employer expectations. These expectations included characteristics like strong work ethic, initiative, and creativity upon which schools can build and develop educational outcomes like strategic planning, discipline specific knowledge, technical skills, computer skills, and communication.

Similarly, recent Association of American Colleges and Universities (AACU) hiring manager survey results herald oral communication as the most desirable skill along with ethical decision making, teamwork, and the ability to apply knowledge (Watson & McConnell, 2018). This report also acknowledges survey results of business executives who would add critical thinking, analytical reasoning, and working independently. While the actual rankings from some of

these surveys vary slightly about the order of importance, research in this decade and the previous one tend to land on the same set of skills and attributes regardless of rank order. In 2006, like most recently, the Workforce Readiness Initiative revealed that professionalism/work ethic, oral and written communication, teamwork/collaboration, and critical thinking/problem solving appeared most important to employers (Casner & Barrington, 2006). While listed in some but not all of the research and articles, information literacy should be among those skills that students must learn and graduates possess.

WHY FOCUS ON INFORMATION LITERACY?

With increasing internet use especially among the latest generation, information literacy skills over the last two decades have increased in importance. The Boyer Commission Report (1998), more than two decades old, emphasized the importance of research-based learning activities and information literacy skills. With immediate and seemingly limitless access to all kinds of information especially on the internet and social media, even more than ever, Gen Z requires information literacy skills to more readily decipher what is relevant, accurate, and credible for workplace decision making and life choices (Seemiller & Grace, 2018; Bridgstock, 2009).

Information literacy initially was defined as “the ability to locate, evaluate, and use effectively the needed information” (The Association of College and Research Libraries, 2000, p. 2). In 2016, the Association of College and Research Libraries (ACRL) adopted an expanded definition that describes information literacy as “the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning” (ACRL, 2016, p.8). In the process of developing information literacy skills, students of all generations can develop technology skills, critical thinking skills, analytical skills, problem solving skills, and communication skills; they learn to use information ethically and can become independent learners as information literacy forms the basis for lifelong learning (ACRL, 2016; ACRL, 2000; Snively, 2008). Mastering information literacy skills like evaluating the trustworthiness of information when using web-based sources, including YouTube, can build students’ confidence and self-efficacy in business research and lifelong learning (Malafi, Liu, & Goldstein, 2017). In essence, developing information literacy skills and dispositions can help students achieve various learning goals needed for professional and personal success as they retrieve and use information.

Gen Z searches for and shares information much differently than their Millennial, Gen X and other generational counterparts. Increasingly, Gen Z business students use digitally based search engines like Google, Bing, and Yahoo as well as various social media sources such as YouTube, Twitter, Pinterest, and LinkedIn when gathering information (Boateng & Amankwaa, 2016; Farhi, 2012; Kim & Sin, 2011). YouTube, one of the largest databases in the world with more than 4 billion video views a day, retains the position as the third-most-visited site on the Internet, behind only Google and Wikipedia (Purcell, et al., 2012; Kim, Yoo-Lee, & Sin, 2011; Farhi, 2012). As well, other social networking sites including Facebook, Instagram, Tumblr and Snapchat offer homework assistance with posts about current events and hints from peer to peer tutoring (Boateng & Amankwaa, 2016).

Among different social media platforms, YouTube has become an increasingly popular choice for students. The site offers user-generated and corporate media videos, documentary and educational program material, music, movie and other forms of material, and depending on how it is used, YouTube can provide a bountiful and innovative resource for enhancing classroom instruction and learning (Duffy, 2007). Observations and informal surveys of students in management classes indicate that YouTube is often consulted for academic tasks. It seems that students prefer to make use of YouTube as a means of information seeking in the early stages of a research assignment and then, perhaps quite indiscriminately, include one or two YouTube findings in a class presentation. Many Gen Zers rely on and are quite proficient in finding informative and entertaining video for their classroom presentations (Asselin, Dobson, Meyers, Teixeira, & Ham, 2011). According to the 2012 PEW Teacher Survey Report, 52% of the teachers surveyed say their students are “very likely” to use YouTube or other social media sites for a typical research assignment. Google or other online search engines are currently the top two information sources for a typical research assignment with 94% and 74% of surveyed teachers reporting on usage respectively. Only 16% report that students were likely to use a school or public library research librarian, and a mere 12% make use of such traditional text research sources as printed books other than textbooks. Surely they will continue this practice as they go through high school, university, and into the workplace. Whether or not students evaluate the information for accuracy and reliability, factual consistency, or author authority when viewing and selecting YouTube presentations and other social media sites in the same way they do (should) when reading book, journal or article sources for an assignment is unclear (Kim

& Sin, 2011). Additionally, students have not been asked directly about how they assess the accuracy, authority, or reliability of the information they find via social media (Kim & Sin, 2011). Moreover, the proliferation of research via the internet and web-based sources has been accompanied by an increase in plagiarism since electronic sources can be easily copied (Ragains, 2013). Like traditional text research sources (e.g., books, trade journals, magazines, and research published in scholarly and academic journals), YouTube and other internet sources require specific skills to identify reliable, accurate and quality information and use it ethically. These critical skills are valued in today's workplace.

As future business employees, Gen Zers must search, find, evaluate, synthesize, and share information with colleagues for decision making and strategizing. In the past decade, globally managed companies increasingly have recognized the ability to access and manage information as a strategic necessity (Cheuk, 2008). The integrity of the information will be of equal if not greater importance in business decision making where a lack of information literacy can negatively impact workplace outcomes. In *Business and Workplace Information Literacy: Three Perspectives*, Stephanie Goldstein writes that "The promotion of companywide knowledge creation, sharing and use—and the critical IL competencies that underpin these—can lead to greater operational efficiency and the exploitation of business opportunities... by adding value and providing returns on investment...by contributing to such business factors as efficiency, profitability, the capacity to provide good customer service, staff self-motivation, and compliance with legal, ethical and other requirements" (Malifi, et al., 2017, p. 82).

Clearly, employers value the ability to find and effectively use information in various formats. The information literacy skills needed and asked for by employers are available in the minds of the Gen Z students who have the capability to easily find exhaustive amounts of information and events occurring anywhere in the world. With so much information instantly available to them, educators of this future workforce must design learning activities that develop necessary skills to find and sift through the plethora of information, determine its accuracy and trustworthiness, recognize and critically evaluate the value of the information relevant to their discipline or business context, make meaningful interpretation, and use information in making business decisions. And, they must do so in an ethical and legal way (Cyphert & Lyle, 2017; Seemiller & Grace, 2016).

WHAT TECHNOLOGY (LEARNING STRATEGIES) CAN WE USE?

The technology of Gen Z can include many, many approaches. Combining current technology and good practices in teaching and learning offers unlimited options for creative assignments that will grab the attention of Gen Zers and involve them deeply in active, collaborative, and/or experiential learning. This holds true of teaching information literacy as well; instructors may consider embedding an information literacy learning framework within their assignments, including instruction about how search engines work, how to conduct research online, how to assess the reliability of the information found online, and methods for improving search skills (Purcell, et al., 2012). The framework should also incorporate the seven principles of good undergraduate education (Chickering & Gamson, 1987). The literature on Gen Z, effective teaching and learning, and information literacy were combined to embed and scaffold information literacy into a business program through three management courses at different levels in the four-year curriculum.

Program/Course Design with Scaffolding

As stated previously, good curricular design starts with designating desired learning objectives, content, assignments, technology tools, and rubrics. In this business program, two faculty members engaged in this curricular planning individually. They had carefully laid out their courses, developed syllabi to communicate clear expectations, and used the learning management system to share with students the information, directions, and course materials including readings, assignments, and rubrics. Although the courses covered relevant content and activities to develop skill areas that employers want (e.g., communication, teamwork, and critical thinking), the faculty discovered an increasing need for students to learn more about information literacy and to infuse the current curriculum with more intentional instruction. Although students were asked to conduct research for projects and papers, limited instruction was given about how to do so, and little evaluation and feedback done in this realm. As the faculty shared stories about the poor quality of research and proliferation of plagiarism from online sources, they chose to revise their approach to information literacy and elevate its importance as a learning objective in these management courses using a scaffolding approach within the business program. The faculty members introduced content, assignments, and rubrics in lower level courses and reinforced them in upper level courses. The courses also included scaffolding where shorter

assignments were used to apply and assess information literacy skills, provide feedback to students, and develop targeted assignments to incorporate that feedback, lead up to, and/or serve as components of larger, more significant assignments due later in the semester. Having shorter related assignments may also address the bingeing mentality raised by Seemiller and Grace (2016).

Partnering with Library

The faculty partnered with their library liaison. Partnering with the university's librarian and having them an integral part of the learning process can bring expertise in this area, reinforce faculty instruction, and offer an additional point of contact for students. Generally, students prefer easier access to resources than libraries provide and are much less likely to seek help from librarians (Head & Eisenberg, 2010). The ACRL suggests developing workshops with university librarians that use multimedia assignments; facilitating opportunities with which students interact, evaluate, produce, and share information in various formats and modes; and collaborating with librarians in designing learning experiences and assignments that will encourage students to assess their own attitudes, strengths/weaknesses, and knowledge gaps related to information (ACRL, 2016).

As the management faculty had developed their curriculum and assignments, they spent time with librarians in discussing expectations, learning goals, assignments, research needs, and assessments. Meeting with the librarian can provide a better foundation upon which to design a library session; give feedback to the faculty member on how to improve learning; and produce more effective interaction between the librarian and students (Ragains, 2013). Though some faculty may want to deliver all, some, or none of the information literacy instruction to the students, partnering with the librarian can help them determine the level of participation desired and gain ideas about what to do. In the three business classes, the librarian was involved to different degrees, but most heavily in the upper level course.

To organize the information, librarians may develop an online library guide (LibGuide) for the particular course, a good tool for integrating information literacy (Ragains, 2013). For the management courses, the LibGuide included modules for basic information on the library, access and searching, and relevant online databases for the assignment, but the site evolved over time with better organization of databases by various types of information needed for the assignment. Other modules were added on writing and citing; and evaluating web resources. With the escalation of plagiarism and lack of proper attribution for web sources, faculty members specifically requested library instruction on these topics, but the librarian added LibGuide modules for evaluating web resources and writing/citing as well. This LibGuide served as a well-organized tool for shaping the library instruction session which kicked-off the research project and gave students an easily accessible resource when conducting research outside of the library session.

Among learning goals, the library session should not only help students meet the requirements of the assignment, but also connect the information and the assignment to their usefulness beyond the course. Gen Z characteristics include wanting relevancy of the assignments to professional development and daily living. In the management courses, the librarian designed information literacy sessions to connect the relevancy of library instruction to their assignments, profession, and/or daily living explaining how to transfer the skills and processes to other settings. The session also allotted time for hands-on learning. Hands-on practice time should be incorporated using relevant examples or parts of the actual research project (Ragains, 2013). Gen Z benefits from opportunities to apply what they learned and appreciates receiving prompt and timely feedback, which is a sound educational practice as well. At the conclusion of the library session, the students received feedback and answers to questions from both the librarian and instructor, as they established a point of contact with the library for future inquiries.

Both the librarian and faculty member may provide guidance on the class assignment throughout the rest of the semester. When students complete their assignment, the librarian can also be useful in evaluating work especially for those comprehensive papers or projects by focusing on the grading rubric's information literacy components. Involving the librarian before, during, and at the conclusion of the project gives the librarian a more comprehensive view of the project that can generate better feedback about student learning outcomes and improving the course.

Integrating technology, social media, and a blend of effective learning strategies

Research on Gen Z indicates that its members expect to use technology, prefer researching with online sources and social media, and will benefit from a blend of learning strategies (e.g., independent and group learning). Teaching information literacy can incorporate all of these attributes. To address these preferences and employ effective learning

strategies, the management classes used learning management systems, online databases, and social media on independent assignments in addition to more involved group projects.

Specific attention was given to integrating YouTube into the information literacy assignments. Strategies for maximizing the use of YouTube as a pedagogical tool in the classroom have been provided by various authors. Clark and Mayer (2002) have suggested that the media should align with expected learning and performance outcomes, and be appropriate for the target learner's level of information literacy abilities. In "Engaging the YouTube Google-Eyed Generation: Strategies for using Web 2.0 in Teaching and Learning," author Peter Duffy (2007) has advocated for maximizing student learning using YouTube in the classroom by playing YouTube videos in short segments, and making sure students play an active role in the learning process by taking notes while watching, asking questions, and/or answering questions to get them to think critically about the content they just viewed. Using YouTube as a supplementary tool to illustrate concepts learned through textbook readings reinforces the concept as a real-world example, facilitates peer collaboration, and provides a way for students to improve their critical thinking and writing skills as they exploit the examples portrayed in the videos they select (Brook, 2011).

As it relates to information literacy, active learning strategies targeted at searching YouTube and other online sources, and evaluating their relevancy and accuracy also could be integrated. When it comes to surfing the internet for video sources, students appear to need only minimal assistance with the research process; they know how to navigate it, but evaluating sources requires much more attention.

Evaluating sources

The management faculty selected a scoring rubric that reflected current research in this area. Researchers have identified various criteria for evaluating print and online sources including content, purpose, ease of use, relevance, authority, coverage, objectivity, currency, purpose, accuracy, and so on. The CRAP test developed by Molly Beestrum and adopted by librarians across the nation summarizes criteria into four categories: currency, reliability, authority, and purpose ("Learn about Evaluating ...," n.d.). Likewise, Blakeslee (2004) developed the CRAAP test with her own twist on the concept including questions about currency (i.e. timeliness); relevance (i.e., importance to topic); authority (i.e., source of information); accuracy (i.e., reliability, truthfulness, and correctness of content); and purpose (i.e., the reason the information exists). Other libraries have posted their own version of the test and rubrics for evaluation. For example, the five criteria articulated on the Penn State University Libraries' website include Currency: When was the website last updated?; Authority: Who is the author or creator?; Validity/Accuracy: Is the information accurate or valid?; Audience: Who was the website created for?; Point of view (bias): What is the website's point of view? ("Evaluating information rubric," n.d.). Since the tests' criteria are overlapping and reinforcing, any can sufficiently guide students in evaluating online sources and form the basis of a rubric to evaluate both web sites and social media sites like YouTube. The management faculty assigned students to use a rubric based on the CRAAP test to evaluate their sources giving them the opportunity to reflect on the key criteria that characterize reliable sources and their application of them.

A few examples

Briefly described below are three examples of information literacy assignments from management courses at various levels in the program. **The first**, simple example comes from an introductory management class that used YouTube videos to illustrate or enhance chapter concepts. To maximize learning according to best practices (Clark & Mayer, 2002; Duffy, 2007), the faculty member carefully selected a YouTube video, determining its accuracy as well as its relevancy to Gen Z students who watched the YouTube video. They received handouts with summary points of the video content, written guidelines, and prompts. Students first worked individually on their responses. For example, they cited factual information heard in the video and made connections to textbook or article material by highlighting important information. In their own words, students wrote one or two main points of correspondence between the video and reading. While this practice is not uncommon, the faculty member expanded the assignment by asking students to work in groups to search for and evaluate additional sources on the same topic. Students were given the CRAAP rubric and asked to report out to the group what videos they selected and how they measured up using the rubric. This example serves as an easy way to introduce criteria for effectively evaluating online sources, including YouTube.

The **second example** comes from an intermediate management course on organizational behavior. Faculty instruction included introducing the assignment; providing an overview of how to select legitimate and authoritative online sources; justifying why effective research requires information from multiple sources – print, web-based, and video; and outlining the steps required to complete the assignment. Using the SmartBoard for internet access, the instructor demonstrated initial online access strategies focusing on how to search for scholarly and professionally produced video. Students were given a printed assignment that explained step-by-step instructions.

Students were assigned the responsibility to read chapter material and complementary articles, prepare responses to relevant discussion questions, and define concepts of motivation theories. In teams of two, students chose according to their interest a motivation theory considered most consistent with their perspective as an employee and from a managerial point of view. They prepared a short report discussing how that motivation theory might be used in a hypothetical work situation in which some employees were highly motivated and others not so much, and explained how manager behavior (motivation style) influences behaviors in organizational settings. They initiated an internet search for support and/or opposition for using their chosen motivation strategy in today's work environment. Students used search words provided by the instructor and expanded the search with other terms that emerged during the process. They were required to find short video clips to demonstrate the topic, give a class presentation showing the clip, and explain why they selected the clip (which involves applying the CRAAP test and rubric). The assignment included a blend of traditional means of learning with Gen Z preferred learning methods and promoted peer-to-peer interaction (discussions, peer editing, cooperation, commenting, and interaction with the entire class). In assignments such as this, students have demonstrated higher levels of initiative and creativity, and intrinsically were driven to produce a quality result (Brook, 2011; Duffy, 2007).

The **third example** uses the scaffolding approach to information literacy within the senior capstone course by completing smaller assignments that provided targeted practice for evaluating online sources and social media sites before embarking on the larger research project. Early in the semester, students completed two individual, online research assignments on familiar companies' stated objectives and competitive strategies (e.g., eBay's or Best Buy's strategies), and applied the CRAAP test to evaluate the sources used for the assignment (Blakeslee, 2004).

For the first company research assignment the first week of class, students completed and submitted the assignment with greatest focus on understanding course concepts, writing a short paper, and citing all sources correctly. They received the scoring rubric after the assignment was submitted and were asked to evaluate their sources using the CRAAP test. The subsequent evaluation part of the first assignment after submission allowed students to focus just on the evaluation of sources rather than having to be concerned about also doing the research, answering the content questions, writing, and citing. For the second assignment, students checked each part of the rubric and submitted it along with the assignment. The first assignment gave practice and feedback on what they need to do for checking online sources with the opportunity to reflect on and use that information for the second assignment. As always, instruction and follow-up for both assignments were intended to highlight the assignment's relevancy and accuracy in terms of content and sources to the course, future assignments, and the workplace.

These shorter assignments were followed by a company research project that integrated library instruction as described above in the section on partnering with the library. After significant course planning, the faculty member met with the librarian to discuss the project and shared the description of the assignment and grading rubric which enabled the librarian to develop the library instruction session and LibGuide for the course. The librarian was careful to connect the session to the needs of the assignment, but also to students' future needs as working professionals by discussing why they need reliable sources for business research and where they might find those sources without access to the universities' databases after graduation.

Best practices in education point to hands-on learning which is also important for library instruction (Ragains, 2013). Hands-on practice time was included by allowing students to follow along throughout the session individually and then work in groups toward the end of the session to make the final selection of their topic, and retrieve and archive their research. While not always possible, students were asked to select a topic/research question prior to their library session. Several weeks before the library session was held, the faculty member introduced the assignment to the students, gave parameters for company selection, and asked student groups to confer and select a company prior to the session. Having their actual topic provided relevancy for students and allowed them to start their actual research in the lab setting where they can receive instruction, immediate feedback, and assistance in their initial search efforts. During the session, students asked many questions of both the faculty member and librarian. Some quickly realized

that they could not find the required information for the assignment, and selected another company better suited. Gen Z appreciates receiving prompt and timely feedback, which is a sound educational practice as well. At the conclusion of the 1.25 hour session, the students not only received feedback and answers to questions from both the librarian and instructor, but they established a point of contact for future inquiries. Some contacted the librarian who could easily be reached through email and the library site's chat function. When students presented their findings, the librarian attended, used the rubric to score the IL portion of the talk, and provided feedback to the faculty member to strengthen the assignment. The librarian remarked how useful it was to see the finished product and that having done so would help in the delivery of future sessions.

CONCLUSION

Gen Z possesses many characteristics that align well with the needs of the 21st century business community. Loyal and thoughtful, students possess tech savvy capabilities and the ability to process information quickly that employers appreciate and need (Latham, 2019; Desjardins, 2019; Seemiller and Grace, 2016; Scroth, 2019).

Business leaders realize the importance of information literacy as their workforce must access, manage, and use the ever-increasing volume of information available through a variety of channels (Cheuk, 2008). Information literacy spawns critical thinking, analytical, problem solving, and communication skills, and is essential for those preparing to enter the workplace.

Having grown up with technology and various forms of social media, Gen Zers are comfortable using the internet to find information even without instruction. However, as this paper asserts, these digital natives often lack information literacy skills needed for evaluating web content and for workplace success.

To build the Gen Zer employability skill set, this pedagogical framework integrates technology, social media (YouTube in particular), and a blend of effective learning strategies focused on developing information literacy skills. Business program faculty incorporated scaffolding approaches by initially introducing content, targeted assignments, and rubrics in lower division courses, and amplified them in upper division courses where students had the opportunity to utilize said skills in simulated real-world applications. Partnering with a university library liaison allowed for additional expertise and perspective that produced improved course assignments and student skill development.

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UNDERSTANDING YOUR STUDENT LOANS: A PERSONALIZED CASE STUDY

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ABSTRACT

This paper outlines an active learning Excel based personalized case study for an introductory finance course utilizing the student's own student loan data. The purpose of this assignment is twofold: to create student "buy in" by demonstrating the relevance of the course material, and to practice basic of time value of money & amortization calculations. This project was run at two separate US colleges between 2011 and 2017. Student feedback was largely positive and indicated increased engagement and understanding of course material.

INTRODUCTION AND LITERATURE REVIEW

As any professor of an introductory finance course can attest, student engagement is a challenge. In my experience, aside from the one or two majors in a typical class of 35 students, the vast majority are just there to fulfill a requirement. The goal therefore becomes, how can I quickly and effectively create student "Buy-in"? One of the primary keys to obtaining student buy-in is making the material relevant to the students (Burke, 2006). In 2012, 71% of all students graduating from four-year colleges had student loan debt, averaging between \$25,550 and \$32,300 for public and private colleges respectively (ICAS fact sheet, 2014) so clearly, loans are relevant. Additionally, the use of personal loans meshes well with the movement towards a focus on personal (rather than managerial finance) as the foundation of introductory finance courses as advocated by Vihtelic (1996). The effectiveness of the of board personalized financial planning exercises has been documented by Butcher (2016) and Gunmuson et al (2015); the advantage of this project is that it focuses solely on student loans so it can serve as a separate standalone project rather than a course long assignment.

One of the issues often raised in the TVM instruction literature is the risk that students focusing on the mechanics of the calculations will lose an application for the underlying concepts on which the calculations are based (Delaney, Rich & Rose, 2016). For this reason, the project includes periodic analysis questions which clearly link the calculations to the relevant course content namely, annuity and amortization calculations. Furthermore, the assignment is color-coded with the calculations and their associated interpretations in the same color to reinforce the connections between the two. The assignment is designed for Excel because most calculations done "on the job" are done using spreadsheets (as opposed to financial calculator) (Bloski, 2012) and because employers expect job candidates to have strong Excel skills (Formby et al., 2017).

I. The Assignment

Understanding Your Student Loans

The purpose of this project is to familiarize you with your student loan debt. This exercise will walk you through gathering your current student loan information, calculating your loan debt and determining exactly how much you will pay in total for your education. This personalized active learning case study will review basic time value of money calculations and amortization tables in Excel.

You will be required to submit this project in a binder. Please **print** and **highlight** all relevant information as instructed. **Required calculations and interpretations are noted in blue. Estimations of future loan amounts and interest rates appear in purple.**

*****If you do not have outstanding student loans or do not wish to use this data for privacy reasons please see me asap to get a sample set for use in this project*****

Step 1: Gather the data: You will need a full list of your loans along with their interest rates, loan origination fees, and principal and interest balances. The steps to gather this data are listed below.

For government loans,¹ **you**² obtained by filling out the FASA form go to: <https://www.nslds.ed.gov>
Select “Financial Aid Review”.

Enter your username and password and select LOG IN if you already have an *FSA ID*. If you do not have an *FSA ID*, select the “Create An *FSA ID*” tab. This will require you to enter your Social Security number.



¹ For **private loans** you will have to go to each lender’s website and follow their procedures to get your loan statements.

Examples of private loans include loans from: Discover, CITI, WellsFargo, Chase, as well as the Sallie Mae “Smart Option” loans

² Parent plus loans are not listed here because your parents signed for them on your behalf. Your parents can use this same process to access this data.

- This will bring you to a page which lists all of your outstanding loans. **Pay attention to the loan types, you will need these to estimate the interest rate on any future loans you may need before graduation.**



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Aid Summary for [] Your enrollment status is [] effective []

Authorization **Subsidized Usage**

Use the **Loan Types** and **dates** to find interest rates and origination fees in the next step

Please click on number in first column to see details

| Type of Loan | Loan Amount | Loan Date | Disbursed Amount | Canceled Amount | Outstanding Principal | Outstanding Interest |
|------------------------------------|-------------|-----------|------------------|-----------------|-----------------------|----------------------|
| 1 DIRECT STAFFORD UNSUBSIDIZED | | | | | | |
| 2 STAFFORD UNSUBSIDIZED | | | | | | |
| 3 STAFFORD SUBSIDIZED | | | | | | |
| 4 STAFFORD UNSUBSIDIZED | | | | | | |
| 5 STAFFORD SUBSIDIZED | | | | | | |
| 6 STAFFORD SUBSIDIZED | | | | | | |
| 7 FEDERAL PERKINS | | | | | | |
| 8 STAFFORD SUBSIDIZED | | | | | | |
| Total DIRECT STAFFORD UNSUBSIDIZED | | | | | | |
| Total STAFFORD UNSUBSIDIZED | | | | | | |
| Total STAFFORD SUBSIDIZED | | | | | | |
| Total FEDERAL PERKINS | | | | | | |
| Total All Loans | | | | | | |

- Click on the number next to each loan (the blue square) to see its basic characteristics including the interest rate. You will need this data to consolidate your loans after graduation.



- **Print** the relevant pages and **highlight** your interest rates
- For other loan types simply google the loan type and interest rates, if you have difficulty please see me asap

UNLESS YOU ARE A GRADUATING SENIOR, YOU WILL NEED TO ESTIMATE YOUR FUTURE LOAN AMOUNTS AND INTEREST RATES:

The maximums for the governments Stafford program can be found at:

<http://studentaid.ed.gov/PORTALSWebApp/students/english/studentloans.jsp>

- Look at your previous and current loans. What trend do you observe? Are your award amounts increasing or are they constant?
 - If they are constant *and your family's financial position has not changed* you should estimate that you will receive the same loans in future years.
 - If they are increasing *and your family's financial position has not changed* you should estimate that they will continue to increase up to the maximum award.
- The interest rates on your current loans are visible in the blue square for each loan, but you will need to estimate the current and *maximum possible*⁴ interest rates for any future loans. These links show the interest rates on previously issued loans. Use these as a guide to estimate your future loans' interest rates.

³ For privacy purposes you may blackout and change loan amounts and dates

⁴ This applies only to private student loans. Loans obtained thru the FASA have fixed rates.

<https://studentaid.ed.gov/sa/types/loans/interest-rates>
<https://studentaid.ed.gov/sa/types/loans/interest-rates#older-rates>

- The chart you are looking for looks like this:

| Interest Rates for Direct Loans First Disbursed on or After July 1, 2017 | | |
|--|---|--|
| Loan Type | Borrower Type | Loans first disbursed on or after 7/1/17 and before 7/1/18 |
| Direct Subsidized Loans | Undergraduate | 4.45% |
| Direct Unsubsidized Loans | Undergraduate | 4.45% |
| Direct Unsubsidized Loans | Graduate or Professional | 6% |
| Direct PLUS Loans | Parents and Graduate or Professional Students | 7% |

All interest rates shown in the chart above are fixed rates for the life of the loan.

- Next, you will need to determine your origination fee for each loan. Scroll down the page to find these rates.

| Loan Type | First Disbursement Date | Loan Fee |
|---|--|----------|
| Direct Subsidized Loans and Direct Unsubsidized Loans | On or after 10/1/16 and before 10/1/17 | 1.069% |
| | On or after 10/1/17 and before 10/1/18 | 1.066% |
| Direct PLUS Loans | On or after 10/1/16 and before 10/1/17 | 4.276% |
| | On or after 10/1/17 and before 10/1/18 | 4.264% |



- **Print** the relevant pages and **highlight** your origination fees

Step 2: Calculate your payments: This section will walk you thru calculating your total outstanding loan balances as well as the standard repayment scenarios.

1) How much do/will you owe?

- Add up your total current debt including any outstanding interest⁵.

a) Why didn't you include the loan origination fees in these calculations?

2) Based on the **current** interest rates calculate the minimum monthly payment you will need make to repay your loans in 10 years (this is the standard repayment schedule)

PMT(rate, nper, pv) *** make sure to make rate and nper monthly!!!*****

Ex: Calculate the monthly payment of a 10 year \$36,000 loan at 6%:

=PMT((.06/12),(10*12),36000))



PRINT these calculations

a) How much will you end up paying in total for your education if you stick to this payment plan?

FV(rate, nper, pmt) *** Make the PMT negative!!!*****

Ex: How much will you end up repaying for a 10 year \$36,000 at 6% if you make monthly payments of \$399.67?

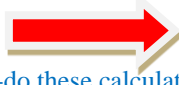
=FV((.06/12), (10*12), -399.67))



PRINT these calculations

3) Based on the **current** interest rates calculate the minimum monthly payment you will need make to repay your loans in 25 years (the maximum possible extension for government loans)

a) How much will you end up paying in total for your education if you stick to this payment plan?



PRINT these calculations

4) Re-do these calculation using the **maximum** possible interest rate if applicable

5) Do you prefer the 10 or 25 years repayment plan? Why?

⁵ For the private loans you may need to calculate this if you only have a copy of your MPN or initial statement.

Step 3: Analyze repayment scenarios: This section involves amortization tables which show the allocation of payments across interest and principal.

- 6) Calculate the **weighted average interest rate** for both the **current and maximum rates** to consolidate all of your loans into a single amortization table.

Ex: You have 3 loans for \$10,000, \$5,000 and \$12,000. Their interest rates are 4%, 3.5% and 6% respectively. Calculate the weighted average interest rate.

Step 1: Calculate the total outstanding loans: $=\text{SUM}(10000, 5000, 12000)=27,000$

Step 2: Calculate the ratio of each loan to the total outstanding loans

Loan 1: $10000/27000=37\%$

Loan 2: $5000/27000=18.5\%$

Loan 3: $12000/27000=44.5\%$

Step 3: Use the ratios in step 2 and the interest rates to calculate the weighted average interest rate

$13\%(4\%)+18.5\%(3.5\%)+44.5\%(6\%)=4.8\%$

PRINT these calculations

- 7) Use the weighted average interest rates to create **amortization tables**⁶ showing how your loans will be repaid in the 10 year time horizons based on the payments you calculated above.

Ex: Set up an amortization table for a 4-year \$1,000 with a 10% interest rate.

| Year | Balance | Interest Due | Payment | Amortization |
|------|------------------------|--------------------|---------|-----------------------|
| 1 | 1,000 | $.1(1000)=100$ | 315.47 | $315.47-100=215.47$ |
| 2 | $1000-215.47=784.53$ | $.1(784.53)=78.45$ | 315.47 | $315.37-78.45=237.02$ |
| 3 | $784.53-237.53=547.51$ | $.1(547.51)=54.75$ | 315.47 | $315.47-54.75=260.72$ |
| 4 | $547.51-260.72=286.79$ | $.1(286.79)=28.68$ | 315.47 | $315.47-28.68=286.79$ |

*** This example is annual but you will make monthly payments on your loans. Don't forget to divide your weighted average interest rate by 12 to reflect this change. This way your interest rate and payments (calculate above) will both be on a monthly basis.

PRINT these calculations

- 8) Use the weighted average interest rates to create **amortization tables**⁷ showing how your loans will be repaid in the 25 year time horizons based on the payments you calculated above.

PRINT these calculations

- 9) Use these tables to show how long it will take you to repay your loans if you increase your monthly payments by 15%. **Note, you are doing this twice: once for the 10 year plan and once for the 25 year plan**

Ex: Suppose your make monthly payments of \$399.67. An increase of 15% would make your new loan payment: $\$399.67*(1.15)=459.6205$

PRINT these calculations

- a) **EXPLAIN THE RELATIONSHIP YOU SEE**

- 10) You receive \$10,000 five years after graduation which you use to pay down your loans

EX: Reduce the loan balance by \$10,000 in month 1 of year 5.

PRINT these calculations

⁶ Your amortization tables may not end at exactly 120 or 300 months due to rounding errors

⁷ Your amortization tables may not end at exactly 120 or 300 months due to rounding errors

- a) **BASED ON THESE CALCULATIONS IS IT BETTER TO INCREASE YOUR PAYMENTS CONSISTENTLY OR PAY OFF A LARGE LUMP SUM OR AT A LATER DATE? WHY?**

II. Student Feedback

This project was run during 7 “regular”⁸ semesters across two separate US colleges between 2011 and 2017. The project was incorporated into the first finance course at each institutions known as Foundations of Financial Management and Financial Management respectively. Students were asked to evaluate the assignment by answering the following questions based on a 5-point Likert scale where (1) represented Strongly Disagree and (5) represented Strongly Agree:

This assignment was relevant to me

This assignment improved my understanding of annuity calculations

This assignment improved my understanding of amortization

I found this assignment engaging

I would like to see more assignments like this

These evaluations were completed in class the day the assignments was due (but before grades were received). Based on enrollment the total potential sample size was 249 student; however, a total of 27 students across the 6 semesters were absent on the due date and thus did not participate in these evaluations. Additionally, roughly one student per semester did not have student loans, these students (10 in total) completed alternate projects; hence, their evaluations were excluded from the analysis. The ending sample size is 215. The following table shows the percentage respondents who rated the assignment as either a 4 or 5 in each of the categories:

| | 2011 | | 2012 | | 2016 | 2017 | |
|---|--------|------|--------|------|------|--------|------|
| | Spring | Fall | Spring | Fall | Fall | Spring | Fall |
| Number of Responses | 32 | 29 | 29 | 28 | 32 | 36 | 33 |
| This assignment was relevant to me | 91% | 92% | 98% | 98% | 91% | 97% | 98% |
| This assignment improved my understanding of annuity calculations | 78% | 86% | 86% | 82% | 81% | 84% | 95% |
| This assignment improved my understanding of amortization | 86% | 76% | 94% | 93% | 97% | 75% | 79% |
| I found this assignment engaging | 81% | 86% | 86% | 79% | 94% | 91% | 88% |
| I would like to see more assignments like this | 84% | 86% | 68% | 68% | 78% | 66% | 75% |

As this table clearly shows, overall student response to the project was largely positive. Follow up questions revealed that the most common reason for the low rating on question 5, “I would like to see more assignments like this,” was that students felt that the assignment was “too challenging”, or “too much work.”

Several students also choose to comment on this assignment in their end of course evaluations. Here are a sample of the most positive, negative and random statements:

“The student loan project was long and detailed. It made me want to cry, but at least now I know what I owe. Also, it made me think differently about the calculations we did in class.”

“I liked this better than the retirement problems and car loan examples in the text because it was more ‘real’ to me. Because we used my loans I paid more attention and actually cared to learn the Excel, before it was just a new kind of problem.”

“I didn’t realize how much I would be repaying on my loans.”

⁸ The assignment was also included in two interim (3 week) sessions but these are not included in the analysis because the project was completed during class

“I hated the student loan project! It was long and there were way to(o) many interpretations! Why couldn’t you just grade the calculations?”

CONCLUSION AND APPLICATIONS

The purpose of this assignment is twofold: to create student “buy in” by demonstrating the relevance of the course material, and to practice basic of time value of money & amortization calculations. The personalized nature of the project dovetails well into the active leaning methodology because students have a desire to understand their future loan repayments. It is my hope that other students and professors will find this assignment useful.

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A LONGITUDINAL STUDY OF STUDENTS' PERCEPTIONS TO A CAMPUS EMERGENCY NOTIFICATION SYSTEM

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ABSTRACT

Emergency Notification Systems (ENS) represent a branch of a growing sub-area of Business Information Systems related to decision support for emergencies in organizations. The focus of this paper is on studying user perceptions of ENS for improving the management of their use, a topic that is covered in very few publications. None of them explores this over longer time however. The paper presents findings from a longitudinal study of students' opinions on usage aspects of an Emergency Notification System (ENS) at a Northeast US university in 2011 and 2019. Though the same subjects were not available for the 2019 survey, the responders were drawn from the same demographic pool as the 2011 study since the characteristics of the student population have not changed. Some of the investigated issues include evidence of improvement in the students' attitude towards the university ENS, what types of emergencies are perceived as important by the users of the ENS, the number of students' experiences of training tests of ENS and others. The statistical results show opportunities for improvement in ways to engage students in training and usage of the ENS. The paper discusses also the limitations of the research and directions for future work

INTRODUCTION

Following the 2007 shooting at Virginia Tech, many educational institutions focused their attention on implementing Emergency Notification Systems (ENS) (using e-mail, instant text messages, short message service (SMS), voice messages and websites) to promote campus safety in response to similar incidents and adhere to the mandates established as part of the Clery Act to make campuses safe (see Han, Ada, Sharman & Rao (2015), Elsass, McKenna & Schildkraut (2016) and others).

In a study of critical incident preparedness of college campuses involving 203 institutions, Schafer, Heiple, Giblin & Burrus Jr., (2010) found that 66 percent of the respondents reported having experienced one or more critical incidents in the five years preceding 2008. Many similar events from recent years underline the importance of the topic. Emergency Notification Systems are a branch of a relatively recent sub-area of Information Systems related to decision support for emergency situations (for an overview of the field see Van de Walle & Turoff (2008)). An example of a decision framework for emergency situations is presented in Xu, Yuan & Ji (2008). For a comprehensive recent bibliometric analysis of emergency management using information systems for the period between 2000 and 2016 see Du, Ke, Chu, & Chan (2017). Another detailed literature review on the topic is presented in Bonaretti (2019).

Overview of the technical features of several early implementations of ENS can be found in Gulum & Murray (2009). Most of those were ENS assuming recipients who receive notifications and act upon them. More recently some dynamic features are added to ENS enabling cooperation between the stakeholders in an emergency (Du et al., 2017). Typically, the features of ENS include (following Elsass et al (2016), Gow, McGee, Townsend, Anderson & Varnhagen (2009) and Gulum & Murray (2010)):

- Multimodal notification utilizing multiple forms of communication creating redundancy and thus improving the likelihood that an alert will reach the recipient. These include text messages, instant messages, emails, university web page, sirens, campus radio and other specialized equipment.
- Participation in such systems is often voluntary, requiring an opt-in membership.
- Participants can update their contact information at any time.

One of the limitations of text messaging relate to their size of just 160 characters which reduces the amount of information that can be transmitted. Another is the bandwidth constraint of cell phone networks that can cause delays from several minutes upwards to an hour (Elsass et al., 2016). Emails may be another alternative form for rapid communication, however they are not checked as often as text messages partly because users may have separate emails different from their university accounts (Schneider, 2010). Hence the attention to the development of techniques for time-constrained information dissemination using location-based social networks (see Litou, Boutsis & Kalogeraki (2017)) and other applications for providing push-down warning communications on emergencies (see Fischer, Putzke-Hattori & Fischbach (2019)).

Most of the literature on ENS is about their design and deployment and this research found that only seven sources have been identified to focus on user perceptions of emergency notification systems (for a partial discussion on the topic see also Elsass et al. (2016)). None of them presents exploration of user perceptions in a longitudinal manner and that is one of the drivers behind this investigation.

The goal of this paper is to present findings from a longitudinal study of student opinions on usage aspects of the Emergency Notification System at a Northeast university in the United States from data collected in 2011 and 2019. The first survey took place in the early stages of deployment of ENS while the second survey was conducted at a time when the technology was more mature and hence the interest in identifying possible differences in student perceptions at the two stages. To the best knowledge of the author this is the first longitudinal study on the topic of evaluation of usage aspects of an ENS. The investigation has also a practical value as it provides for better understanding of the student perceptions and the environment in which the ENS is used at the university concerned.

The paper proceeds with a short review of past publications on user perceptions about ENS, then is described the methodology of the study followed by the discussion of the findings from the two surveys conducted in 2011 and 2019 and a conclusion outlining the limitations of the research and possible directions for further work.

BRIEF OVERVIEW OF PAST PUBLICATIONS ON USER PERCEPTIONS OF ENS

Historically the first large investigation on user perceptions about ENS was conducted at three Canadian universities in 2007 (Gow et al., 2009:35). They analyzed the preferences of students for mode of communication for two types of emergencies: active shooter on campus and unexpected severe weather. The preferences for the first type of emergency were sirens, public address systems and then text messaging while for severe weather the preferred method was email. The paper discusses further issues related to how students may obtain confirmation to different types of alerts and various legal and compliance issues.

The second reported study investigated student response to two tests of an ENS between September 2008 and January 2009 at Missouri University of Science and Technology (Gulum & Murray, 2009). The confirmation rates by users to the two tests were relatively low – 51% in the first test and 58% in the second though on the other hand only 3% and 5% of the responders were dissatisfied with the system (Gulum & Murray, 2009:1468).

A more rigorous study of user perceptions about ENS at the University of Maryland was documented in Wu (2009). It employed constructs related to measuring the perceived usefulness and perceived ease of use of the ENS that had been installed around that time at that university. A similar approach supplemented with ideas from compliance research was applied to the analysis of user perceptions regarding the way in which students would react to emergency notifications was presented in Han et al. (2015). Further theoretical attempts to link the broader field of emergency information management to the theory of effective use of technology and representation theory are presented in Bonaretti (2019). Fischer et al (2019) analyze the factors affecting usage of more recent warning apps, running on smartphones and enabling precise and immediate distribution of warnings via push-notification approach that does not require the user to check for messages.

Schildkraut, McKenna & Elsass (2016) and Elsass et al. (2016) sought to understand perceptions about ENS within the context of one's position within the university – the first paper was from the point of view of students and the second was an investigation from the point of faculty and staff. They studied the enrollment of stakeholders in the university ENS and how it was used. The derived conclusions can be used for improvements regarding the need to educate the users about the ENS and how to sign up for the system.

The above sources document quantitative surveys of user perceptions of ENS. A study described by Madden (2015) presents the results of a deep qualitative analysis using focused groups for investigating how an ENS is used within a large mid-Atlantic university. The chosen approach provides insights in the issues surrounding the use of such systems.

While the first two sources mentioned in this section document the application of descriptive statistics for analysis of the data, the latter publications include more elaborate theoretical foundation for their research. None of them however explores the evolution of user perceptions about an ENS from the early days of its deployment to the present and hence the relevance of the project described next.

RESEARCH APPROACH

A survey was developed in 2011 to study aspects of students' usage of the recently implemented ENS at a medium sized public university in the Northeast (see Appendix 1). Its questions were based partly upon the survey questions used in Gulum & Murray (2009) and Gow et al. (2009) and on elements of a systemic methodology for evaluation, Critical Systems Heuristics developed by Ulrich in 1983 (see Ulrich, 2002) (the results from that part are not discussed here for space reasons). The project was approved by the Institutional Review Board of the university.

The same questionnaire was used for analysis of student perceptions about usage issues related to the ENS at the university also in 2019. Though the same subjects were not available for the 2019 survey, the responders were drawn from the same demographic pool as the 2011 study as it has not changed much during the last 8 years (a similar justification for a longitudinal study was provided in Peslak, Hunsinger & Kruck (2018)).

The ENS at the university where this study was conducted at first in 2011 was MIR3 which was popular at the time and is used by over 150 universities nationwide (Elsass et al., 2016:334). During the second survey in 2019 the university used an ENS developed by Everbridge (according to the Emergency Notification System site for the university system). It permits the distribution of emergency information via telephone, e-mail, text message and/or voice message. Messages can be provided to land-lines or cell phones. Individuals receive information or instructions relative to the specific emergency according to the same web site. It has additional features to those of MIR3 (see Comparison of Everbridge and MIR3 ENS) that enable integration of emergency notifications with other remaining processes, assessment of how severe is an incident, enable the location of the right people and enactment of response to an incident that go well beyond the traditional capabilities of an ENS but those features are not mentioned on the current university web site and hence it was assumed that they are not included in the current installation and therefore the functionalities of the ENS used in 2011 and 2019 are comparable which is important for the longitudinal study.

This paper reports the findings from the answers to the first nine questions in Appendix 1 (dealing with demographic analysis of the respondents, their attitudes towards the ENS, their preferred mode of communication with the ENS) and their answers on the number of tests of ENS that were experienced (question 15), on whether their awareness of the university ENS was improved by participating in the survey (question 17) and whether they appreciate the efforts of the university to provide an ENS (question 18) in the 2011 and 2019 data sets.

The *research questions (RQ)* that were investigated are listed below:

- RQ1. Is there an improvement in the attitude towards the university ENS in 2019 compared to 2011?*
- RQ2. What types of emergencies are perceived as important by the users of the ENS in 2011 and 2019?*
- RQ3. What are the students' preferences of mode of communication by ENS in 2011 and 2019?*
- RQ4. Whether training is provided to the users of ENS in 2011 and 2019?*
- RQ5. Has the students' awareness of ENS improved by participating in the survey?*
- RQ6. Has the students' appreciation of the efforts of the administration to provide ENS changed in 2019 compared to 2011?*

The statistical results were based on samples of 61 valid surveys collected in 2011 and 97 surveys in 2019. The data was obtained from a convenience sample in both cases involving students in classes and hence the response rate was near 100%. Since the data collected was either on a nominal scale (categories of data) or ordinal scale (involving ranking), the appropriate processing involved mainly generation of frequencies and cross tabulation while measures of central tendency were not suitable with one exception when the data was of the interval type. The data was analyzed using SPSS v.25.

The gender distribution of the subjects in both surveys shows that the 2011 group consisted of 59% male and 41% female students while the 2019 sample was more even as the male group were 49.5% and the female students were 50.5% which is reflecting slightly better the actual ratio of female to male students on campus.

The percentages of commuter students in the samples were not very different: 61% in 2011 and 54% in 2019. This is slightly higher than the proportion of commuter students within the whole student population but is partly due to the fact that the surveys were administered in both years to classes that did not include first year students.

RESULTS AND DISCUSSION

First, we will consider *RQ1* Is there an improvement in the attitude towards the university ENS in 2019 compared to 2011? It is related to the answers to questions 4 (the greater proportion of those registered with the ENS indicates positive attitude to it) and 7 (about how necessary the ENS is perceived) in the survey (see appendix 1). The count of those registered with the ENS in both surveys as shown in Table 1 (based on question 4) shows that in 2019 only 10.3% of the respondents were not registered, while in 2011 that group of the sample was almost 25%.

Table 1. Registered with ENS versus not registered students in 2011 and 2019.

| | | | Registered with ENS? | | Total |
|---------|------|-------------------------------|----------------------|-------|--------|
| | | | 1 | 2 | |
| Dataset | 2011 | Count | 46 | 15 | 61 |
| | | % within Dataset | 75.4% | 24.6% | 100.0% |
| | | % within Registered with ENS? | 34.6% | 60.0% | 38.6% |
| | 2019 | Count | 87 | 10 | 97 |
| | | % within Dataset | 89.7% | 10.3% | 100.0% |
| | | % within Registered with ENS? | 65.4% | 40.0% | 61.4% |

Those students that considered ENS as a necessary measure to protect individuals (see q.7 of the survey) as opposed to privacy intrusion in 2011 were 92% of the sample population while in 2019 they were 97%. These results compare to the proportion of those satisfied with the ENS in the survey reported in Gulum & Murray (2009). We can conclude that the answer of *RQ1* is positive and that there is improvement in the attitude of students at the university towards the ENS in 2019 compared to 2011.

To answer to *RQ2*. What types of emergencies are perceived as important by the users of the ENS in 2011 and 2019? was used data for the students' ranking of several types of emergencies on a scale from 1 to 5 where 5 meant "most important" and 1 – "least important". *Snow* is ranked highly probably by commuters and low by residential students. The results showed high frequencies in both extremes. *Snow* was either least important (in 2019 35% of respondents ranked it that way) or most important (34% in 2011 and 21% in 2019). This may be explained probably partly by the fact that present students drive better cars and are less affected by bad weather. The results indicate however that for the environment of this university snow is still an important emergency.

Fire was considered by both groups as very important and the largest group in both cases ranked it at 4 (30% of responses in 2011 and 39% in 2019). The increase in size of the 2019 group expressing such an opinion may be due to recent incidents of fire in businesses in the neighborhood of the university as those affected temporarily the air quality on campus.

Active shooter on campus was considered as the most important emergency by both groups of respondents (84% of responses in 2011 and 89% in 2019). That is aligned with the high perceived risk by campus administrators about this emergency according to the findings in Schafer et al. (2010).

Given the location of the university in the Northeast of the USA the low ranking of another threat, *Hurricane*, is understandable. Almost half or 49% of responders in 2011 and 40% in 2019 ranked it at level 1 or 2. On the other hand another emergency that is not very common for this geographic area, *Tornado*, was considered important probably due to its potential devastating impact in any geographic region. Thus 65% of the respondents in 2011 ranked it at level 3 or above and correspondingly 63% of those in 2019 did so as well. This concludes the discussion on the type of emergencies information that were perceived as important by students in 2011 and 2019.

RQ3. What are the students' preferences of mode of communication by ENS in 2011 and 2019? is linked to question 9 in the survey. It required choice between emails, instant messages or SMS on student phones or as a third option – both.

Most respondents preferred messages or both emails and messages. In 2011 their percentage was 51% and 44% respectively while in 2019 – 41% and 52%. This increase of preference for both communication channels can be further explained with the desire of respondents to have more alternatives for communication as that improves its reliability. The predominant use of smart phones in 2019 as compared to 2011 might be another reason for the larger number of answers in the last category since both modes of communication are easy to use with such devices.

For *RQ4. Whether training is provided to the users of ENS in 2011 and 2019?* were used the results on q. 15. Students were asked to indicate how many tests of the ENS they experienced at the university with answers ranging from 0 to 4. Those that had experienced no tests in 2011 and 2019 were of a very similar proportion of their samples – 13.1% and 14.4% respectively. This shows that the inclusion of incoming students in ENS training in 2019 has not improved compared to 2011. That may be partly due to the fact that some students join the university late or in the second semester only. Those students that experienced 4 or more tests in 2011 were a slightly bigger group, 13.1% of all respondents as compared to 10.3% in 2019. The mean number of tests experienced in 2011 was 1.737 while the same mean for 2019 was lower (1.464). Since the data for question 15 of the survey is of the interval type, we can use the *t-test for two independent samples* (with equal variance and also not assuming equal variance of the means) to investigate the first null hypothesis:

Hypothesis 1₀. Any difference in the two means of responses about the number of tests experienced by students is due to chance factors and is statistically insignificant.

An independent samples t-test was applied to the data on q.15 from the sets for 2011 and 2019, comparing the mean scores in 2011 to those in 2019. No significant difference was found if we assume equal variance of the means ($t=1.431$, $df=156$, $Sig. 0.191$, $p>0.5$). Therefore, the mean number of tests experienced in 2011 ($m=1.737$, $sd=1.237$) was not significantly different from the mean for 2019 ($m=1.464$, $sd= 1.128$). Similar conclusion was produced by SPSS for the same t-test if one does not assume equal variance of the two means. Hence, we may conclude that any difference in the means for the number of tests experienced by students in 2011 and 2019 is not statistically significant and is probably due to chance factors.

Next will be discussed *the results on RQ5 and RQ6*. The data on *RQ5. Has the students' awareness of ENS improved by participating in the survey?* is tabulated in table 2 below.

Table 2. Frequencies of the answers in the 2011 and 2019 data sets on whether students' awareness of ENS has improved by participating in the survey (on a scale from 1(disagree strongly) to 5 (agree strongly) with 3 meaning "neutral").

| | | | Improved Awareness | | | | |
|---------|------|-----------------------------|--------------------|-------|-------|-------|-------|
| | | | 1 | 2 | 3 | 4 | 5 |
| Dataset | 2011 | Count | 2 | 4 | 30 | 18 | 7 |
| | | % within Dataset | 3.3% | 6.6% | 49.2% | 29.5% | 11.5% |
| | | % within Improved Awareness | 50.0% | 44.4% | 46.2% | 32.7% | 28.0% |
| | 2019 | Count | 2 | 5 | 35 | 37 | 18 |
| | | % within Dataset | 2.1% | 5.2% | 36.1% | 38.1% | 18.6% |
| | | % within Improved Awareness | 50.0% | 55.6% | 53.8% | 67.3% | 72.0% |
| Total | | 4 | 9 | 65 | 55 | 25 | |

It can be noticed that in 2019 those students that answered, "Agree somewhat" and "Agree strongly" constituted 57% of the sample while in 2011 – 41%. There is increase in each of the two categories as well. This indicates increase in the awareness of the students about the ENS as a result of participation in the survey. The question arises whether this

difference is due to chance factors. A null hypothesis can be formulated for the data on RQ5 from the two data sets as follows:

Hypothesis 2₀. The distribution of improved awareness is the same across the two data sets.

The data for RQ6. *Has the students' appreciation of the efforts of the administration to provide ENS changed in 2019 compared to 2011?* is summarized in Table 3.

Table 3. Frequencies of the answers in the 2011 and 2019 data sets on whether the students' appreciation of the efforts of the administration to provide ENS changed (on a scale from 1 ("disagree strongly") to 5 ("agree strongly") with 3 meaning "neutral").

| | | | Appreciate efforts on ENS | | | | |
|---------|------|------------------------------------|---------------------------|-------|-------|-------|--------|
| | | | 1 | 3 | 4 | 5 | Total |
| Dataset | 2011 | Count | 0 | 12 | 18 | 31 | 61 |
| | | % within Dataset | 0.0% | 19.7% | 29.5% | 50.8% | 100.0% |
| | | % within Appreciate efforts on ENS | 0.0% | 48.0% | 50.0% | 32.3% | 38.6% |
| | 2019 | Count | 1 | 13 | 18 | 65 | 97 |
| | | % within Dataset | 1.0% | 13.4% | 18.6% | 67.0% | 100.0% |
| | | % within Appreciate efforts on ENS | 100.0% | 52.0% | 50.0% | 67.7% | 61.4% |

Note that in both the 2011 and 2019 surveys there were no answers in the second category "Disagree somewhat" and only one strong disagreement was noted in 2019. The table shows that in 2019 those that remained neutral were 13% compared to 20% in 2011 and those that answered "Agree somewhat" were 19% and "Agree strongly" - 67% of the sample while in 2011 – respectively 29% and 51%.

While there is a decrease in the frequencies of the fourth category, the increase in the frequencies for the last answer "Agree strongly" is visible. This indicates a rise in the appreciation by students of the efforts of the administration to provide the ENS. The question arises whether this difference is due to chance factors or not. A null hypothesis can be formulated for the data on RQ6 in both data sets as follows:

Hypothesis 3₀. The distribution of student appreciation of the efforts of the administration to provide ENS is the same across the two data sets.

Due to the ordinal type of data involved in questions 17 and 18 (see appendix 1), non-parametric inferential statistics can be applied to test the null hypotheses 2 and 3 and namely the Mann-Whitney U test. It tests whether two independent samples are from the same distribution. The SPSS results for the two tests are shown in table 4.

The results in Table 4 indicate that in 2019 the distributions of the dependent variables (Awareness of the ENS as a result of participating in the survey and Appreciation of the efforts of the university to provide an ENS) are the same as in 2011 and therefore we must accept the null hypotheses in both cases. This conclusion means that despite the observed increase in 2019 of the student awareness of the ENS and of the increased appreciation of the university administration for providing ENS the data for the two questions in the 2011 and 2019 surveys does not show different distributions and hence the observed differences are not statistically significant.

Table 4. SPSS results on testing null hypotheses 2_0 and 3_0 on the data sets from 2011 and 2019.

| | Null Hypothesis | Test | Sig. | Decision |
|---|---|---|------|-----------------------------|
| 1 | The distribution of Improved Awareness is the same across categories of Dataset. | Independent-Samples Mann-Whitney U Test | .058 | Retain the null hypothesis. |
| 2 | The distribution of Appreciate efforts on ENS is the same across categories of Dataset. | Independent-Samples Mann-Whitney U Test | .062 | Retain the null hypothesis. |

Asymptotic significances are displayed. The significance level is .05.

According to Sullivan & Artino (2013), it is possible to apply in a survey that is using data based on Likert scales also the t-test for equality of means of two independent samples under certain conditions despite the ordinal nature of the data. One reason is that this test is stronger than the Mann-Whitney U test. The *t-test for the equality of means of two independent samples* was applied to the data for the two questions of concern here as well but the SPSS results in both cases did not justify rejection of the corresponding null hypotheses considering that the means are the same. Since the conclusions would be of similar nature to the findings reached already with the Mann-Whitney U tests listed in table 4, those results are not provided here for space reasons.

Finally the strength of the relationship between the two variables “Increased awareness of the ENS” and “Appreciation of the effort of the university to provide ENS” for the entire data set from 2011 and 2019 was studied using the Spearman correlation coefficient due to the ordinal data for both variables. The SPSS results are shown in table 5. The significance level shown in the table is 0.000 which is in fact a significance level < 0.01 . Since the Spearman correlation coefficient is greater than 0.3 (Spearman’s rho = 0.397 for 156 degrees of freedom= $N-2$), the relationship is considered relatively strong and is statistically significant at the 0.01 level according to SPSS. That indicates significant relationship between the two variables: greater awareness of the ENS leads to more positive appreciation of the efforts of the university to provide an ENS for faculty and staff. This underlines the continuous need for informing students, faculty and staff of the ENS potential as a factor for better campus climate.

Table 5. Spearman rank correlation index for the data on “Awareness of ENS” and “Appreciation of the university effort to provide ENS”.

| Correlations | | | Improved Awareness | Appreciate efforts on ENS |
|----------------|---------------------------|-------------------------|--------------------|---------------------------|
| Spearman's rho | Improved Awareness | Correlation Coefficient | 1.000 | .397** |
| | | Sig. (2-tailed) | . | .000 |
| | | N | 158 | 158 |
| | Appreciate efforts on ENS | Correlation Coefficient | .397** | 1.000 |
| | | Sig. (2-tailed) | .000 | . |
| | | N | 158 | 158 |

**. Correlation is significant at the 0.01 level (2-tailed).

Additional statistical analysis was performed on the 2011 and 2019 data sets considering Gender and Commuter status as independent variables with the same dependent variables described above. These results, as well as the findings on questions 10-16 from Appendix 1 are not shown here for space reasons as well and because they did not lead to major changes in the findings on the research questions considered in this study.

CONCLUSION

The research in this paper covers an exploration of student perceptions of usage aspects related to a university Emergency Notification System recorded at two different points of time. The initial survey was conducted in 2011 which was one of the early years of ENS deployment in the USA. The second was in 2019 when this technology and the way it is managed by universities are more mature. The results from both surveys demonstrate a positive attitude to ENS by the students. They show also opportunities for improvement. Thus, while table 1 indicates improvement in the efforts to educate incoming students at the start of the academic year, 10% of the students in the spring 2019 sample were not registered for ENS. Hence more ways must be sought to engage better transfer students and others that may miss any ENS related training at the start of the academic year.

Another avenue for improvement is to reduce the percentage of those that did not experience any ENS tests. According to the 2019 survey they were 14% of the sample. Therefore, in the case of real emergencies some students may not have the proper training to act as expected and hence more attention is needed to engage greater number of students in ENS tests. It is not known also if any official results from such tests are used by the university in any ways for better preparation for various types of crises.

One of the *limitations of the study* is that it did not include staff and faculty to cover all stakeholders involved as users of the ENS. The analysis of their perceptions is important as demonstrated by the related studies by Elsaas et al. (2016) and Schildkraut et al. (2016). Another limitation is that the sample size in both surveys is not sufficiently large to enable generalizability of the findings across other institutions. However, the results of this project may be viewed as a case study of a longitudinal investigation of student perceptions about an ENS at a particular university and as this is the first such reported study, some of its features may be useful to others attempting to evaluate usage aspects related to their ENS over time.

Opportunities for future work may involve the investigation of the perceptions about the campus ENS by faculty and staff. Additional possibility is to conduct a related study about the perceptions of ENS by public safety personnel and university administrators as well using qualitative data gathered through focused groups or interviews. Further work may explore the reaction of students during actual tests of the ENS. The results from this longitudinal study are just an initial step that may lead to better understanding of user perceptions of the ENS at the university of concern and to expansion of training and other activities for improving the management of ENS and the overall campus safety.

Acknowledgements

Part of the work reported here was supported by a university research reassigned time grant in 2019. The author is grateful to a former student, Adam Dickenson, who has partially contributed to the design of the survey instrument in 2011 and collected the data in that year. However, the final design of the questionnaire used in the two surveys and the processing of the data from 2011 and 2019 for this paper was performed by the author and any mistakes are his.

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APPENDIX 1 **A SURVEY RELATED TO THE UNIVERSITY EMERGENCY NOTIFICATION SYSTEM**

Notice: This research has been approved in 2011 by the Vice President Student Affairs and the University Committee on doing research with human subjects as not requiring a consent form by participants. The results will be used anonymously to derive generalized conclusions and will not be linked to individuals.

1. I am (encircle one option that is most relevant to you please for every question)

a. student b. faculty c. Management d. admin staff e. public safety staff

2. My gender is:

Male / Female

3. Commuter:

Yes / No

4. I am registered with the university Emergency Notification System: Yes / No

If you answered "YES" please move to question 7.

5. If NOT registered: has anyone at the university approached you in any way to register once you joined the university? Yes / No

6. Are you aware how to register for the ENS at the university?

Yes / No

Please answer the following questions on your opinion about some issues related to the university Emergency Notification System

7. If there was no required registration for the ENS, would you consider an ENS notification as an intrusion on your privacy or as a necessary measure in your own interest?

Privacy intrusion.

As a measure to protect me.

8. How would you rank the importance to you of emergencies covered by the university's emergency notification system? (on a scale from 1 – least important to 5 – most important)

Snow closure..... Fire..... Shooter on campus..... Hurricane..... Tornado.....

9. Please specify the way in which you prefer to be reached /notified (encircle):

Email

Instant message or SMS on my cell phone

Both

10. How long is the acceptable time for the notification to reach you? (encircle one option)

15 minutes

30 minutes

1 minute or less

11. Rank the importance of the listed possible measures of success of the university ENS according to you? (on a scale from 1 – least important to 3 – most important)

To save me time....

To limit damage, save lives....

To notify me to stay away.....

12. Who is responsible to change the measure of improvement for the ENS according to you? (encircle one)

Public safety dept.

IT department.

Facilities dept.

Administration

13. If you had to choose to include in the ENS between any kind of emergencies or only rarely occurring life threatening situations like tornado, campus shooting or fire, which one would you prefer (encircle one)?

Any kind of emergencies situations

Only rarely occurring life threatening situations

14. Has anyone requested your opinion before on the design or functioning of the university ENS? (encircle one option that applies)

Never

Long time ago – once

at least twice

15. I have experienced the tests of the ENS that have been conducted at the university:

Never

Once

Twice

Three times

Four or more times

16. Do you have any recommendations for the university ENS?

17. I have improved my awareness of the university ENS by participating in the survey:

1

2

3

4

5

Disagree

Disagree

Neutral

Agree

Agree

Strongly

Somewhat

Somewhat

Strongly

18. I appreciate the efforts of the university to provide an ENS for faculty and staff:

1

2

3

4

5

Disagree

Disagree

Neutral

Agree

Agree

Strongly

Somewhat

Somewhat

Strongly

Thank you for participating!

ON WAYS OF USING THE WORK SYSTEM METHOD IN VARIOUS IS EDUCATION COURSES

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ABSTRACT

The purpose of the paper is to describe how the Work System Method (WSM) can be incorporated at several levels in an Information Systems (IS) program. The WSM was developed by Steven Alter to facilitate the understanding between business and technical experts during Information Technology projects. It is one of the very few existing theoretical frameworks to support teaching of information systems published initially in 2002 and continuously evolving. It provides a rigorous but non-technical approach to analyze the functioning of an organization as a socio-technical system before building an information system or just as an analysis methodology in industrial engineering, management or in the design of service oriented systems. The paper presents an overview of the work system method and related research including a review of publications on how it is used in IS education. Then are presented details on how the WSM ideas were used in the teaching of different types of courses in the IS program and lessons learned. Those are based on 15 years of experience of the authors in using WSM techniques in various forms: as an approach for understanding and analyzing problems in an introductory Information System course, for analysis of business operations and outlining the main characteristics of the client organization in a Systems Analysis and Design course or in a IT project management course and finally as one of the techniques used for initial business analysis before developing an IS strategy project in the capstone IS course.

INTRODUCTION

The Work System Method (WSM) is a pragmatic approach designed to enable business professionals to describe a work system as a problem situation (Alter, 2006). According to Alter (2013), the Work System Method provides a rigorous but non-technical approach to any manager or business professional to visualize and analyse systems related problems and opportunities. Further Alter (2013) defines a *work system* as a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products and/or services for specific internal or external customers.

On the other hand, according to Alter (2006), an *Information System is a work system* whose processes and activities are devoted to processing information, that is, capturing, transmitting, storing, retrieving, manipulating, and displaying information.

Alter developed the WSM to facilitate the understanding between business and technical experts during Information Technology projects (Alter, 2006). It is a socio-technical approach that emphasizes the need to consider both technical and social aspects of information systems. WSM is one of the two theoretical frameworks to support IS education existing today, the other one being the system interaction theory (see Silver, Marcus & Beath (1995)).

The purpose of the paper is to describe how WSM can be incorporated at several levels in various courses in Information Systems (IS) programs. Some of the issues related to applying WSM in individual courses were discussed in previous publications of the authors but it is time to present some lessons from the implementation of those ideas not only in isolated courses but across the IS program. To the best knowledge of the authors there is no other published account of the way in which WSM can be introduced across the IS curriculum. The paper proceeds with an overview of the foundations of WSM, followed by past research on how it was applied in individual IS education. Then is presented the approach followed by the authors on infusing WSM ideas at different levels of IS courses.

SOME NOTIONS ABOUT THE WSM AND PREVIOUS RELATED RESEARCH

The work system method is based on two major components (Alter, 2006, Alter, 2008):

- the *work system framework*, which is documented as a work system snapshot, representing a *static* description of the work system;
- the *work system life cycle*, focusing how a current or proposed work system evolves dynamically over time.

The WSM covers all important elements of an organization: customers, products and services, work practices, participants (stakeholders), information, technology, infrastructure, environment and strategy. It considers them as interconnected and hence it is a systemic approach (see also Alter, 2007a).

The WSM is practiced in a three-step process for analysis of a problem (Alter, 2013) which is simple, logical and is related to the traditional process in Operations Research:

- Identify the system and problems;
- Analyse the system and identify possibilities;
- Recommend and justify changes.

The WSM provides the opportunity to conduct the analysis of a work system at several levels of detail depending on the actual purpose and granularity of analysis. Level 1 analysis is the highest level which is suitable for discussions of a problem at senior management level. The working analysis of a problem is performed usually at level 2. At this level the three steps of WSM analysis listed above are supported by a set of questions guiding the dimensions of the WSM analysis at each step (Alter, 2006). Alter used those questions (with some modification) has developed also a work system template in 2010 that makes the application of the methodology by novice users or students even easier.

Major developments in WSM were some extensions that adapt it for service-oriented organizations including the introduction of responsibilities tables (see Alter, 2007b). A more recent development in WSM theory is the WSM meta-model and the generalized Work System Theory published in Alter (2013). The WSM has found many applications in Systems Analysis, IS development, Business Analysis, Service Systems Management and Industrial Engineering (Alter, 2013). More recently WSM and namely the WSM snapshot has been applied for deriving use cases in functional modelling in IS development projects (see Alter & Bolloju (2016). Work system theory has been applied in Industrial Engineering, Operations Management and other related disciplines expanding its applicability. Recent overview of developments in WSM and its relevance for the changing nature of business and technology can be found in Alter (2019).

The authors of this paper have explored in the past theoretical and practical aspects of using WSM in combination with other methodologies. The original proposal for the combined use of WSM and other systems approaches in software engineering was made in Petkov, Edgar-Nevill, Madachy & O'Connor (2008). Petkova & Petkov (2012) compared WSM and SSM on several criteria related to IS development.

Petkov, Alter, Petkova and Andrew (2013) investigated the project contexts suitable for mixing of WSM and SSM in software development. That was analysed by exploring how WSM and SSM serve different project situations characterized by their complexity and the interests of the stakeholders involved. The same authors concluded that when using WSM in complex pluralist problem situations, the analysts may consider augmenting existing techniques within WSM like the work system snapshot with elements of SSM such as Rich Pictures in order to deal more effectively with the plurality of stakeholder interests and the related cultural and political aspects of the problem and thus was justified the combined application of WSM and SSM. The above findings were proven in practice recently in a project on the combined use of WSM, SSM and Critical Systems Heuristics in a framework for enhancing client – developer project collaboration in IS development (see a forthcoming paper by Wing, Petkov & Andrew, 2020).

A BRIEF REVIEW ON PUBLICATIONS SHOWING WSM USE IN IS EDUCATION

A number of IS experts have introduced WSM in individual IS courses over the years and we will only point to sources (which are readily available) that have analyzed their work without repeating the main points in those analyses. Alter (2008) provides a review of various reports on the application of WSM in IS education prior to 2008. Further analysis covering the main results on this topic including the next 5 years was presented in Alter (2013). More recent reviews by Alter of related work can be found in Bolloju & Alter (2016) as well as Alter (2019).

Next, several early publications by these authors on the use of WSM in IS courses are mentioned. The first published controlled experiment showing the benefits of applying WSM in an IT introductory undergraduate university course was presented in Petkov & Petkova (2008). Petkov, Misra & Petkova (2008) and Petkov, Petkova, Sewchurran, Andrew & Misra (2012) investigated in detail the potential of the work system method as an approach for teaching

and researching systems analysis and design. Further analysis of their ideas and related research can be found in those papers and is not repeated here for space reasons.

The next sections will outline the ways how WSM is used across the IS program at two state universities in the Northeast and lessons learned. Those are based on the experience of the authors in using WSM techniques in various forms: as an approach for understanding and analyzing problems in an introductory Information System course, for analysis business operations and outlining the main characteristics of the client organization in a Systems Analysis and Design (SA&D) course and in an IT project management course and finally as one of the techniques used for initial business analysis before developing an IS strategy project in the capstone IS course.

USING WSM OR ITS PARTS IN COURSES ACROSS THE IS PROGRAM

The following sub-sections will outline for several IS course a specific problem that requires the use of WSM and a brief outline of how it was used by the authors in their teaching.

Introductory IS courses or a Systems Analysis and Design course

Background information: Most business degrees have an introductory IS course covering the fundamentals of IS. They have usually a team project that focuses on investigating how IS are used in organizations. None of the existing textbooks on IS fundamentals provide a simple and coherent methodology for this analysis. As a result the quality of a project depends to a great degree on the choices made by instructors regarding the parameters of such analysis and the way how the students approached the problem. The same issue arises before the start of a Systems Analysis and Design project on a more complex project that requires careful analysis of the problem before proceeding with systems analysis.

Problematic issue: There is no clear methodology for making sense of how information systems are used by organizations within an introductory IS course or within a SA&D course.

How the WSM provides a solution: WSM can be used in this case as a sense making methodology to structure the work on a project. The three stages of the WSM level 2 analysis facilitated by the WSM template provide the pathway for a systemic and rigorous analysis.

Discussion: The Work System Method was used by the authors as the methodology for making sense of complex IT problems in such projects in an introductory IS course since 2006. One may use a complex case study on an IT problem like the one in Volkoff (2003). Students may analyze a separate real organization in an IS course or in a Systems Analysis and Design course (see Rusconi & Ross (2013), a paper presenting such a project by undergraduate students of the first author at the NCUR 2013 conference). This can prepare them for the large systems development project in the SA&D course.

The students used prior to 2010 in such projects the questions for the three stages in WSM analysis published in Alter (2006). As Steven Alter produced a relatively simple template for applying WSM in 2010, the projects in the courses of concern since then were using that template. As a result the work of the students became easier and their motivation to complete such a project successfully increased. Some of them used the documentation of such projects successfully as artifacts to demonstrate their skills in business analysis during job interviews.

It should be noted that Alter (2013) provides a brief discussion on how WSM is used for similar type of projects also at masters level like MBA classes by him and others.

IS development Projects in Systems Analysis and Design or IT Project Management courses

Background information: A considerable number of IS projects are not achieving their potential due to poor understanding of the requirements by the developers or incomplete requirements.

Problematic issue: Both in IS education and IS practice there is often lack of a systemic analysis of the problem situation for which a new system is built. Another difficulty is the transition from a general systems analysis of the

problem that may involve a systems thinking methodology like Soft Systems Methodology to the technical analysis and formulation of requirements using for example UML or agile approaches.

How the WSM provides a solution: It is possible either to conduct a full WSM analysis like in the previous subsection or at least to use one technique from WSM – the WSM snapshot to capture all elements of the work system for which a new information system is developed.

Discussion: We have used in such courses only one element of WSM, the Work System Snapshot discussed earlier. An example of WSM snapshot from a student project about development of an information system for a pediatric medical center (based on a case in Bellanger, 2003) is presented in Appendix 1.

The main benefits from using WSM snapshot in such a project are:

- the WSM snapshot documents most important elements of the organization or business for which a new information system is being analyzed in simple terms without IT jargon and therefore in a way that is understandable by clients. The WSM snapshot ensures that the important elements of a work system are not ignored when building an IT solution for it and thus guarantees to some degree that a systemic approach is applied to the analysis of the problem. This was useful both in Systems Analysis and Design and also in IT Project management courses.

- the work practices (or processes) are the most important element of the WSM snapshot for a problem. They are leading directly to the formulation of use cases when defining use case diagrams an Information System that is being designed. This is explained in more detail in Bolloju & Alter (2016)). Therefore the general WSM analysis can transition to the technical aspects of systems modeling and design using Object Oriented Analysis and agile approaches (see also Alter, 2019). The progression from work practices to use case modeling was used in the Systems Analysis classes of the first author since 2010. It helped students for formulating better use cases for the corresponding systems development projects as the students had understood it much better as a result of the preceding WSM analysis captured in the snapshot

Projects on developing IS strategy in the capstone IS course

Background information: The capstone of many IS programs is often dedicated to development of IS strategy. Building an IS strategy starts with a comprehensive analysis of the organization and its positioning within the particular industry.

Problematic issue: During the analysis of the entire work system for which a strategy is being developed with the goal of supporting the business strategy, according to Luftman (2004), are used the following techniques in this sequence:

- Porter's five forces analysis for industry environmental analysis of the company of concern.
- Political, Environment, Social and technical (PEST) analysis.
- SWOT analysis,
- Ansoff analysis for the market situation of the organization

These techniques are powerful but the success depends to a great degree on the overall analysis of the work system and deep understanding of all its elements before applying these methods, which may be lacking in both educational projects and in real life strategy development projects.

How the WSM provides a solution: as in the previous situation, it is possible either to conduct a full WSM analysis like in the previous subsection or at least to use one technique from WSM – the WSM snapshot to capture all elements of the problem.

Discussion: The first author has added since 2007 as a first step of the analysis process suggested by Luftman also either a complete WSM analysis or just the development of an WSM snapshot since it documents the initial understanding of the business organization for which an IS strategy is being developed. The benefit of this is that the WSM analysis (or the WSM snapshot) creates a better understanding of the problem before application of the rest of the analytic approaches that lead to formulation of ideas on the relevant IS strategy that is needed for an organization.

CONCLUSION

We provided a very brief overview of some major publications on the WSM by its author Steven Alter with respect to its relevance to IS education and of several other previous writings by the authors of this paper that discussed a field experiment showing the usefulness of WSM in an undergraduate IS course, comparisons between WSM and other systems methodologies and some possibilities for using WSM in Systems Analysis and Design. Most of those papers were written before 2012 in the early stages of application of WSM in IS teaching by the authors of this publication.

This paper summarizes the authors' experience in applying WSM over the last 15 years to address problematic issues for instructors in three types of IS undergraduate courses: Introductory course on IS fundamentals, Systems Analysis & Design or IT Project Management and Information Systems Strategy. It provides suggestions on how the use of WSM can provide a solution to those issues.

The experiences shared in this paper provide us with confidence to conclude that the Work System Method (see Alter, 2006; Alter, 2013; and Alter, 2019) is a very important theoretical and practical research development that emerged within the IS discipline since 2002 which has also very relevant implications for providing better IS education.

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Work System Snapshot for a Pediatric medical center systems analysis and design project

| Customers | | Products & Services | |
|--|---|--|--|
| -Patients (Children) | | -Pediatric appointments, vaccinations, patient procedures / tests by doctors and staff. -Hospital exams of patients by doctors and staff. | |
| Major Work Practices / Processes and Activities | | | |
| -Patient makes appointment. -Parent or Guardian provides personal information and insurance. -Physician performs examination. -Staff performs tests. -Receptionist generates bill. -Patient or Insurance pays bill. -Manager generates report. | | | |
| Participants | Information | Technologies | |
| -Physician -Receptionist -Insurance Carriers -Maine Department of Public Welfare -Guardian of child | - Patient Medical History - Patient information - Diagnosis Codes - Doctor Exams of patients - Insurance Carriers - Services and tests performed | - Phones - Computers - Internet Access - Printers | |

ECONOMIC ASSESSMENT OF WATER FRAMEWORK DIRECTIVE IMPLEMENTATION MEASURES IN THE EAST AEGEAN REGION

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ABSTRACT

We present a methodology for assessing the economic efficiency of ecological measures in river basins that follows the European Water Framework Directive (European Commission, 2000). Unlike other similar studies, the presented methodology has been developed and tested in terms of the water pollution as a result of mining activities. The application of this methodology to the East Aegean region will make it possible to draw conclusions on the effectiveness of the measures taken and identify cases of deterioration. Based on them, we will plan additional measures to meet the objectives of the Directive in the period 2022-2027. In terms of economics theory, the methodology can be described as follows: The cost effectiveness analysis used to select the optimal mix of costs is integrated into the cost-benefit analysis to assess the cost-effectiveness of the proposed measures.

INTRODUCTION

The European Water Framework Directive (WFD) sets out the principles guiding the policies of the European Union (EU) Member States as well as the choice of economic instruments for controlling the use of water resources including the *Principle of Recovering Full Cost*, and the *Polluter Pays Principle* as well as the choice of method for economic assessment.

According to the WFD, the European Union's water quality objectives were to be achieved by 2015. Potential extensions of the deadline are allowed either for reasons of technical feasibility or because of a disproportionate cost (European Commission, 2000; Article 4, paragraphs 4, 5, 7). These reasons justify the possibility of extending the deadline for achieving *Good Environmental Status* (GES) by 2027. If the costs are disproportionate, lower targets may be established to achieve *Acceptable Ecological Status*.

The European Commission has developed several methodological rules to carry out an economic analysis (European Commission, 2009). These rules offer various assessment tools, depending on the different strategies and policies of the individual EU member states (Brouwer, 2008). The evaluation itself supports the process of political decision-making and provides the necessary transparency. However, the general nature of the rules does not define the practical procedures which each country could use to assess the benefits and costs associated with a list of necessary measures (Jensen et al., 2013).

Analyzing the WFD methodological guidelines and the good research practices, in this paper we propose a methodology to assess the cost-effectiveness of the measures for restoring the ecological status of water bodies in the East Aegean Region. This methodology has been tested in mining and ore processing regions, but could also be applied to other regions and water areas.

In the next section, we present our methodology for economic assessment of the WFD implementation measures. After that, we explain how we applied this methodology to the East Aegean Region. We conclude with a discussion and description of the limitations of the proposed method.

METHODOLOGY FOR ECONOMIC ASSESSMENT OF WFD IMPLEMENTATION MEASURES

The most commonly used methods for economic evaluation of large investment projects for environmental purposes are cost effectiveness analysis (CEA) and cost-benefit analysis (CBA). The CEA compares the monetary values of the costs and the physical benefits of the measures taken (i.e., the costs are compared with the reduced level of pollution), while the CBA compares the cost-benefit monetary costs (i.e., costs are compared to the direct and indirect benefits of the improved environmental status). CEA avoids the discrepancies related to the monetization of some intangible assets, such as the environment, and is therefore a preferred tool in the comparative analysis of alternative measures.

As the CBA method is assessing not only costs, but also tangible and intangible assets, it is appropriate for an overall assessment of the economic effectiveness of the adopted measures or combinations of measures.

The lack of information and/or the high level of uncertainty of some key technical and economic indicators may justify lower thresholds than those normally required in the CBA. Such adjustments increase the role of the subjective factor, thus compromising the confidence in the assessment method. One of the ways to overcome this problem is to combine the indicators of the two methods – CEA and CBA. In such cases, the policy prescriptions should be directed toward intervention in areas with best assessments from both methods.

The choice of evaluation methods and benchmarks is complemented by the choice of the most appropriate scale of economic analysis. According to the Common Implementation Strategy of the WFD (European Commission, 2003), the water body is the reference unit for achieving the target water status and represents the minimum scale at which each EU Member State has to identify the sources of pollution and measures for surface and groundwater rehabilitation. However, the “optimal scale” of the analysis is not defined either in the official recommendations or in the other empirical studies. Therefore, the scale of analysis is a key factor in the final assessment of the economic efficiency. For example, costs which are too high for a particular body of water may be acceptable at a higher scale of analysis.

The approach in our methodology can be summarized as follows. The effectiveness of WFD measures is assessed in terms of target water status and is limited to pre-selection of the measures by which this status can be achieved in the most effective way. There are two parallel analyses – of cost and of benefits. The cost estimate is calculated after selecting the set of measures and calculating their unit value and total value. After that, the measures are revised until the minimum level of expenditure is reached, i.e., the level at which no more savings are possible. The value of the benefits is assessed on the basis of an a priori classification of the positive effects of reaching the target status. The benefits and costs of the individual water body are assessed; then the benefits and costs of a part of a water body, or of a combination of parts of underground and surface water bodies are assessed. After that, a staged aggregation is undertaken to cover the entire water area. Efficiency analysis is performed at each level using CEA and CBA methods.

APPLICATION OF THE METHODOLOGY FOR THE EAST AEGEAN REGION

Water Status in the East Aegean Region

Regional Inspectorates of Environment and Water (RIEWs) determine to what extent individual economic sectors (agriculture, communal, and industrial) are responsible for the various forms of pressure (qualitative/quantitative, point/non-point) over the water bodies in the country. As a rule, the majority of point sources of pollution are due to the industrial sector which generates organohalogen and metal pollutants. Agriculture and livestock cause diffusion pollution (nitrogen, phosphorus, pesticides) and may have quantitative impact (over-exploitation of water resources). Morphological changes, in turn, are mainly associated with the extraction of inert materials.

The functional purpose of each body of water could be classified as drinking water, bathing water, and fish/shellfish water. Bathing water in the East Aegean basin is generally of good ecological quality, while fish/shellfish water is declining in quality as a result of the outgoing natural processes. The impact of various factors threatens the fish/shellfish water and worsens the quality of drinking water in most plain areas in the region.

To simplify the methodology, we assume two degrees of ecological status – “lower” and “good or better.” In most district management plans of the Basin Directorates, however, the ecological status of the water bodies, and hence the assessment of the benefits of the measures taken, is carried out on a five-level Likert scale.

According to the Basin Directorate of the city of Plovdiv, nutrients, pesticides, heavy metals, morphological changes and over-use of water are the main threats to the water resources in the East Aegean region. The degree of impact varies: 44% is the threat of nitrogen and phosphorus concentrations, 3% of pesticides, 5% of heavy metals, 6% of water scarcity, and 15% of morphological changes.

The industrial sector, including the mining enterprises, is the major source of quality pressure. Depending on the distribution of different categories of chemicals, construction of new treatment plants for heavy metals and hydrocarbons, as well as re-cultivation of the industrial zones contaminated with organohalogen, is recommended.

The extraction of inert materials from the nearby rivers is a source of morphological changes. Therefore, the industrial sector is also a potential threat for water scarcity (the main source of quantitative pressure, however, is the agriculture). In such cases, the measures include the construction of sewage treatment plants and distribution networks for drainage water.

Rules for Assessing the Costs and Benefits of the Proposed Measures

In the proposed methodology, the costs and the benefits are involved not in their net present value, but in their annuity equivalents. Annuity values are interpreted as single or total costs and benefits averaged over one year. In this manner, the difficulties in comparison of measures that would produce future effects without initial costs are avoided.

The costs in the methodology are estimated in the same way as the way they are reported when activating measures for achieving GES in each particular sector. This means that all transfers (taxes or subsidies) from one economic sector or player to another one are excluded, and there is no distinction between financial and economic costs. Such an approach is compatible with the *Polluter Pays Principle*, but it is preferred because there is a lack of sufficient data on the actual impact of the multiple measures (who pays for what), and hence, it is impossible to carry out more accurate analyses.

In cost estimation procedures, key factors are the consumer price index, the cost of the capital, and the time horizon representing the operational life of the investment. In most economic analyses of the WFD, the cost of the capital of 2.5-4% is assumed. Because of the higher risk and risk premium, we increased this rate to 5%. This higher rate was also recommended by the European Commission for the period 2009-2015. It is also assumed that the European practice should be analyzed in a 30-year time horizon. According to the economics theory, the rate and the time horizon should correctly reflect the opportunity cost to achieve GES for future generations.

A serious barrier to accurately assessing the measures is the inability of obtaining comparable results for the different sources of pollution. A commonly used method for solving this problem is employing corrective procedures. The nitrogen and the phosphorus from nutrients, for example, are measured in P-equivalents, with the nitrogen value divided by ten to account for its lower ecological (eutrophication) effect.

For the assessment of unit costs in the construction or reconstruction of sewage treatment plants, a similar approach applies to mining and chemical industries. Heavy metal compounds are converted into comparable units thanks to the freshwater Aquatic Eco-toxicity Potential Index (fAETP). This index was introduced by Huijbregts et al. (2000), with the idea that all substances should be presented in terms of one reference substance. For heavy metals one unit of 1,4-dichlorobenzene (para-dichlorobenzene) equals one unit of fAETP. Based on this, the relative weights of 181 elements are determined. The fAETP values of the most common ones are as follows: para-dichlorobenzene=1; mercury=1700; cadmium=1500; lead=9.6; zinc=920; copper=1200; nickel=3200; chromium=28; arsenic=210 (Van Soesbergen et al., 2008).

The unit costs per cubic meter of purified water are obtained by dividing the total cost by the annual flow (0.04 €/m³ in microfiltration, 0.05 €/m³ in precipitation). The flow rate of the treatment plants is 5000 m³/day for chemical industry companies or 1000 m³/day for metallurgic industry companies. The estimates of the cost per cubic meter depend on the total costs and on the level of functionality of the basic technology.

Benefits assessments are carried out in accordance with Annex I of Guide No 20 (European Commission, 2009). Several categories of values (use value, non-use value, side effects from other sectors, and cross-effects from other environmental projects) are listed in the Guide. Systematic analysis of all aspects of the benefits requires an extremely large and costly study. Moreover, some of the benefits listed are difficult to present not only in monetary terms but also in physical terms. Only the categories of use and non-use values are evaluated in the presented methodology, using additional checklist for some categories.

Some assumptions have been made regarding the method of assessment of the non-use value – the so-called benefit transfer (BT) method. With this method, estimates of the non-use values in the explored area are calculated on the basis of the results of investigations in other areas. Such adaptation processes usually generate distortions. The closer the two areas from socio-economic point of view, the smaller the distortions. Ideally, the areas would be from the same country. Due to the lack of studies of the WFD in Bulgaria, for the assessment of the benefits in the East Aegean

Region through the BT method, the results of the studies of the Northern Italian region of Emilia-Romagna are used. When using the BT method, it is assumed that there is no distortion of the estimates.

As a rule, the use value is assessed for each individual sector that benefits from improving the water quality. The assessment depends on the functional use of the water resources (drinking, bathing, fish/shellfish water) and the indirect damage caused by over-consumption of water. In Bulgaria's water basins, pollutants are mainly detrimental to the quality of drinking water. Regarding the benefits, the achievement of GES leads to reducing the cost of water treatment for bringing it to drinking standards and to reducing the costs related to solving the problem of water shortages in long periods of drought.

Estimates of the Benefits of Anti-Pollution Measures from Mining and Ore Processing

Use benefits are assessed through the savings made. The achievement of GES saves the treatment of nutrient-contaminated water as well as the emergency response caused by water scarcity. The unit costs for denitrification and purification of water contaminated with organohalogen (bioremediation) were provided by the Basin Directorate of Plovdiv. The unit costs associated with emergency interventions are determined on the basis of available data in the region for the past 10 years.

| Measures | Pressure | Units | Ave. Value |
|--|-------------|--------------|------------|
| Non-use value | | | |
| Recovery value | Point | PP/household | 8.11 |
| Ecological value | Diffusive | PP/household | 5.58 |
| Use value | | | |
| Savings from drinking water treatment costs | Point | €/mc | 0.09 |
| Saving from drinking water treatment costs | Diffusive | €/mc | 0.80 |
| Saving from emergency interventions in case of drought costs | Qualitative | €/mc | 0.79 |

Table 1. Average estimates of the benefits for GES in the East Aegean region

As mentioned above, the values for the Emilia-Romagna region (Galioto et al., 2013) have been adjusted to assess the non-use benefits of the measures against water pollution in the East Aegean region. Following Navrud and Ready (2007), the propensity to pay (PP) for Bulgaria is calculated after a correction that takes into account the income differences between East Aegean region and Emilia-Romagna region.

$$PP_B = PP_I (Y_B / Y_I)^\beta, \quad (1)$$

where PP_B and PP_I represent the propensity to pay in Bulgaria and Italy, respectively; Y_B and Y_I are the income levels in the two countries, and β is the elasticity vs. the income of the demand for environmental goods. For the various eco-friendly goods, the elasticity typically has values less than one. For the new EU member states, the elasticity versus the income is 0.5, and this value is used in the present study. According to the World Bank (2015), in 2015 the GDP per capita based on purchasing power parity (PPP) is €15,731 for Bulgaria and €35,075 for Italy.

From formula (1) it follows that the transformation coefficient of Navrud and Ready $(Y_B / Y_I)^\beta$ of the Emilia-Romagna region for the East Aegean region is 0.67. Because of the lower ecological status in Bulgaria, the effectiveness of the measures is increased by 14%, or 0.14 (Matthei et al., 2012). Therefore, the coefficient of Navrud and Ready should be adjusted to 0.81.

As the object of this study is the pollution of water bodies from mining and ore processing, it is necessary to define the relative share of the measures taken as part of the total benefits. Following Younger (2001), we will assume that 67% of the deteriorated water quality in Europe's mining regions is due to point sources of pollution and 33% to diffuse pollutants. Therefore, it is reasonable to assume that in the mining regions of Bulgaria, the annual benefits of the measures against the point sources of pollution from mining enterprises are 67% of the total benefits.

The East Aegean region, which has 2,250,000 residents, has 48 underground water bodies with a total annual water extraction of 250 million cubic meters. From this data, a hypothetical average groundwater body can be defined which provides drinking water to 46,875 residents and has a water extraction of 5.2 million cubic meters.

The total annual extraction of drinking water (underground and surface) in the region is 270 million cubic meters. Before being directed to the distribution network, 11.61 million cubic meters of them are purified from nitrogen and phosphorus, 1.35 million cubic meters are purified from organohalogens, and an average of 1.62 million cubic meters of water per year are provided in cases of drought. Considering the use benefits of 1 cubic meter, the total value for the whole area is €10,689,300 per year ($11.61 * 0.8 + 1.35 * 0.09 + 1.62 * 0.79$ million).

The non-use benefits are calculated as the number of households is multiplied by €13.69 (see Table 1). Assuming that the average household is composed of 2.3 people, it follows that the number of households in the area is 978,261 ($2,250,000/2.3$). Thus, the area-wide estimate of the non-use benefits is €13,392,393 ($978,261 * 13.69$).

The total value of the benefits is €24,081,693 per year ($13,392,393 + 10,689,300$) and per capita benefits are €10.7 per year ($24,081,693/2,250,000$).

If the body of water is in a mining region, 67% of these values are due to the measures against point pollution by mining enterprises. In other words, €16,134,734 total and €7.17 per capita are the annual benefits of these measures.

Following the recommendations that the cost-benefit ratio must exceed 1.2, the last calculations also show that the cost of implementing measures against point pollution from mining companies should not exceed €6 per year per resident and €281,250 per year for all residents using drinking water from this body of water.

Assuming that operating costs are 10% of the total costs (Mattheiß et al., 2012), from the last amount it follows that for the implementation of the measures for the conditional water body an investment of €253,125 and an operating cost of €28,125 per year are needed. For the 30-year period at a 5% cost of capital rate NPV of investment is €4,085,709.

CONCLUSION

The presented methodology provides an economic assessment of the implementation of Directive 2009/90/EC in the period 2009-2015 and identifies the cases of deterioration (Article 4 [4], [5] & [7]) in the East Aegean Region. Based on the obtained results, additional measures could be taken in the period 2022-2027.

The methodology has been tested for contamination from mining and ore processing, but it is suitable for all water bodies and aggregates as well as for the entire region. The employment of administrative boundaries of the area stimulates the efforts of the local administrations to look for financing of the necessary measures.

The reference point in the methodology is the target water status in the area. Once the sources of pressure have been identified, local stakeholders are consulted about the possible measures for each form of pressure. Then, an analysis of cost minimization is carried out, which makes it possible to choose the most effective set of measures and the levels of activation of individual measures.

The main benefits of the methodology are the simplicity, the logical transition between the different steps, and the ease of practical use.

LIMITATIONS

For benefit assessment, the changes in water status affecting the use costs and the changes that are associated with the non-use cost are analyzed. The available information is employed to estimate the use cost in terms of savings on drinking water treatment and emergency drought interventions. In the analysis of the non-use values, some secondary effects for the economy and society are omitted, which is a deficiency of all methodologies of this type.

The non-use benefits are determined through the benefit transfer (BT) method. We assess the value for recreation and the value of water quality. Due to the limitations of this method, sensitivity analysis is recommended. The analysis

would allow determining the limits in which the actual recovery cost varies. Despite this additional information, in general, the way the benefits are determined needs significant improvements and further on-site research.

Another problem for carrying out analysis is the uncertainty. Uncertainty is generated by technical and economic factors. The incorrect estimates of these factors influence both the final outcome of the evaluation and the choice of intervention option. The consequences of uncertainty can be estimated with higher accuracy through more precise models such as stochastic models, Monte Carlo simulation, and Bayes models.

As any other methodology the one presented here depends on the data used and the time constraints. The credibility of the economic analysis could certainly be enhanced by a more detailed study of the local conditions.

From a practical point of view, the methodology can be improved by reproducing a more categorical two-step approach, which involves prior identification of the problem areas and subsequent detailed analysis of some of them (Vecherkov et al., 2017). For researchers and managers, it would be useful to develop a model of the reciprocal dependence between pressure and water quality/quantity to help making more accurate assessments of the measures concerning water quality.

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THE IMPACTS OF A VOTER APPROVED MINIMUM WAGE INCREASE IN ARKANSAS

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ABSTRACT

Much has been written concerning minimum wage, but the critical issues on this topic are far from resolved. Supporters argue for fair wages, living wages, and an increase in the United States federal minimum wage. Opponents argue that minimum wage laws lead to higher unemployment, higher inflation, and disincentivize workers from seeking skills that would lead to higher earnings in the workplace. This research focuses on state-level minimum wage law in Arkansas and the impact on prices and employment. A change in Arkansas' minimum wage law in 2014 gradually increased minimum wages over a 3 year period. This research adds to the body of knowledge on the topic of minimum wage by providing evidence that relatively smaller increases in minimum wage may not have the negative impacts argued by opponents. Based on the primary data collected for this research, the increase in minimum wage in Arkansas did not result in an increase in the price of fast food compared to the US nationally and the change in price was not significantly greater than the overall inflation rate in the US nationally. In addition, no negative employment effects were observed.

INTRODUCTION

Franklin Roosevelt was famous for his fireside chats. In 1938, just before signing the Fair Labor Standards Act (FLSA), Roosevelt said of this legislation, “Without question it starts us toward a better standard of living and increases purchasing power...” (Reich, 2015, p.538). The FLSA has been accepted and has lasted the test of time. The stated purpose of the FLSA was to create a minimum wage to maintain a “minimum standard of living necessary for health, efficiency and general well-being” (hrdirect, 2019). However, the FLSA was not the first attempt at establishing a minimum wage in the United States. First, Massachusetts passed a limited minimum wage law in 1912 and President Roosevelt's New Deal legislation included a federal minimum wage component in 1933. The Supreme Court struck down both the Massachusetts law and the New Deal minimum wage component (hrdirect, 2019).

The FLSA established the first minimum wage at 25 cents/hr. Most American economists did not oppose the establishment of a wage floor when the FLSA was passed. In fact, John Maynard Keynes argued that the downward spiral of wages contributed to the great depression (Reich, 2015).

Since the passage of the FLSA in 1938, the minimum wage has been increased several times at the federal level. The current federal minimum wage is \$7.25/hr. and was established at this level in 2009 (hrdirect, 2019). As of June 2019, ten years have passed since the minimum wage rate was increased at the federal level. This marks the longest period of time since the passage of the FLSA that the federal minimum wage rate has not been increased (Olen, 2019).

LITERATURE REVIEW

There are many arguments for having a minimum wage. Proponents argue that it reduces employee turnover, increases productivity and helps the economy (Brown, 2019). Minimum wage is also said to result in greater spending power of low-income individuals (Whitaker, Herian, Larimer, & Lang, 2012). Others state that it reduces income inequality (Gasparro & Morath, 2015). There is also the argument that minimum wage allows, or at least should allow, workers to support themselves and their families (Miller, Benjamin, & North, 2014).

Some good examples of a more evidenced-based argument for minimum wage can be found in the case studies of David Card. In his study of California, Card found that the increase in minimum wage in 1988 did not result in any significant job losses and that the result was an increase in wages for teenagers and an increase in the employment population (Card, 1992). A study of New Jersey had similar findings. From 1991 to 1992, New Jersey increased its minimum wage from \$4.25/hr. to \$5.05/hr. Card and Krueger found that this increase did not result in a decrease in employment for the restaurants surveyed. In fact, employment increased in spite of the fact that New Jersey was in a recession at the time (Card & Krueger, 1993).

From economists' perspective, low skilled workers lack bargaining power and the result is that companies, in the absence of a minimum wage law, will set wages very low. As Adam Smith stated, “employers are “always and

everywhere” in a conspiracy to keep wages as low as possible” (Krueger, 2015, p. 534). During the 1930’s and 1940’s, the view of many prominent economists was that wages are set not only by supply and demand forces, but also by morale, loyalty, turnover, and bargaining power (Krueger, 2015).

Arguments against Minimum Wage

The arguments against minimum wage range from opinionated positions focused on behavior to broadly accepted economic theory. The most often expressed views opposing minimum wage focus on its perceived negative impact on employment and prices. The theory is simple, an increase in the price of low-skilled labor will result in an increase in the price of goods and services and a decrease in the quantity demanded of that labor and goods and services. A wage floor, established by an intervening government, therefore disrupts the labor market and results in greater unemployment and higher prices. The final result is that the law hurts those it is intended to help.

Many scholars argue that minimum wage reduces employment (Brown, 2019) (Gitz, 2016) (Hanson & Hawley, 2014) (Miller, et al, 2014) (Stigler, 1946). These arguments range from the far right view that not having any minimum wage law is preferable, to the more commonly accepted view of opponents that the current minimum wage should not be increased. These arguments date from at least the 1940’s to modern times. Though the institutional view of economists in the 1930’s and 1940’s was supportive of minimum wage, not all economists at that time agreed. George Stigler, a Chicago economist, argued that minimum wage reduces employment and does not reduce poverty (Stigler, 1946). His argument continues to more recent times. In 2014, the Congressional Budget Office released a report on the impact of increasing the minimum wage from \$7.25/hr. to \$10.10/hr. This report showed that the expected loss of jobs would be 500,000 to 1 million (Hanson & Hawley, 2014).

It is commonly accepted that a large portion of minimum wage workers are teenagers. One of the most common arguments against minimum wage, or increasing minimum wage, is that it will reduce the opportunity for teens to enter the workforce and gain the skills they need to advance their careers. This argument has been extended to describe even higher unemployment for minority workers. “When the government mandates an above-market wage, the result is a surplus of low-skilled workers. It thus becomes easier and cheaper to discriminate” (Miller, et al, 2014, p. 91).

The effect of minimum wage on employment, particularly on teens, is the primary focus of most of the literature from opponents of minimum wage. However, there is also some focus on the effect of minimum wage on price as well. Several scholars address the issue broadly by stating that increases in minimum wage, or the very existence of any minimum wage, increases the price of goods and services and the cost of living (Allegretto & Reich, 2018) (Belman & Wolfson, 2014) (Brown, 2019) (Gitz, 2016) (Wong, 2014). A number of these focus on more specific industries. For example, Belman & Wolfson, 2014, itemize 7 published studies that reflect a positive impact on prices as a result of an increase in minimum wage. These studies cover a variety of industries that rely on low-wage labor, with an emphasis on restaurants. These seven studies range from 2000-2010 (Belman & Wolfson, 2014).

State vs. Federal Minimum Wage

From 1938 to 2019, the federal minimum wage was increased, or modified to add additional types of workers, 28 times (United States Department of Labor, n.d.). On average, the increase or change occurred approximately every 2.9 years. However, these increases did not occur evenly. There are 3 periods of time when the minimum wage was frozen, or stagnant, for an extended timeframe. Table 1 below describes these periods (United States Department of Labor, n.d.).

Table 1**Minimum Wage Freezes for Long Periods of Time**

| | Start Date | End Date | Rate | Timeframe |
|---|---------------|-----------------|--------|---|
| 1 | Jan. 1, 1981 | Apr. 1, 1990 | \$3.35 | 9 yrs. and 3 months |
| 2 | Sep. 1, 1997 | Jul. 24, 2007 | \$5.15 | 9 yrs. and 10 months |
| 3 | Jul. 24, 2009 | Still in effect | \$7.25 | Still in effect (federal legislation has been introduced and is pending to increase minimum wage to \$15) |

The FLSA did not prohibit states or localities to establish a minimum wage above the federal level. Even so, states did not begin to establish minimum wages above the federal level until the 1980's (Reich, 2015). Each of the periods listed in Table 1 resulted in states taking action to increase minimum wage above the federal level. By the late 1980's, the real value of minimum wage had declined to the point that many states began to establish a minimum wage above the federal level (Card, 1992). During the second period, 29 states had increased minimum wage to a level above the federal minimum (Gascon, 2014). By 2015, during the third period still in effect, 29 states had set minimum wage above the federal level (Gasparro & Morath, 2015). The wave of state increases is further evidenced by 21 states that raised the minimum wage in 2015 and 19 states raising minimum wage in 2019 (Kasperkevic & Srinivas, 2015) (Long, 2018). Many of the states that increased minimum wage in 2015 also increased it again in 2019.

Minimum Wage and the Cost of Living

This discussion of minimum wage and the cost of living is very closely related to the discussion of minimum wage at the federal vs. state level. The quote from Franklin Roosevelt clarified one of the reasons for establishing minimum wage as a tool toward a better standard of living. But, with the cost of living differences in the United States, standardizing minimum wage does not seem to make much policy sense. States began to address this directly in the 1980's as they began to recognize the income inequality within their states and the fact that the federal minimum wage rate was not satisfactory to address it (Riech, 2015).

The Bureau of Economic Analysis, BEA, has done some important work in addressing the issue of cost of living differences throughout the country. The BEA has developed a measure for this known as Regional Price Parities, RPPs, to show the difference in the cost of living between states and major metropolitan areas. This tool has been used to simply identify the real minimum wage in various geographic locations based on the federal minimum wage (Gascon, 2014). The issue is that a national standardized minimum wage has differential impacts on states and metropolitan areas (Hanson & Hawley, 2014).

An excellent tool has been developed by the Massachusetts Institute of Technology to identify a 'living wage' and compares that to the minimum wage across the United States (Glasmeier, 2019). This tool shows the differences in cost of living on a county level and by Metropolitan Statistical Area, MSA. The tool defines a living wage as "the hourly rate an individual must earn to support their family, if they are the sole provider and are working full-time (2080 hours per year)" (Glasmeier, 2019). This calculator shows the living wage necessary based on several family sizes. For example, in the Little Rock-North Little Rock-Conway, AR MSA, the living wage is \$11.03/hr. for a single adult, while the minimum wage in Arkansas is currently \$8.50. For the San Francisco-Oakland-Hayward, CA MSA, the living wage is \$18.73, while the minimum wage is currently \$11.00. For the New York-Newark-Jersey City, NY MSA the living wage for a single adult is \$15.97, while the minimum wage is \$10.40.

The discussions of the differences in the cost of living and the disparate impact of a standardized federal minimum wage are addressed by several scholars (Gascon, 2014) (Glasmeier, 2019) (Reich, 2015). These sources detail what states have done to address the issue and what states and MSAs should do to increase their minimum wage based on the differences in the cost of living.

An opposing view is that minimum wage was never intended to provide sufficient wages to support a family. Wage increases should be given by employers for performance, not by government decree. A large percentage of the jobs

included in the discussion are held by teenagers, college students, and part-time workers (Gitz, 2016). According to Gitz (2016), workers should use these jobs as entry level to gain skills. But, minimum wage discourages workers from doing so and increasing minimum wage will have greater negative effects than positive. Increases in minimum wages in California and New York ultimately serve as a trap for workers that have no incentive to gain additional skills. These workers fall subject to the political pandering that entraps them (Gitz, 2016).

Minimum Wage and Teenagers

The issue of minimum wage is largely an issue of pay for teenagers. “During the 1979 to 2014 period, 40.2% of working teens earned within 10% of the statutory minimum wage as compared to 7.7% of workers overall” (Allegretto, Dube, Reich, & Zipperer, 2017, p.562). Focusing on teenage unemployment then is appropriate, particularly since the strongest opposition to minimum wage laws is based on the view that employment is negatively impacted by establishing a binding minimum wage.

The findings of two studies strongly support having a minimum wage. In fact, these studies show that increasing the minimum wage resulted in an increase in teen employment, not a decrease. In 1987 California’s legislature voted to increase minimum wage. The increases took effect over the next 3 years. David Card’s study of the impact of this increase on employment demonstrated that teen employment actually rose. Unemployment declined and the overall employment-population ratio increased. These conditions were superior to that of the entire United States during the same timeframe, demonstrating that the minimum wage increase did not have negative job effects as opponents argued. Another famous study by David Card and Alan Krueger, 1993, showed that an increase in minimum wage increased employment in New Jersey among fast-food workers, who are typically teenagers. Strikingly, this occurred during a recession (Card & Krueger, 1993).

In spite of these findings, there are still strong arguments that an increase in the minimum wage will result in decreased employment opportunities for teenagers. One argument is that teenagers and older workers working part-time may be more vulnerable to being replaced by automation. The Obama proposal to increase minimum wage to \$10.10/hr. could also result in the replacement of labor with capital and could also result in greater unemployment of minorities (Hanson & Hawley, 2014).

Minimum Wage and the Restaurant Industry

In addition to focusing on teens, it is also appropriate to focus on the restaurant industry because many teens earn minimum wage, or within 10% of it, and many restaurant workers do also. In 2006, 33% of restaurant employees earned within 10% of minimum wage. Also, the restaurant industry employed approximately 30% of all workers earning within 10% of minimum wage (Dube, Lester, & Reich, 2010). “No other industry has such high intensity of use of minimum wage workers” (Dube, Lester, & Reich, 2010, p. 948).

There are several studies that have focused on the impact of changes in the minimum wage on the restaurant industry (Allegretto & Reich, 2018) (Belman & Wolfson, 2014) (Card, 1992) (Card & Krueger, 1993) (Katz & Krueger, 1992). The studies of David Card are discussed in the Minimum Wage and Teenagers section above and show that an increase in the minimum wage in New Jersey and California not only did not decrease employment, but actually resulted in an increase in employment, particularly among teens.

Allegretto & Reich (2018) studied an increase in California in 2013, about 20 years after Card’s study. The Allegretto & Reich (2018) study focused on price impacts from a 25% increase in minimum wage. They found that the 25% increase resulted in a 1.45% increase in restaurant prices. This small percentage price increase is in line with the findings of other researchers that conclude that an increase in minimum wage does not significantly change price. This is in spite of the findings of Belman & Wolfson (2014) who provide evidence from 7 different studies indicating a positive impact on price. The literature is inconclusive and the impact on restaurant menu prices are found to range from none to positive to positive in the long-run (Allegretto & Reich, 2018) (Belman & Wolfson, 2014). Worth mentioning is an article from Bloomberg.com that reports several restaurant chains with plans to increase prices as a result of increases in minimum wage. Jack In The Box, Cheesecake Factory, Denny’s, BJ’s Restaurants, and Nathan’s Famous all reported an expected increase in price as a response to the increase in minimum wage in California in 2013 (Wong, 2014). However, the reported expected increase in prices for these restaurants was only 1.4%, on average, compared to the 12.5% increase in minimum wages.

Katz & Krueger's study (1992) of the impact of an increase in minimum wage in Texas in the early 1990s epitomizes the findings of several. They looked at the impact on price and employment for the fast-food industry. They also focused on the impact on teens. They discuss the conventional economic theory that an increase in price should result in higher prices of goods and reduced employment. However, as with others, they found that the conventional view did not hold. Price changes occurring during their study did not appear to be the result of minimum wage increases and employment increased. They go one step further than other researchers do by pointing out that a relatively high minimum wage may result in the expected increase in price and reduction of employment (Katz & Krueger, 1992).

This issue of the impact on price, and the restaurant industry, based on a relatively greater minimum wage increase is brought into focus by articles addressing the recent increases in minimum wage to new-high levels. For example, Seattle's city council voted to gradually increase its minimum wage to \$15/hr. in 2014. The increases began in 2014 and were scheduled to be fully implemented by 2021. "Data shows that Seattle MSA lost 700 restaurant jobs from January to September (2015)" (Jessen, 2015). This was in spite of an overall climate of job growth in the Seattle MSA. Also, the additional recent increases in California are impacting the restaurant industry. In San Francisco, "an early adopter of the \$15 wage. It's now experiencing a restaurant die-off" and in "San Diego...wage was increased 43 percent in two years...Watch for the next mass die-off there" (Agott, 2017).

Recent National Trends in Minimum Wage

The Raise the Wage Act passed the Democratic controlled House of Representatives on July 18, 2019. This bill would raise the federal minimum wage to \$15/hour by 2025 (Clark, 2019). The Republican controlled Senate will likely not pass the bill. As has been the case since the passage of the FLSA in 1938, economists disagree on the consequences of passing the bill (Maurer, 2019).

As of June 2019, there are 29 states that have a minimum wage above the federal minimum. The highest state minimum wage rate is \$12 in California, Massachusetts, and Washington. There are also 44 other municipalities that have a higher minimum wage than their state. Half of these municipalities are in California. The highest minimum wage in among these 44 municipalities is \$16/hr. in Seattle, WA, which applies to companies employing more than 500 workers (Labor Law Center, 2019).

The wave of increases in minimum wage above the current federal level was foreseen in 2012 by Whitaker, et.al. They stated that federal inaction to increase minimum wage could lead to pressure for states to act. Their prediction came to fruition in just a few years. In 2015, 21 states raised their minimum wage (Kasperkevic & Srinivas, 2015). But during this timeframe, it was not only states that were increasing wages. A variety of high profile public companies also made public their plans to increase wages above minimum wage (Che, 2015). Among these 13 companies was Starbucks. This is no surprise given that Starbucks is based in Washington state and that state has some of the highest minimum wage rates in the country. But also included in the list of companies was Walmart of Bentonville, AR. With minimum wage in Arkansas at only \$7.50/hr. as of the time the article was written, Walmart's increase to \$9/hr. was significant. Also, Walmart announced that wages would be raised to \$10/hr. in 2016.

The movement to increase minimum wage at the state and local level has continued and has apparently increased in momentum over the past couple of years. From 2017 to 2019, 23 states have increased their minimum wage. Also, 17 of the 44 municipalities referred to above have passed laws to increase their minimum wage either on July 1, 2019 or January 1, 2020 (Labor Law Center, 2019).

Recent Arkansas Trends in Minimum Wage

This empirical research study focuses on the impact of an increase in minimum wage on the state of Arkansas. So, before moving on to the methodology section of this paper, a review of the recent trends and law changes in minimum wage in the state of Arkansas is appropriate.

In 2014, Arkansas' state minimum wage was \$6.25/hr. This was \$1/hr. below the binding federal minimum of \$7.25/hr. As a result, Arkansas' state minimum wage was not effective. Arkansans undertook a ballot initiative to increase the minimum wage in the November 2014 election (Kasperkevic & Srinivas, 2015). The issue passed with 65.94% voting for and 34.06% voting against the issue (Ballotpedia, 2019). There was very broad support for Issue 5

from across the state. Senator Mark Pryor (D) wrote of his support for Issue 5 in an article titled *Time to give Arkansans a raise* (2014). In addition, the Republican running for Governor in the same 2014 election, Asa Hutchinson, also supported Issue 5. A final revealing fact on Issue 5 is that \$471,010 was raised in support of the issue and \$0 was raised in opposition according to Ballotpedia (2019). Specifically, the law increased minimum wage as shown in Table 2 (Basten, 2018).

Table 2

Arkansas' Issue 5 Minimum Wage Amounts from November 2014 Election

| Year | State Minimum | Federal Rate | Increase in the Binding Minimum Wage | New Minimum Wage and Effective Date |
|------|---------------|--------------|--------------------------------------|-------------------------------------|
| 2014 | \$6.25/hr. | \$7.25/hr. | | |
| 2015 | \$7.50 | \$7.25 | \$.25 | \$7.50 as of Jan. 1 |
| 2016 | \$8.00 | \$7.25 | \$.50 | \$8.00 as of Jan. 1 |
| 2017 | \$8.50 | \$7.25 | \$.50 | \$8.50 as of Jan 1 |

This increase in minimum wage in Arkansas increased wages from \$7.25/hr. to \$8.50/hr. over 24 months and 1 day. This represented an increase of 17.24%.

Also, Arkansas voted to increase its minimum wage again in the fall of 2018. The scheduled increases will raise the Arkansas minimum wage from \$8.50 to \$11.00 by 2021. Since these increases will continue for the next two years, the data showing any consequences of this new law are not yet available. This will be addressed in the section below regarding future research.

METHODOLOGY

Research Questions

As summarized in the literature review above, there are many arguments for and against minimum wage laws. However, the most often expressed views opposing minimum wage focus on its perceived negative impact on employment and prices. A number of studies have been done from the 1990's to 2013 in large states with higher relative population incomes, populations, and costs of living than Arkansas (Allegretto & Reich, 2013) (Card, 1992) (Card & Krueger, 1993) (Katz & Krueger, 1992). Arkansas is a low-income state with a small population. Arkansans voted on in the November 2014 election to increase minimum wage above the federal level by 17.24%. The research questions focused on in this study address the employment and price impacts of Arkansas' passage of Issue 5 in the 2014 election.

The five research questions addressed are as follows:

- I. Did the increase in minimum wage in Arkansas lead to an increase in fast food menu prices greater than the increase in fast food menu prices in the United States?
- II. Did the increase in minimum wage in Arkansas lead to an increase in fast food menu prices greater than the increase in the overall rate of inflation in the United States?
- III. Did the increase in minimum wage in Arkansas result in a greater rate of unemployment compared to the United States?
- IV. Did the increase in minimum wage in Arkansas result in a greater rate of teen unemployment compared to the United States?
- V. Did the increase in minimum wage in Arkansas lead to a difference in the labor force participation rate compared to the United States?

The important issues addressed by these questions are not whether the price increased or employment changed, but rather how these things changed compared to the overall economy.

Data Collection

To determine the impacts on prices and employment resulting from the change in minimum wage rates in Arkansas, the authors collected menu price data from fast food restaurants in Arkansas. The data were collected from 44 restaurants quarterly from the fourth quarter of 2014 to the first quarter of 2017. This timeframe began before the first minimum wage increase on January 1, 2015, and ended after the last increase on January 1, 2017. A total of 292 menu item prices were collected each quarter. These 292 menu items were the exact same items for the entire study. At the beginning of the study, 46 restaurants were included and several additional menu items were included. During the data collection timeframe, 1 restaurant closed and 1 burned down. The menu items for these two restaurants were removed. Also, as restaurants changed their menus, items that were not consistent over the entire data collection period were dropped. For example, if a restaurant ceased to offer a specific item, then the item was removed from the sample. Menu prices were obtained by visual observation from drive-through menus from various Sonic, Subway, Taco Bell, Burger King, McDonald's, Popeyes, Arby's, Hardees, Dairy Queen, Chick-fil-a, Wendy's, and Kentucky Fried Chicken restaurants.

To compare the change in menu prices to other price changes and to compare changes in employment statistics, secondary data was obtained as shown in Table 3.

Table 3
Secondary Data & Sources

| | Data Collected | Frequency of Data | Time Period for Data | Source of Data |
|-----|--|-------------------|-----------------------|--|
| I | US CPI U for limited service restaurants | Quarterly | 4Q14 – 1Q17 | Bureau of Labor Statistics |
| II | US CPI U | Quarterly | 4Q14 – 1Q17 | Bureau of Labor Statistics |
| III | US & Arkansas Unemployment Rate | Monthly | Oct. 2014 – Mar. 2017 | Bureau of Labor Statistics |
| IV | US & Arkansas Teen Unemployment Rate | Monthly | Oct. 2014 – Mar. 2017 | US-Bureau of Labor Statistics AR-Bureau of Labor Statistics Data provided by the Arkansas Division of Workforce Services |
| V | US & Arkansas Labor Force Participation Rate | Monthly | Oct. 2014 – Mar. 2017 | US-Bureau of Labor Statistics AR-Bureau of Labor Statistics Data provided by the Arkansas Division of Workforce Services |

FINDINGS

Research Question I – Comparing Fast-Food Prices

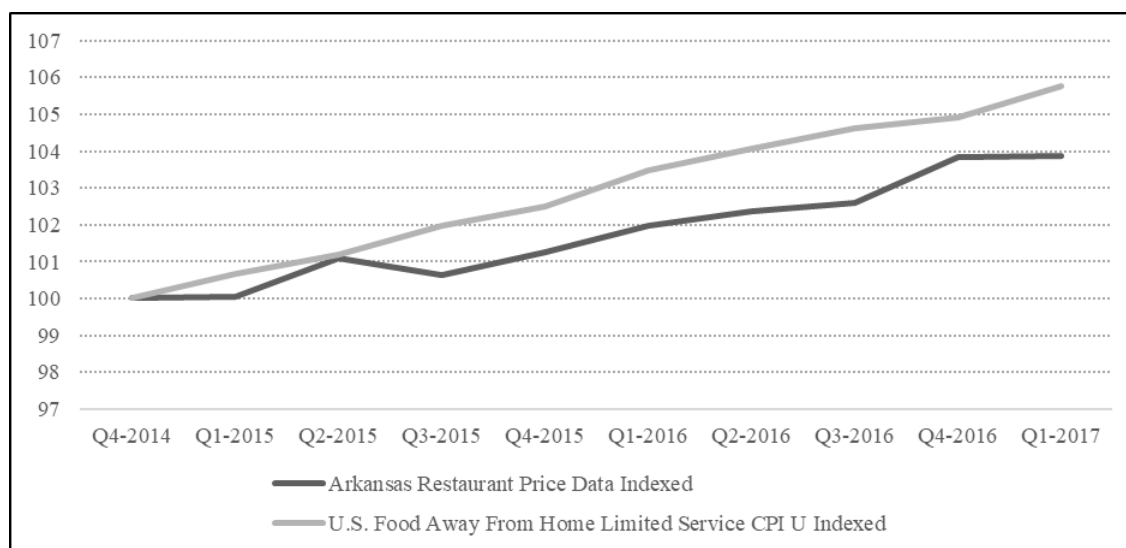
Primary data collected for this study were menu prices for fast food restaurants from 4Q14 – 1Q17, also referred to as food away from home – limited service by the BLS. The menu items' prices were totaled and the totals were indexed with the total price for all items in 4Q14 being set as the base period and equal to 100. The CPI U for the United States for limited service restaurants was also indexed from the BLS data with the base period being set to 4Q14 and equal to 100.

The data show that the increase in menu prices for Arkansas fast food restaurants rose from the base period index amount of 100 to 103.859 as 1Q17. This is an increase in food prices of 3.859% in Arkansas. The CPI U data for

limited service restaurants across the United States show an increase in price from 100 to 105.774, reflecting an increase in food prices of 5.774% over the United States. Figure 1 compares these indices.

Figure 1

Arkansas vs. United States Fast Food Prices



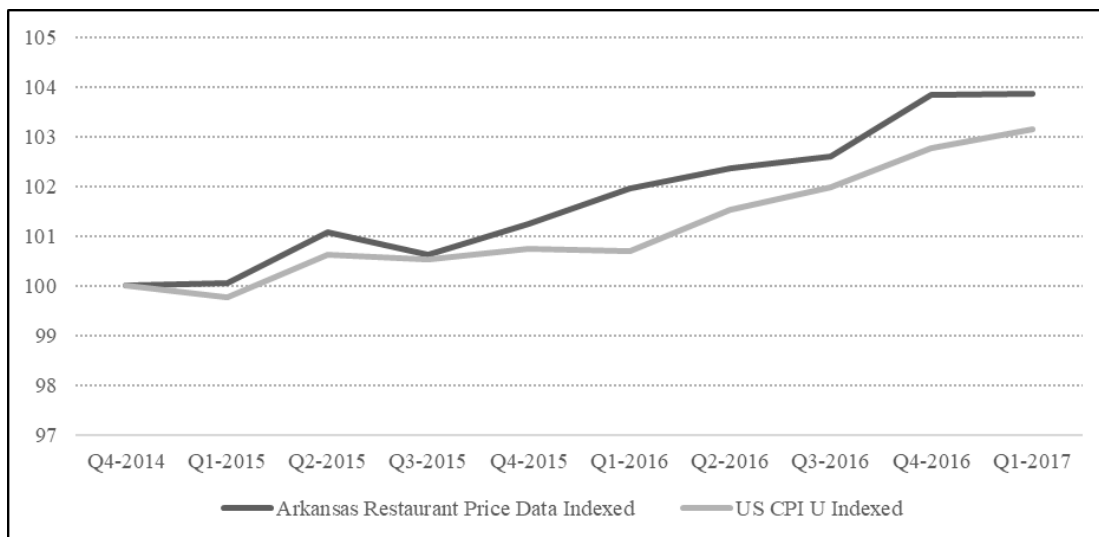
Research Question II – Comparing Arkansas’ Fast-Food Prices to United States Inflation

Similarly to research question I, a comparison was made of the change in prices of fast-food restaurants in Arkansas to overall inflation in the United States. With the US CPI U data being indexed with a base period of 4Q14 at 100, the US CPI U data show an increase in prices from 100 to 103.161 at 1Q17. This represented an increase in prices of 3.161%.

Since the increase in Arkansas’ menu prices was greater than the increase in US inflation, an independent T-test was done to determine if the difference was significant. The independent T-test produced a one-tail p value of 0.338909111. This result fails to support that the change in menu prices for Arkansas was significantly greater than the overall inflation rate in the United States. Figure 2 compares these indices.

Figure 2

Arkansas Fast Food Prices vs. United States CPI U



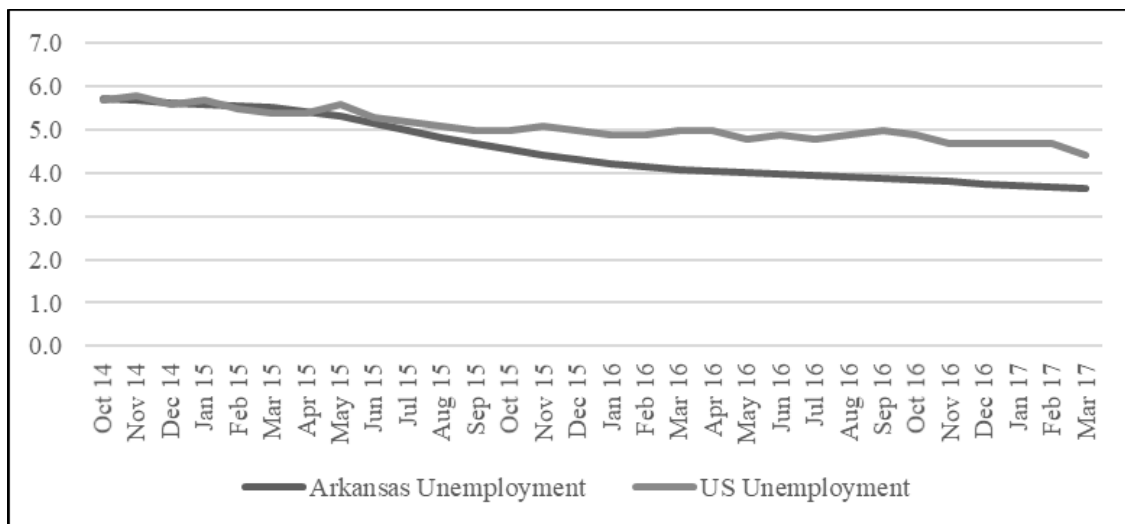
Research Question III – Comparing the Unemployment Rate

Arkansas' unemployment rate declined from 5.7% to 3.6% over the 30 month period measured. This reflects a decline of 1.9%. Further, in each month measured, the rate was either steady or declining. There was no month during the timeframe where unemployment increased.

The US unemployment rate declined from 5.7% to 4.4% over the same period. This decline was, in absolute terms, less than the decline Arkansas enjoyed. Figure 3 compares these unemployment rates over the 30 months measured.

Figure 3

Arkansas Unemployment Rate vs. United States Unemployment Rate



Research Question IV – Comparing the Teen Unemployment Rate

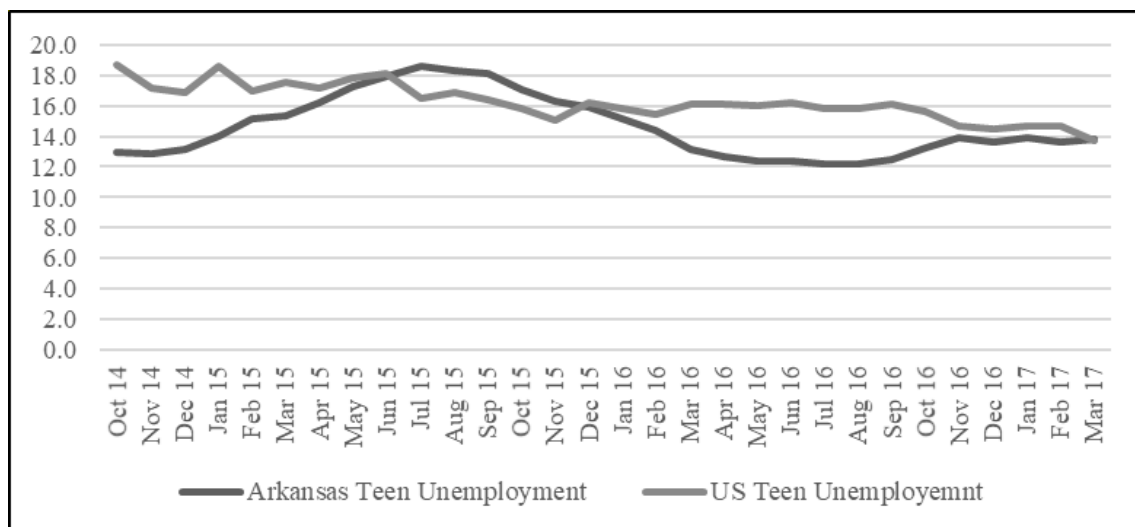
The Arkansas teen unemployment rate was 13.0% at Oct. 2014. This rate increased to a peak of 18.1% in Sep. 2015 before declining to 13.85% at Mar. 2017. This was not a steady directional change as was the Arkansas unemployment rate reflected in the Research Question III data.

The US teen unemployment rate was 18.7% at Oct. 2014. This rate declined to 13.7% by Mar. 2017. However, this rate also did not follow a steady directional path during the 30 month timeframe.

The Arkansas teen unemployment rate and the US teen unemployment rate were indexed based on a base period of Oct. 2014 and a value of 100. An independent T-test was performed on the change in the values of the indices to determine if the change in the Arkansas teen unemployment rate was greater than the change in the value of the US teen unemployment rate. The independent T-test produced a one-tail p-value of 0.138338629. This result fails to support that the change in Arkansas teen unemployment was significantly greater than the change in US teen unemployment over the same period. Figure 4 compares these teen unemployment rates over the 30 month period.

Figure 4

Arkansas Teen Unemployment vs. United States Teen Unemployment Rate



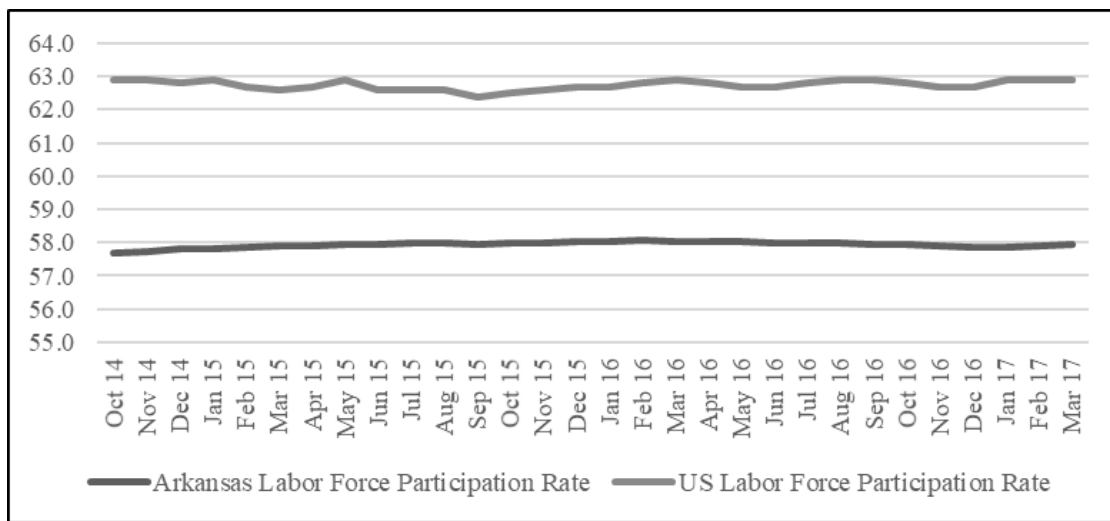
Research Question V – Comparing the Labor Force Participation Rate

During the 30 month timeframe measured, Oct. 2014 – Mar. 2017, Arkansas' labor force participation rate, LFPR, was fairly steady and consistently below the US LFPR. For Arkansas, the LFPR was 57.7% in Oct. 2014 and 57.9% in Mar. 2017. The rate only fluctuated .4% over the 30 months. For the US, the rate was 62.9% in Oct. 2014 and 62.9% in Mar. 2017. The US rate was also fairly steady over the period and only fluctuated .5%, down to 62.4%, during the period.

To determine if the change in the AR LFPR was significantly different than the change in the US LFPR, an independent T-test was performed. The AR LFPR and the US LFPR were indexed with to Oct. 2014 with a base value of 100. The change in the rates was compared using the independent T-test. The test produced a two-tail p-value of 0.708228595. This result fails to support that there was a significant difference in these labor force participation rates. Figure 5 compares these rates.

Figure 5

Arkansas Labor Force Participation Rate vs. United States Labor Force Participation Rate



Analysis

At the beginning of this study, and as the authors were beginning to gather data, the expectation was that Arkansas' fast food prices would increase at a rate greater than the US as a whole and that the increase would negatively impact employment in the state because of the increase in minimum wage. These expectations were in line with traditional economic theory. It was surprising to find that fast food prices in Arkansas increased by less than the fast food prices in the US. Although the Arkansas fast food index rose by 3.859%, this was less than the 5.774% increase in fast food prices across the US. For research question I, regarding price comparisons of fast food restaurants, clearly Arkansas did not suffer an increase in fast food prices as compared to the US as a result of the minimum wage hike. For research question II, although Arkansas' fast food price increase was 3.859% over the period measured, more than the US inflation rate of 3.161%, the change in these measures was not significant. These findings related to price fail to support the economic view that an increase in minimum wage will result in an increase in price, measured as a comparison of goods or as a comparison of inflation for the broader economy.

The findings for the employment effects also fail to support the economic view that an increase in minimum wage will result in greater unemployment, particularly among teens. This is clearly demonstrated by the fall in unemployment in AR from 5.7% to 3.6% compared to the fall in unemployment in the US from 5.7% to 4.4% over the same 30 month period. According to the traditional economic view, Arkansas' unemployment should have increased, or at least decreased by a lesser rate, when compared to the overall economy. This did not happen. Unemployment actually decreased in AR by .8% more than in the broader economy. The teen unemployment analysis is more challenging because the change in both the Arkansas teen rate and the US teen rate is not steady. However, with the independent T-test one-tail p-value result of 0.1338338629, the comparison of the change in the two rates is not significant. Lastly, the LFPR for both Arkansas and the US is very steady. There is no significant difference in the change in these rates. It is clear that the increase in minimum wage in Arkansas did not lead to an increase in unemployment, any significant difference in the change in teen unemployment rates, or the LFPR.

Limitations

This study is limited by the fact that the primary data from Arkansas fast food restaurants was collected from 44 restaurants across 8 cities and 6 counties. However, these counties range from rural to urban, including several restaurants from small towns and several from the largest MSA in the state.

The timeframe for data collection and the analysis is limited to the quarter before the minimum wage was changed to the quarter in which the last increase in minimum wage was implemented in the state of Arkansas. Thus, the timeframe

covers the entire period of the increases in minimum wage. However, a lag effect may impact the results if collection of data had continued for additional quarters.

CONCLUSIONS

Summary

Traditional economic theory suggests that an increase in minimum wage will result in both an increase in prices and negative impacts on employment. For Arkansas, the increase in minimum wage did neither from 4Q14 to 1Q17. In fact, unemployment dropped, teen unemployment did not change significantly when compared to US teen unemployment, and the LFPR remained very stable. Also, prices increased less than related prices nationally and did not increase significantly greater than prices in the broader US economy.

It would not be appropriate to suggest that traditional economic theory is wrong. To the contrary, traditional economic theory includes the phrase ‘*ceteris paribus*’. This means ‘all other things held constant’. Of course this is a useful tool when learning economic theory. But, when applying economic theory to real-world situations, the *ceteris paribus* consideration must be kept in mind to avoid misunderstanding.

For minimum wage, the research seems to conflict. Many studies show that an increase in minimum wage resulted in an increase in price (Lemos, 2008). Several recent increases in minimum wage demonstrate, at least anecdotally, that increases in minimum wage have resulted in negative employment consequences (Agott, 2017) (Jessen, 2015). What researchers should keep in mind is that not all other things are held constant. There are many other factors to consider. Further, an increase in price or an impact on employment must be compared to something to be relevant. Some other factors often ignored are the lag effect, the magnitude of an increase in wages, the minimum wage compared to the average wage in the economy, the condition of the economy within the business cycle, the incentive or disincentive to workers of an increase in minimum wage.

We find that the increase in minimum wage in Arkansas, approved in the 2014 fall election, did not result in an increase in price compared to other relevant factors or in negative effects on employment, *ceteris paribus*.

Future Research

Interestingly, Arkansas voted in the fall of 2018 to raise the minimum wage again (Arkansas.gov, 2018). This time, Arkansas voted to increase minimum wage from \$8.50/hr. to \$11.00/hr. by 2021. The 2014 law increased minimum wage by \$1.25/hr., representing a 17.24% increase. The 2018 law will increase minimum wage by an additional \$2.50/hr., representing an additional 29.41% increase. Future research may focus on whether or not the higher increase amount will result in negative impacts on price and employment more in line with traditional economic theory.

A final consideration is that research on this topic should focus on policy. Much has been done to describe the impacts of minimum wage, but little has been done to focus on what an appropriate minimum wage policy really looks like. Some states index their minimum wage, but all do not. The federal government has not increased minimum wage in over 10 years. Regional price differences seem to call for differences in minimum wage. Research should focus on the development of minimum wage policy without political pressure.

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DO WE IMPOSE TARIFFS? - HOW FOREIGN IMPORTS ARE HURTING US PRODUCERS- CASE OF MONTMORENCY TART CHERRY MARKET

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ABSTRACT

This paper explores the current market conditions in the US where many producers and manufacturer are complaining of cheap imports from foreign countries hurting their businesses. The current administration has passed a number of tariff measures recently, including a trade war with China to confront the issue at hand. Trump tariffs has affected 14.9% of all U.S. imports being covered by some sort of special trade protection. The question is- Are tariffs the right strategy to adopt or is there any other alternative that US economy can adapt? Specifically, this paper looks at the case with tart red cherry growing industry based out of Michigan facing competition from Turkish imports. The arguments here in this paper could be used in other trade situations also where similar cheaper imports are affecting US domestic markets.

INTRODUCTION

Michigan, which ranks 2nd nationwide in agricultural diversity in the USA grows 75 percent of all U.S. tart cherries and 20 percent of sweet cherries, making it 4th in the nation for sweet cherries and 1st for tart. Utah, Washington, New York, Wisconsin and Pennsylvania are other prominent Montmorency tart cherry-producing states. Michigan state also leads in cherry processing, as 99 percent of tart cherries (mostly the Montmorency variety) are canned, frozen, dried or in juice form. Michigan's climate and fresh water provide an ideal ecosystem that keeps orchards cool in the summer and moderates harsh winds in winter. On the average, there are 7,000 cherries on each cherry tree; 250 cherries make one pie; each tree makes 28 pies. If the average U.S. consumer eats 1 pound annually, this adds up to approximately 260 million pounds annually. Americans demand cherries —and growers are filling those expectations.

Often referred to as America's Super Fruit, cherries are rising in popularity due to the recent focus on health-promoting properties of antioxidants. Instead of relying on fruits from foreign markets, health and nutrition experts advise consumers to look for American-grown fruit. An alternative to exotic berries grown and marketed in a foreign rainforest, the cherry packs a lot of nutrition. Plus, it's available year-round as dried, canned, frozen and in juice.

Another reason for its popularity is that February is American Heart Month and also National Cherry Month. Could the simple cherry one day be the cure for diseases that affect the body? Scientists suggest that this fruit may offer powerful heart-health benefits that provide answers to the mysteries of illness.

There is a recent news article in Wall Street Journal, dated July 29th, 2019 titled “Cherry Capital of the world faces threat from Turkish imports” by Shayndi Raice where the writer talks about how the recent cheap imports of dried cherries from Turkey, apparently subsidized by their government is undercutting the price of our home grown cherries. The fight centers on the tart Montmorency cherries grown around nearby Traverse City, which is nestled along Lake Michigan's Traverse Bay, about four hours northwest of Detroit. The region has crowned itself the cherry capital of the U.S., where it supplies two-thirds of the country's supply of tart cherries. It battles the state of Washington for the title, where more sweet cherries are grown. About 300 million pounds of tart cherries worth about \$56 million were produced in Michigan last year. Almost the same amount was worth \$107 million in 2014, according to USDA data. Tart cherries are used for pie filling and juice, or are dried and put into cereal and breakfast bars. Neat rows of cherry trees resembling Mediterranean groves line the highways around the region. The sandy loam soil and proximity to

Lake Michigan, which moderates the climate, creates rich ground for the fruit to grow. Tart cherries are a small crop compared with the much larger sweet cherry industry, which produced 344,400 tons of fruit in 2018 worth \$638 million. Now here is where the issue started. Turkey participates in the United States' Generalized System of Preferences, which grants duty-free trade access for developing nations. Turkish imports of tart dried cherries have nearly doubled annually over the last three years to 1.5 million pounds in 2018, selling at 89 cents a pound. U.S. processors sell the same product for about \$4.60 a pound, according to data from USDA. The average price per pound that growers could command for tart cherries dropped from 27 cents a pound in 2016 to 20 cents a pound last year, according to USDA data.

Traverse City's Shoreline Fruit LLC and Cherry Central Cooperative and Frankfort's Smeltzer Orchard Co. LLC and Graceland Fruit Inc. — along with Utah-based Payson Fruit Growers Co-op make up the Dried Tart Cherry Trade Committee — petitioned the ITC and the U.S. Department of Commerce on April 23 to open probes into the imported dried fruit and hit them with tariffs, claiming the dried cherries from Turkey, which is the world's largest tart cherry producer, are sold too cheaply in the U.S. market. According to the petition, as mentioned in this paper earlier, imports of dried tart cherries from Turkey almost doubled between 2016 and 2017, and the imported cherries are sold at increasingly lower prices, depressing the price of U.S.-grown dried cherries. The petition alleged that the Turkish cherries are sold at 628.9% below fair market value. The petition which was approved by the ITC asks for 650% anti-dumping and countervailing tariff (CVD- Counter veiling duty) on dried tart cherries from Turkey. The tart cherry industry annually contributes millions to Northern Michigan's economy and is a part of the National Cherry festival which brings thousands of people to Michigan every year.

“This steep underselling has facilitated the rapid increase in subject imports throughout the period and permitted imports to take market share from the domestic industry,” the petition says. “The commission should find that imports of dried tart cherries from Turkey have had significant adverse price affects.”

The American cherry farmers also claimed that the Turkish government unfairly props up its cherry farmers with export subsidies, tax benefits and other financial assistance. The petition also took aim at a European Union assistance program for rural development, which sends funds to Turkish dried cherry producers.

The ways that the Turkish agricultural sector is subsidized under the EU program “appear to be truly Byzantine,” the petition says, but available information indicates that the program provides half of the capital for projects by dried fruit exporters. The petition was approved by ITC and moved to the US Commerce department.

FREE TRADE VS PROTECTION

Free trade increases the number of goods that domestic consumers can choose from, decreases the cost of those goods through increased competition, and allows domestic industries to ship their products abroad. In a recent paper by Botero, Garcia and Giarldo(2018), they look at the cost to implementing tariffs and other non tariff barriers to imports in Columbia and find that that agricultural protection costs the country about 1.5% of GDP; and between 0.9% and 3.4% of household income, with large losses in some productive sectors and gains in others, which highlights the problems of political economy that the implementation of this type of reforms faces.

Tariff is a tax on an import. It adds to the cost borne by consumers of imported goods and is one of several trade policies that a country can enact. Tariffs are paid to the customs authority of the country imposing the tariff. Tariffs on imports coming into the United States, for example, are collected by Customs and Border Protection, acting on

behalf of the [Commerce Department](#). Tariffs are often created to protect [infant industries](#) and developing economies but are also used by more [advanced economies](#) with developed industries. Here are five of the top reasons tariffs are used.

Protecting Domestic Employment

The [levying of tariffs](#) is often highly politicized. The possibility of increased competition from imported goods can threaten domestic industries. These domestic companies may fire workers or shift production abroad to cut costs, which means higher [unemployment](#) and a less happy electorate. The unemployment argument often shifts to domestic industries complaining about cheap foreign labor, and how poor working conditions and lack of regulation allow foreign companies to produce goods more cheaply. In economics, however, countries will continue to produce goods until they no longer have a [comparative advantage](#) (not to be confused with an [absolute advantage](#)).

Protecting Consumers

A government may levy a tariff on products that it feels could endanger its population. For example, South Korea may place a tariff on imported beef from the United States if it thinks that the goods could be tainted with a disease.

Infant Industries

The use of tariffs to protect infant industries can be seen by the [Import Substitution Industrialization \(ISI\)](#) strategy employed by many developing nations. The government of a developing economy will levy tariffs on imported goods in industries in which it wants to foster growth. This increases the prices of imported goods and creates a domestic market for domestically produced goods while protecting those industries from being forced out by more [competitive pricing](#). It decreases unemployment and allows developing countries to shift from agricultural products to finished goods.

Criticisms of this sort of [protectionist](#) strategy revolve around the cost of [subsidizing](#) the development of infant industries. If an industry develops without competition, it could wind up producing lower quality goods, and the subsidies required to keep the state-backed industry afloat could sap [economic growth](#).

National Security

[Barriers](#) are also employed by developed countries to protect certain industries that are deemed strategically important, such as those supporting national security. Defense industries are often viewed as vital to state interests, and often enjoy significant levels of protection. For example, while both Western Europe and the United States are industrialized, both are very protective of defense-oriented companies.

Retaliation

Countries may also set tariffs as a retaliation technique if they think that a trading partner has not played by the rules. For example, if France believes that the United States has allowed its wine producers to call its domestically produced sparkling wines "Champagne" (a name specific to the Champagne region of France) for too long, it may levy a tariff on imported meat from the United States. If the U.S. agrees to crack down on the improper labeling, France is likely to stop its retaliation. Retaliation can also be employed if a trading partner goes against the government's foreign policy objectives.

COMMON TYPES OF TARIFFS

There are several types of tariffs and barriers that a government can employ:

- Specific tariffs
- [Ad valorem tariffs](#)
- Licenses
- Import quotas
- [Voluntary export restraints](#)
- Local content requirements

Specific Tariffs

A fixed fee levied on one unit of an imported good is referred to as a specific tariff. This tariff can vary according to the type of good imported. For example, a country could levy a \$15 tariff on each pair of shoes imported, but levy a \$300 tariff on each computer imported.

Ad Valorem Tariffs

The phrase *ad valorem* is Latin for "according to value," and this type of tariff is levied on a good based on a percentage of that good's value. An example of an ad valorem tariff would be a 15% tariff levied by Japan on U.S. automobiles. The 15% is a price increase on the value of the automobile, so a \$10,000 vehicle now costs \$11,500 to Japanese consumers. This price increase protects domestic producers from being undercut but also keeps prices artificially high for Japanese car shoppers.

TARIFF AS A BARRIER TO TRADE

The benefits of tariffs are uneven. Because a tariff is a tax, the government will see increased [revenue](#) as imports enter the domestic market. Domestic industries also benefit from a reduction in competition, since import prices are artificially inflated. Unfortunately for consumers - both individual consumers and businesses - higher import prices mean higher prices for goods. If the price of steel is inflated due to tariffs, individual consumers pay more for products using steel, and businesses pay more for steel that they use to make goods. In short, tariffs and trade barriers tend to be pro-producer and anti-consumer.

The effect of tariffs and [trade barriers](#) on businesses, consumers and the government shifts over time. In the short run, higher prices for goods can reduce consumption by individual consumers and by businesses. During this period, some businesses will profit, and the government will see an increase in revenue from [duties](#). In the long term, these businesses may see a decline in efficiency due to a lack of competition, and may also see a reduction in profits due to the emergence of [substitutes](#) for their products. For the government, the long-term effect of subsidies is an increase in the demand for public services, since increased prices, especially in foodstuffs, leave less [disposable income](#).

How Do Tariffs Affect Prices?

Tariffs increase the prices of imported goods. Because of this, domestic producers are not forced to reduce their prices from increased competition, and domestic consumers are left paying higher prices as a result. Tariffs also reduce efficiencies by allowing companies that would not exist in a more competitive market to remain open. When a tariff or other price-increasing policy is put in place, the effect is to increase prices and limit the volume of imports.

Tariffs and Modern Trade

The role tariffs play in international trade has declined in modern times. One of the primary reasons for the decline is the introduction of international organizations designed to improve free trade, such as the [World Trade Organization](#) (WTO). Such organizations make it more difficult for a country to levy tariffs and taxes on imported goods, and can reduce the likelihood of retaliatory taxes. Because of this, countries have shifted to [non-tariff barriers](#), such as quotas and export restraints. Organizations like the WTO attempt to reduce production and consumption distortions created by tariffs. These distortions are the result of domestic producers making goods due to inflated prices, and consumers purchasing fewer goods because prices have increased.

International trade increases the number of goods that domestic consumers can choose from and also decreases the cost of these goods through competition. This is in an ideal free trade world where the exporting or the importing country are not engaging in any sort of domestic favoritism by allowing high subsidies unilaterally. Free trade also allows domestic producers to expand their production abroad. In US, tariffs are collected by the Customs and Border Protection on behalf of the Commerce department.

Qammar Abbas in a graduate level study at Oregon State University has investigated the effect of steel tariffs imposed by the US on the stock returns of 17 major steel companies listed at the NYSE using a event study methodology (Abbas,2018). He found while most steel manufacturers experienced a significant positive return due to the event (announcing of steel tariffs by President Trump on March 1st, 2018), the steel consumer companies experienced significantly negative returns. Paul Krugman (1997) writes about increasing demand from countries in terms of “total integration” with respect to not only trade liberalization but also having same standards in terms of labor practices, environmental standards etc.

NON-TARIFF BARRIERS TO TRADE

Licenses

A license is granted to a business by the government and allows the business to import a certain type of good into the country. For example, there could be a restriction on imported cheese, and licenses would be granted to certain companies allowing them to act as [importers](#). This creates a restriction on competition and increases prices faced by consumers.

Import Quotas

An import [quota](#) is a restriction placed on the amount of a particular good that can be imported. This sort of barrier is often associated with the issuance of licenses. For example, a country may place a quota on the volume of imported citrus fruit that is allowed.

Voluntary Export Restraints (VER)

This type of trade barrier is "voluntary" in that it is created by the exporting country rather than the importing one. A voluntary export restraint is usually levied at the behest of the importing country and could be accompanied by a reciprocal VER. For example, Brazil could place a VER on the exportation of sugar to Canada, based on a request by Canada. Canada could then place a VER on the exportation of coal to Brazil. This increases the price of both coal and sugar but protects the domestic industries.

Local Content Requirement

Instead of placing a quota on the number of goods that can be imported, the government can require that a certain percentage of a good be made domestically. The restriction can be a percentage of the good itself or a percentage of the value of the good. For example, a restriction on the import of computers might say that 25% of the pieces used to make the computer are made domestically, or can say that 15% of the value of the good must come from domestically produced components.

US. GOVT RULING ON THE MONTMORENCY CHERRY MARKET

In a preliminary ruling, the US Department of Commerce has removed the duty free status of the Turkish tart cherry juice imports coming into USA. The U.S government may now charge Turkish cherry producers and exporters between a 204.93 percent to 648.35 percent tariff to protect the Michigan dried cherry industry, the Department of Commerce (DOC) said in a preliminary ruling end of September, 2019.

The DOC ruled that Turkish trade practices “had a significant adverse impact on the domestic industry” and will make a final decision in early 2020 whether to impose additional duties.

The cherry growers have sighed a breath of relief and is crediting the President for standing on their side.

CONCLUSION

The Montmorency tart cherry market has been a case in hand of how lack of trade restrictions coupled with cheaper production cost abroad can flood a domestic market with a foreign competing product. Turkey had been dumping their cheaper tart cherry juice into US markets for years which was creating a huge competition issue for domestic tart cherry growers. Turkey was even planning on getting into the dry tart cherry market too along with the juice market. U.S trade intervention has effectively provided relief to the U.S. producers. Now the question still remains if imposing duties are detrimental to the idea of fair competition, does the consumer lose at the end? It perhaps is, as is evidenced by the loss of consume surplus etc in various basic economics text tariff graphs. So on one hand, we have the classic free market theorists who argue against tariffs and other trade barriers and on the other hand we have domestic high cost producers who protest and ask for protection. The right solution is anybody's guess.

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THE EVOLUTION OF GROUP EXERCISES WITHIN AN INTRODUCTORY COLLEGE BUSINESS COURSE

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ABSTRACT

This paper describes the ongoing evolution of Group Exercises within an Introductory College Business Course over three semesters. This paper describes the purpose and use of Group Exercises in higher education, along with the evolution of Group Exercises within a current course, based on formal and informal feedback and observations. Additionally, this paper describes the changes made to the Group Exercises within the course, to include the use of fictional narrative, more detailed rubrics for participation and the use of standing groups. Finally, this paper outlines the way ahead for further research and potential contributions to the educational and practical fields.

INTRODUCTION

The practices in this paper were adopted by the author, a new professor, in teaching “*Getting to Know the Modern Value Chain*”, a 100-level introductory business course at York College of Pennsylvania. Table 1 describes York College’s definition of a 100-level course, in terms of knowledge, thinking skills /literacies, and abilities/dispositions. Using a “backwards design” (Wiggins & McTighe, 1998), group exercises were adopted and evolved to implement a more active learning approach and provide students the opportunity to apply knowledge in practical settings.

Table 1
York College’s Definition of a 100-level Course

| Knowledge | Thinking Skills/Literacies | Abilities/Dispositions |
|--|--|---|
| Foundational knowledge, “language,” and methodologies of discipline(s). Faculty guidance structures work and learning opportunities. | Knowledge is used as basis for introducing students to necessary skills for understanding how the discipline approaches thinking, including (and depending on the discipline): critical/analytical/quantitative and creative thinking, and the evaluation of the quality of information and connections to other disciplines and their perspectives. | Knowledge gained enables students to begin, develop and demonstrate college-level abilities and choices in areas appropriate to the discipline, such as communicating with a variety of audiences, working cooperatively and collaboratively, using technology in a more skillful manner, and applying knowledge beyond academia. |

LITERATURE REVIEW

While focused on STEM courses, Freeman et. al (2014)’s meta-analysis of undergraduate education supported the use of active learning processes as the preferred method within college settings. As compared to traditional passive techniques, lecturing being the primary method, active techniques have students performing activities while in class, such as worksheets, tutorials, or group problem-solving (Cavanagh, 2011; Freeman et. al, 2014; Biggs, 1999). Jardine et al. (2017) found group exercises to be an effective active learning method by putting students “at the center of learning”, while prompting them to collaboration, collective sensemaking and group inquiry.

EVOLUTION OF GROUP EXERCISES

Semester One

Approach: During this first semester, group exercises were conducted nearly every session. This resulted in overview and lecture (passive learning) for the first 20-25 minutes of each session, with group exercises comprising the remaining time. The group exercises were designed loosely based on scenarios outlined in the course text, with little

to no continuity from one exercise to the next. Groups were randomly formed at the time of class, changing each class session. Background was provided during the opening of the group exercise and was not provided ahead of time.

Feedback: Feedback from this first semester was gained from a mid-course focus group and end of course evaluation. The focus group was conducted half-way through the course by a third party to gain general feedback on the conduct of the course. Table 2 depicts the highlights from this focus group regarding group exercises. Students were asked three general, open-ended questions about the course, without specific focus on the group exercises. Twenty-seven percent of respondents indicated that Group Exercises were best helping their learning, no respondents indicated that Group Exercises were the greatest challenge to their learning, and eighteen-percent of respondents stated that more Group Exercises would help improve their learning.

Table 2
Results from Semester One Focus Group

| <i>Question</i> | <i>Number of Responses concerning Group Exercises</i> |
|---|--|
| What is best helping your learning? | 6 of 22 (27%) |
| What is the biggest challenge to your learning? | 0 of 7 (0%) |
| What will help improve your learning? | 2 of 11 (more group work) (18%) |

Students also completed a general, open-ended course evaluation. While specific questions on group exercises were not asked, students were allowed to write in comments on multiple questions. Table 3 depicts the results from this first semester course evaluation. Twenty-six percent of responses highlighted that Group Exercises were most valuable, and seven percent of responses highlighted Group Exercises on the question of course quality. Zero responses highlighted group exercises in response to aspects of the course found least favorable, or as areas in which the instructor could improve the course.

Table 3
Results from Semester One Course Evaluation

| <i>Question</i> | <i>Number of Responses concerning Group Exercises</i> |
|--|--|
| Which aspects of this course were found most valuable? | 6 of 23 (26%) |
| Please comment on the quality of this course. | 3 of 21 (7%) |
| Which aspects of this course were found least valuable? | 0 of 23 (0%) |
| How can the instructor improve the quality of this course? | 0 of 18 (0%) |

Semester Two

During this semester, this course was taught in two sections of 30 students each.

Approach: Group exercises were scheduled and conducted for the second meeting within each week. With this approach, the first day each week was dedicated primarily to a concept overview delivered in lecture, passive-learning approach. This enabled the second session each week to be dedicated to a Group Exercise, lasting 60 minutes. Students were oriented to this method on the first day of the course.

Ten group exercises were conducted throughout the course. Group exercises centered around a fictional narrative, created by the instructor. This narrative focused on a small business with a highly technological product. The narrative was designed to provide continuity throughout the course and the group exercises. Groups were formed at random, changing each class session. While some background was provided ahead of the group exercises, the majority of background material was provided at the time of the exercise.

Feedback: Students also completed a general, opened course evaluation, similar to the first semester. While specific questions on group exercises were not asked, students were allowed to write in comments on multiple questions. Table 4 depicts the results from these second semester course evaluations, from the two courses that were offered. Noting that there were more respondents overall for the second section of the course than the first (26 vs 18, respectively), there was also a greater number of overall comments, both positive and negative, regarding the Group Exercises; within section 2, 50% of respondents highlighted Group Exercises as most valuable, with 23% of respondents finding the Group Exercises least valuable. Seemingly, responses became more polarized, either thoroughly enjoying the group exercises, or not preferring them at all. Negative comments about the Group Exercises were in three areas: 1) a perception that group collaboration was uneven during these events, and 2) the fictional narrative was too complicated.

Table 4
Results from Semester Two Course Evaluations

| <i>Question</i> | <i>Number of Responses concerning Group Exercises</i> | |
|--|---|----------------|
| | Section 1 | Section 2 |
| Which aspects of this course were found most valuable? | 3 of 17 (18%) | 12 of 24 (50%) |
| Please comment on the quality of this course. | 4 of 17 (23%) | 1 of 26 (3%) |
| Which aspects of this course were found least valuable? | 4 of 17 (23%) | 6 of 26 (23%) |
| How can the instructor improve the quality of this course? | 3 of 14 (21%) | 0 of 26 (0%) |

Semester Three

At the time of writing, this third semester is in process. While the overall approach remained similar to the previous semester, several changes were implemented to address end of course evaluation feedback.

The first class day of each week is dedicated to providing a concept overview. Active learning measures, such as ‘interactive windows’ and cooperative learning in lectures (Cavanagh, 2011; Huxham, 2005) were incorporated in the form of “minigames”, to make these overview days more interactive.

The second class day of each week is dedicated to a specific group exercise, lasting approximately 60 minutes. Ten group exercises are scheduled for the course; these exercises build on each other, with a thread of continuity achieved through the fictional narrative. The fictional narrative has been rewritten to be less complicated and easier to understand; the narratives have been complemented with illustrations by the instructor to facilitate understanding of the respective problem at hand. Background material for each group exercise is provided several days ahead. Students were provided a rubric to guide their individual participation as part of the larger group; as part of this rubric, students were instructed that groups would not have “repeat briefers” or leaders.

Overall Observations Across the Three Semesters

While the third semester is ongoing, there are observations that can be shared from this evolution of the group exercises within this course. Many students do self-report benefit from learning material, then having the ability to apply it in a practical application. Some seem to move to collaboration quickly and naturally, while others have a “warm up”, and there may be those who prefer a more passive learning method, such as the conventional lecture. Many students appreciate the regularity of alternating overviews with the opportunities to apply the knowledge they have gained; however, some students express the need to vary the schedule and approach on occasion. Extended, one-way concept overviews, without some interactive activity at the end or in the middle, may be too passive for some students.

In terms of the content of group exercises, there seems to be a range in which a particular group exercise is a “just right” combination of the appropriate level of complexity and challenge. If group exercises fall below this range,

students seem to underestimate the relevance of the learning objectives. If group exercises exceed this range, students may become frustrated. Related, if a fictional narrative is unnecessarily complicated, students may become frustrated with “fighting the storyline” versus accomplishing the learning objective. While ensuring “backwards design” between the accompanying concept overview and the group exercise assists with this issue, determining the borders of the appropriate level of group exercise complexity and challenge may be an area for further study.

Standardization of Group Exercises, to include standing groups and “no repeat briefers”, seems to enhance the efficiency of this time spent in class. Students know what to expect and where to find information. From these foundations, they seem to quickly build upon their knowledge and make improvements in their collaborative learning process, to include inter-group collaboration and presentation skills. These standing processes may contribute to increased ability to address more complex problems as the course continues.

Future Study Plan

As this course is programmed for a fourth semester, study will continue throughout this semester and next, with the intent of expanding these generalized observations to formal research findings. In addition to open-ended course evaluations, data will be collected and analyzed from specific student surveys and focus groups. Table 6 lists several questions from the individual student survey. Specific focus will be given to measuring how respondents felt group exercises helped them enjoy, understand and apply the course material.

Table 6
Sample Questions from Student Survey

| | |
|--|---|
| The Group Exercises helped me <i>enjoy</i> the course material. | Strongly agree (a) to Strongly disagree (e) |
| The Group Exercises helped me <i>understand</i> the course material. | Strongly agree (a) to Strongly disagree (e) |
| The Group Exercises helped me <i>apply</i> the course material. | Strongly agree (a) to Strongly disagree (e) |

Through past observations and future research, this study seeks to make contributions on the overall efficacy of group exercises, the specific contribution of group exercises within an introductory higher-level course, and the role of fictional narrative in student fulfillment and learning.

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EVOLUTION OF THE YOU DRIVE: AN ACTIVE-LEARNING APPROACH IN UNDERGRADUATE OPERATIONS MANAGEMENT AND DATA ANALYTICS COURSES

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ABSTRACT

This paper describes the implementation of the YOU DRIVE approach, designed to increase the active learning of college students in operations management and data analysis courses. After watching the professor perform a concept and approach, students work on a problem during class, under observation from each other and the professor. This approach allows students to immediately gain feedback, make mistakes, learn from each other, and apply concepts after seeing them. This approach also enables the professor to learn individual students more personally, to include understanding individual strengths and weaknesses with the respective course material. This paper describes the ongoing evolution of the YOU DRIVE approach over three semesters and two different courses. This paper will include observations gained over three semesters, the latter of which is in progress. This paper will also describe changes and improvements based on the various feedback, and will outline a plan for future research.

INTRODUCTION

The YOU DRIVE approach described in this paper was developed and implemented by the author, a new professor, in teaching Operations Management and Data Driven Decision-Making (Statistics I) during his first three semesters at York College of Pennsylvania. The YOU DRIVE approach was adopted and evolved to implement a more active learning approach that provides earlier assessment of students' comprehension and ability to apply concepts. The approach was named from the analogy of teaching one how to drive a car. Under this approach, after the student first watches the instructor "drive the car", i.e., perform math-oriented problems, the student "drives the car" by performing a like problem on their own, under the supervision of the instructor. The approach is referred to as YOU DRIVE by the instructor and students, both to reinforce the analogy of active and applied learning, as well as to stimulate student interest, excitement and motivation.

As students work a problem set during a YOU DRIVE session, they are encouraged for their effort to solve the problem, not necessarily their ability to get the correct answer. They can work together or by themselves, and use notes, internet and other resources. They interact with the instructor during the problem set to seek clarification, get "unstuck", recognize their mistakes and gain validation that they can apply the concepts correctly. Students who finish the YOU DRIVE quickly and are validated by the instructor are still expected to stay in class to gain participation credit, as they will participate in a class discussion on challenges encountered and lessons learned during the YOU DRIVE. Ideally, each student leaves the YOU DRIVE exercise with at least hands-on 'repetition' applying a given concept.

LITERATURE REVIEW

Focused on STEM courses, Freeman et. al (2014)'s metaanalysis of undergraduate education highly supported the use of active learning processes as the preferred method within college settings. As compared to traditional passive techniques, lecturing being the primary method, active techniques have students performing activities while in class, such as worksheets, tutorials, or group problem-solving (Cavanagh, 2011; Freeman et. al, 2014; Biggs, 1999, Huxham, 2005).

THE EVOLUTION OF THE YOU DRIVE METHOD

Semester One

During this first semester, Operations Management was taught in two courses, both in a twice per week format, at 75 minutes per session. Each session was predominantly taught in a lecture style format, with the instructor performing problems on the whiteboard and eliciting participation from students along the way. Students were assigned 200 points of homework on-line, which they performed largely at their own pace, towards established deadlines. This homework, graded by the on-line system, served as the primary means of assessment outside of exams.

Students were given one in-class, non-graded quiz early in the semester, and towards the end of the example, were asked to perform two separate in-class problems, not for a grade, but to assess understanding.

Feedback from this first semester was gained from an end of course evaluation. While specific questions on group exercises were not asked, students were allowed to write in comments on multiple questions. While the majority of comments did not criticize the use of lecture and reliance on homework as the primary means of learning in the course, two write-in comments stood out in response to the question: "How can the course be improved?" One student responded, *"More in class practice problems. I can watch you do it and follow along a hundred times, but I won't learn until I do it."* Another student responded, *"Have more student involvement in class."* Additionally, the instructor observed that passive-learning in operations management was not very effective, nor was on-line homework as a primary means of assessment. These observations led the development and implementation of the YOU DRIVE method.

Semester Two

During this semester, this course was taught in one section of 13 students. This course was delivered as a night class, meeting once per week for a duration of 165 minutes. YOU DRIVE exercises were introduced at the beginning in the course, outlined in the course syllabus and discussed on the first day of class. Meant to be a core portion of a student's class interaction and participation grade, students were able to earn 30 points for their effort during these exercises, from a total of 600 points for the course.

YOU DRIVE exercises were scheduled and conducted for the second hour of each class session. With this approach, the first hour of each class period was dedicated to a concept overview delivered in lecture; this was primarily a passive-learning approach with the instructor eliciting student participation through question and answer. The remainder of the class was dedicated to the YOU DRIVE exercise, with students choosing to work together or individually. Each class would conclude with group discussion on what challenges they collectively encountered during the YOU DRIVE, and what errors were made or avoided.

Eleven YOU DRIVE exercises were conducted throughout the course. While on-line homework was still assigned, it was valued at 50 points for the course. To provide context to the YOU DRIVE exercises and continuity throughout the course, these problems involved a fictional narrative, created by the instructor. This narrative focused on a small business with a highly technological product.

Semester Three

At the time of writing, this third semester is in progress. For this semester, the YOU DRIVE method is implemented in three courses: two sections of Operations Management and one section of Data Driven Decision Making, an introductory statistics course taught in a business setting. While the Operations Management courses are taught twice per week, with each session lasting 75 minutes, the Data Driven Decision Making course is a night class, meeting once per week for 165 minutes. Students across the three courses totaled 68, with the distribution being 26 in an Operations Management section, 18 in another Operations Management section, and 24 in the Data Driven Decision Making section.

Several changes were implemented to improve the efficacy of YOU DRIVES as an active learning method and leading means of assessment. For the Operations Management courses taught twice per week, a lecture-style overview is provided the first day of the week, with homework assigned afterward. The YOU DRIVE is a scheduled event for the second day of the week, consisting of a problem set on the concepts just covered. For the Data Driven Decision course taught once per week, the YOU DRIVE follows the second semester model: the first hour of class is dedicated to concept overview, with the remainder of time dedicated to the YOU DRIVE exercise. Eleven YOU DRIVES are scheduled for both courses. The YOU DRIVE fictional narratives have been complemented with illustrations by the instructor to facilitate understanding of the respective problem at hand. For all courses, the homework point totals were increased from 50 to 150 points, and YOU DRIVE class interaction and participation points were increased from 30 to 65 points to emphasize the significance of these exercises. Students were briefed on YOU DRIVE interaction and participation expectations on the first day of class, as well as provided details within the course syllabus.

During class sessions dedicated to preparing for upcoming exams, the instructor constrained the conventional YOU DRIVE rules of engagement somewhat, encouraging students to work problems by themselves and with less resources. To extend the analogy further and promote student independence in retaining knowledge beyond the YOU DRIVE,

the instructor has published “SOLODRIVES”, problems sets with solutions that students can perform on their own that are not a graded or turn-in requirement.

OVERALL OBSERVATIONS ACROSS THE THREE SEMESTERS

While the third semester is ongoing, there are observations that can be shared from this evolution of the group exercises within this course. Anecdotally, several students have reported enjoying the hands-on opportunity the YOU DRIVE provides, and the confidence they gain as a result. This seems most pronounced with highly technical problems, such as those involving spreadsheet modelling. The YOU DRIVE forces most students to ask questions, which they otherwise would not ask in a group setting; with these questions comes the opportunity to understand how to actually perform the required work. Moreover, students seem to enjoy these sessions from the perception they “gain” something from them.

Although there may be a few students who purposely do not attend the YOU DRIVE sessions, the preponderance of students apply themselves during the YOU DRIVE, and are not distracted by “non-YOU DRIVE work”, such as homework or projects for another class, social media, etc.. Instructors implementing a YOU DRIVE approach may benefit from anticipating which students may not elicit validation, but instead sit passively upon completing work, or not attempt the work at all. Similarly, instructors will want to consider that those students who ask questions during YOU DRIVE exercises may not be the ones who need the most assistance, and have a rough plan circulate among students equally. Moving among 26 students during a YOU DRIVE is challenging; knowing students individually may help lessen this challenge.

It seems that students enjoy the YOU DRIVE session, both due to the ability to perform work, and for the engagement of peer collaboration. While an unintended outcome, some students “bond together” through the YOU DRIVE exercise and potentially develop relationships that go beyond the classroom; this may further contribute to students’ future application of the knowledge they have gained.

In contrast, getting students to share lessons learned at the end of YOU DRIVES continues to be a challenge. Students seem either hesitant to disclose a particular error they may during the YOU DRIVE, or may not have awareness of the error itself. Both reasons potentially compromise the learning process. While student disclosure is the most valuable, the instructor has mitigated the lack of shared student observations by providing his own at the end of each session, gained through circulating among students during the YOU DRIVE.

Similarly, the YOU DRIVE method has enabled the instructor to interact with each individual student much earlier, thus gaining insight to student strengths and weaknesses much earlier in the course and prior to the first course exam. As a means of post-exam follow up, the YOU DRIVE provides the instructor the opportunity to spend more one-on-one time with students who are having difficulty, and to challenge those who can quickly grasp the material.

Finally, the YOU DRIVES serve as a series of “mini-test” conditions; by the time the student encounters the exam, most are familiar to how the exam will feel, and are comfortable previously working problems within the same environment. Granted, there are a greater quantity and diversity of problems on an exam than most individual YOU DRIVES (with the exception of pre-exam YOU DRIVES), but the YOU DRIVES seem to promote certain desirable student habits.

FUTURE STUDY PLAN

This study will continue throughout this semester and next, with the intent of expanding these generalized observations to formal research findings. In addition to open-ended course evaluations, data will be collected and analyzed from specific student surveys and focus groups. Table 1 lists several questions from the individual student survey. Specific focus will be given to measuring how respondents felt group exercises helped them enjoy, understand and apply the course material.

Table 1, Sample Questions from Student Survey

| | |
|---|---|
| The YOU DRIVES helped me <i>enjoy</i> the course material. | Strongly agree (a) to Strongly disagree (e) |
| The YOU DRIVES helped me <i>understand</i> the course material. | Strongly agree (a) to Strongly disagree (e) |
| The YOU DRIVES helped me <i>apply</i> the course material. | Strongly agree (a) to Strongly disagree (e) |

Through past observations and future research, this study seeks to make contributions on the overall efficacy of the YOU DRIVE as an active-learning method, the specific contribution of the YOU DRIVE method within undergraduate Operations Management and Introductory Statistics courses, and the role of fictional narrative in student fulfillment and learning.

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ALIGNMENT OF CORE VALUES FOR HIGHER PERFORMING ORGANIZATIONS

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ABSTRACT

This article will provide leaders of organizations with a practical understanding of how a strategic and pro-active approach to recruiting, hiring and developing human resources whose values are aligned with the core values espoused by the leaders of organization will inspire and motivate employees to higher levels of performance. The literature from the disciplines of leadership, corporate culture, and human resources management reviewed for the study support the position that creating mutually beneficial career opportunities where core values of leaders and their human resources are aligned leads organizations to higher levels of performance. The literature reviewed for this paper supports the correlation between organizational commitment to intellectual capital and high-performing loyal internal customers.

CORE VALUES AND PURPOSE

According to Cafferky (2010) there is a fundamental paradox between a leader's responsibility to take his or her organization to highest possible levels of performance and simultaneously to care for the needs and professional development of human resources. According to Van Duzer (2010) there is an added cost to ensuring that human resources are inspired, motivated and positioned within their organization to best utilize their unique skill sets for the good of the community and their organization. Mesdaghinia (2019) explains that leaders should be strategic and pro-active about their investment in recruiting, hiring, training and retaining valuable human resources, underscoring the importance of leaders clearly communicating their vision and values to human resources.

Martinez (2010) proposes that human capital is an organizational asset and that when a priority is placed upon fully leveraging human capital, an organization can create separation from competitors. Creating mutually beneficial career opportunities will result in inspired human capital, an organizational asset that leads to higher performing organizations (Martinez 2010). When inconsistencies exist between the communicated vision of the leader and an employee's actual observed leadership actions, there is a negative impact on motivation and job performance (Byza, 2019). The positive impact human capital has on organizational performance according to Martinez (2010) is dependent upon the leader's sincere belief and clear communication that human capital is a firm's greatest asset and a potential source of sustainable competitive advantage.

According to Ortega-Parra (2013) there is a connection between core values of a firm and employee commitment to leadership vision. Strategic and pro-active human resources practices positively impact an employees' perception of organizational values. Leaders who adhere to the mindset that caring for employee's needs and professional development before grasping for increased revenue is an expression of wisdom (Mea, 2019).

According to Fox (2013) when human resources professionals refer to their employees as "internal customers", they are exhibiting evidence of a healthy core culture, one with core values that demonstrate a sincere believe that internal customers are a most valuable corporate asset. Core values that define an organization are formed over long periods of time and are a result of organizational experiences that cannot be pre-planned (Lin, 2012). Core values, if they truly are core values of a firm or an individual are deeply embedded and thus highly resistant to change (Levine, 2012).

A MUTUALLY BENEFICIAL CAREER

Employees have a need to perceive a high-degree of corporate-level leadership integrity before they will wholeheartedly support the leadership vision (Prottas, 2013). According to Ortega-Parra (2013) a new paradigm in the field of human resources management involves directing new policies and practices toward internal customers. Brieger (2019) suggests that such policies should be designed to enhance a firms' ability to acquire and retain human resources that represent the greatest future value to the firm.

According to Watkins (2012) firms should match prospective employees with their culture before making hiring decisions. Employees should do the same evaluation before accepting a position, a thorough investigation of a prospective employer is critical (Koole, 2010).

Leadership's view of intellectual capital and the ethical standards that leadership espouses and lives out in practice must be clearly understood before making a career decision (Neubert, 2016). According to Watts (2012) the integrity of the leaders of an organization is directly related to the clear communication of vision and mission and the authenticity with which the leaders carry out what they communicate.

OBSERVABLE CULTURE

According to Knight (2018) leadership must clearly communicate a sincere desire to leverage intellectual capital through a strategic and pro-active approach to recruiting, hiring, training and retaining human resources. Johnson (2007) advocates that leaders view their business activities as opportunities and that caring for the personal and professional needs of employees will lead to a collective increase in loyalty. Rundle (2011) advocates that when leaders take a more holistic approach and give back to community and invest in human capital ultimately the firm benefit from increased levels of commitment.

Prospective internal customers must perceive the firm to be sincerely interested in on-going professional development of intellectual capital. According to Kavida (2009) leadership philosophy impacts corporate culture and corporate communications give insight into whether or not leaders are customer-driven and whether or not they are employee-driven.

According to Schermerhorn (2014) leaders must ensure that prospective internal customers become astute at analyzing the observable culture of the firm. Mesdaghinia (2018) suggests that looking at the firm from an outsider perspective enables the prospective employee to construct a view of the values and philosophies the firms' leaders espouse. From the outside looking in a prospective employee should be able to gain an accurate understanding of whether or not the prospective employers' value system is in alignment with their own.

According to Lin (2013) leadership must be sincere as well as strategic about leveraging their valuable human resources as a unique source of competitive advantage. A prospective employee must be certain that his or her employment with a firm will be mutually beneficial and will not lead to conflicting values or ethical dilemmas. According to Robbins (2014) there is no certainty that the observable culture will reflect the core culture, the true personality of the firm. The observable culture will however yield subtle insight into whether leaders are employee-driven and customer-driven in their philosophy. The prospective employee should be able determine if the leaders of the prospective firm take a strategic and pro-active approach to recruiting and hiring the best and the brightest and determine if leadership trains and continually invests in the professional development of human resources (Byza, 2019).

According to Koole (2010), a firms' intellectual capital can be a source of sustainable competitive advantage when leadership views human resources as a unique and valuable asset. Symbolic Leadership theory according to Schermerhorn (2014) proposes that no leader alone can take an organization to its highest levels of performance. Only when human resources are inspired, motivated, and empowered can organizations maximize performance. Path Goal Theory (Schermerhorn, 2014) proposes the symbolic leader rather than working side-by-side front-line employees, is more concerned with clearly communicating vision and providing intellectual capital with the resources and decision-making power necessary to deliver the customer-keeping vision of the firm.

Kolfschoten (2012) agrees that intellectual capital can be leveraged as a source of sustainable competitive advantage only when human resources are inspired, motivated, and empowered and further establishes that this is only possible when organizations are structured in a contemporary fashion. Traditional hierarchical structures typically centralize power at the top and are slow to adapt to market changes. According to Naidenova (2012) relational leaders must clearly communicate a customer-keeping vision dependent upon the firms' human resources delivering that customer-keeping vision. Organizations must be flatter with a decentralization of power, adaptive, flexible, and responsive to ever-changing customer needs (Brieger, 2019).

THE COST OF COMPROMISE

Schneider (2011) advocates trust in the employer/employee relationship to be the essential ingredient necessary for the leader's vision to become inspiring. When convictions are compromised, the outcome is something less than excellence. Sampath (2019) discusses that compromise leads to corruption and cultural distance.

According to Newstrom (2014) leaders do not enter organizations with a plan or propensity to sin by making unethical or irresponsible business decisions. Irresponsible business decisions are a result of short-term profit pressure on leaders and a slow process of compromise and desensitization. According to Dess (2017) organizations are short-term competitively disadvantaged when their decisions are responsible because it costs more to ensure quality, safety, and the brand image of the organization.

According to Wong (2011) when leaders operate their businesses for the common good, for the good of the community and for the personal welfare of their employees. The investment has long-term positive impact on both employee and customer loyalty. Compromise at a minimum reduces our effectiveness and is indeed the pathway to organizational mediocrity (Dose, 2012). Responsible decisions are an investment and with time create customer loyalty, enhanced brand image, and premium profit margins (Cosans, 2019).

The long-term consequences of compromise are severe. According to Watts (2012) when values are compromised, dissonance, a disquiet in our soul occurs. The more consistently one compromises their values, the easier it gets. It is a slow and dangerous process of desensitization according to Watts (2012). According to Hansen (2010) new employees find it difficult to address unethical workplace behavior for risk of losing their job. Prospective employees may downplay a values conflict because of the over-arching need to find employment (Baird, 2019).

RESPONSIBLE ORGANIZATIONS

Chick-Fil-e out of Atlanta Ga. is an example of a firm that embodies the customer-driven and employee-driven philosophies that ensure a mutually beneficial employee/employer relationship. "We're always searching for new people, those willing to share their creative suggestions and innovative solutions to meet the challenges we face. One thing you won't hear much of at Chick-Fil-e is that old creativity squelcher, we've never done it that way before".

According to Schermerhorn (2011) an organization can only reach highest levels of performance when intellectual capital is leveraged and when diversity is seen as a source of sustainable competitive advantage. "At Chick-Fil-e, diversity is a corporate asset" (Chick-Fil-e.com). The firm is strategic and pro-active about their recruiting and hiring processes and about leveraging a diverse workforce as a source of sustainable competitive advantage.

According to Robbins (2014) leveraging intellectual capital is possible in organizations only where contemporary structures have been implemented, those that give a voice to front-line employees. Chick-Fil-e regularly visits college campuses seeking the best and the brightest and the firm recruits degreed college graduates from top-tier universities into an accelerated management development program. "Chick-Fil-e is made up of individuals who are energized by solving a broad range of problems with innovative enthusiasm.

Peet's Coffee headquartered in Emeryville, California, has published a values statement that says; "Our people are the key to our success. Therefore, we strive to foster a culture that inspires people to unleash their unique, personal passion and expertise toward achieving our vision and mission. This culture is grounded in four common values; Mastery, Curiosity, Responsibility, and Prosperity" (Peet's.com). The values espoused by Peet's leadership are meant to foster an environment that inspires and motivates employees. Empowerment is implicit in the values statement and leadership sincerely encourages employees to unleash their unique talents.

Peet's leadership is pro-active and strategic about the four functions of human resources management; recruiting, hiring, training, and retaining as evidenced by the following quote; "After 40 years of brewing, we've learned that the secret to great coffee is the people who make it. So we apply the same care in selecting and preparing our staff as we do when creating the perfect cup" (Peet's.com).

According to Mundra (2008) if leaders take care to analyze the observable culture of a prospective employer, once inside the company the core culture should be confirmed as consistent with the observable culture. The leaders of the Peet's and of McMaster-Carr Supply Company have been pro-active and strategic about the training and retaining functions of human resources management. Cross-training and continued professional development are embedded into their management development programs.

PRACTICAL APPLICATION IN HUMAN RESOURCES MANAGEMENT

According to Long (2013) customer-centric philosophy no longer refers to simply supporting external customers, but to building loyalty from the inside out. Iszatt-White (2019) suggest that integrating new-paradigm human resources practices with internal customers requires a partnership with dialogue and multiple touch point opportunities. Kalshoven (2013) is careful to point out that a customer-centric strategy requires organizational fit, a full and complete buy-in to the employee-driven philosophy from the highest levels of the leadership of the firm. According to Long (2013) human resource practitioners are the change agents of firms, responsible for creation of rewarding and mutually beneficial careers.

According to Levine (2012) leaders in most every industry fail to recognize a valuable asset, a potential source of sustainable competitive advantage, the firm's intellectual capital. Leadership must clearly communicate a vision and long-term objectives as the basis for new-paradigm human resources practices. Prospective employees should be inspired and motivated to rally around the leader's vision (Knight, 2018).

SENSITIVITY IN LEADING

Leadership's vision and values should reveal a customer-driven mindset, a demonstration of their understanding of the need to inspire and motivate employees (Cosans, 2018). Leaders must be certain that employees know they are a valuable asset, a potential source of sustainable competitive advantage, not simply a general and administrative overhead cost. According to Banutu (2013) the pursuit of the leaders' vision is in vain when new employees are hired to fill a slot and considered as a general and administrative expense.

According to Robbins (2014) mission statements often espouse maximizing profits and maximizing shareholder value with little indication of leadership's belief in leveraging intellectual capital in order to anticipate the future needs of best and most valuable customers. There should be evidence in the company's published mission and value statements of the importance of human resources and of creating delighted customers (Neubert, 2016).

Prospective internal customers must validate leadership's position that customers are delighted only when front-line human resources have the power and motivation to do whatever it takes to meet individualized customer needs (Peppers and Rogers, 2018). The leadership team must have a pro-active and strategic view of the four functions of human resources management (recruiting, hiring, training, and retaining). The pro-active firm seeking the best and brightest employees should visit local campuses, recruit interns, and employ management development candidates. The research of a prospective employee should demonstrate whether or not leadership is in search of the best and the brightest and prepared to retain those most valuable internal customers.

CONCLUSIONS

Van Duzer (2010) advocates that when leadership places a high importance on leveraging human capital, it is possible to lead organizations to high performance levels without compromising a care and concern for human resources. Iszatt-White (2019) underscores the importance of sincere, reverent and authentic sharing of leadership vision to inspire and motivate a firms' intellectual capital.

According to Watts (2012) mutually beneficial job fit occurs when leaders facilitate an alignment of organizational goals with the recruiting, hiring, and training of employees. According to Peppers and Rogers (2018) employees as well as customers have different current and future value to a firm. Over time and through responsible performance, internal customers should be able to differentiate themselves from other employees and reap the professional development benefits of stellar job performance. According to Lin (2012) prospective employees have a heightened sensitivity to what leadership espouses as being sincere or not.

According to Yukl (2010) high performance is directly linked to job fit, empowerment, and progressive career opportunities within a firm. Leaders must take the necessary time to validate the alignment of core values of the organization with those of the employees of the firm. This investment should ultimately lead to a mutually beneficial relationship Brieger, (2019).

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INDUSTRY 4.0: NEW CHALLENGES FOR SKILLS AND COMPETENCES OF YOUNG STUDENTS AND GRADUATES

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ABSTRACT

Human being is just an entity, when accompanied by knowledge, skills and competences, further transforms into a resource acting as an asset for the industry, leading to human capital. But requirement for skills and competences keeps on changing with dynamic and rapid advancements in technology. This research paper determines skills and competence requirement for the era of future industrial revolution 'Industry 4.0'.

(1) Purpose and Potential Impact: The main objective of this paper is to investigate the changes in requirements for the skills and competences in the context of Industry 4.0 and provide a model for the graduates to develop the required skills and competences in a strategically optimized way to retain their jobs in changing working environment. Technology can indeed be a significant enabler for achieving competences in the technology driven world. There is a need to look beyond the phrase, Information and Communication Technology and use the term technology more holistically. For this to happen, substantial investment will need to be made across infrastructure, teaching, education, and content and curriculum. It is necessary for technology to be incorporated into curriculum delivery and teacher capacity building.

(2) Design/ Methodology / Approach: The research draws on literature review of 11 relevant literatures and subjective opinion gathering from 302 first year engineering students of an Institution of National importance in the field of engineering in India, and the skills and competences are broadly categorized into Technical, Social, Personal and Practical and their preference orders are decided accordingly for the era of Industry 4.0 using Friedman test and Chi-square tests.

(3) Findings/Specific Results Described: The study is conclusive about Technical and Practical skills being more preferred as it endorses Continuous Learning, Interdisciplinary Knowledge, Critical Thinking and Decision Making as the most preferred competences for young graduates to prepare themselves against the challenges coming up due to Industry 4.0 but the social and personal skill-set also need to be developed to have a better humane approach for future.

(4) Originality/value: This study is one of the few emerging researches considering Industry 4.0 in the Indian context. As a result, the research provides useful new insights for researchers, teachers and industrialists to enhance existing and embed new skill-set according to and in pursuit of existence of human work-force in the era of Industry 4.

INTRODUCTION

Initially a human being is just an entity, when accompanied by knowledge and skills, that entity becomes a human resource, further when that human resource becomes an asset for the industry, it leads to human capital. Endorsing the 'smart factory,' the Industry 4.0 movement emphasizes the interconnectivity of objects and people through advances in computer engineering. Industry 4.0 is a coordinated push for automation in Smart Factories and other Cyber-Physical Systems (CPS) making use of machine learning, embedded systems, artificial intelligence and many more. Industry 4.0 can be regarded as a change of paradigm, which has the main intention to enforce digitalization, networking and virtualization in the companies in all areas (Spöttl, 2017). Industry 4.0 introduces what has been called the "smart factory," in which cyber-physical systems monitor the physical processes of the factory and make decentralized decisions. The physical systems become Internet of Things, communicating and cooperating both with each other and with humans in real time via the wireless web (Forbes, 2016). Hence, only those who proactively align their skillset to match the fast-changing changing industry demands will succeed in transitioning into the 'future workforce'. The need for out of the box thinking, something new, and something innovative and unique has been the unanimous hunt for employers since ages. The ever-increasing competition and the ever-enlarging pool of talent has brought a change in the competence demand for the employees and has been forcing the new students and graduates to develop and show some special skill which overshadows others and hence to enhance their visibility as employable.

The 'World Economic Forum' says that the change will depend on the type of industry, for example, Global media and entertainment, has already seen a great deal of change in the past five years. Computers are reshaping the labor market in many ways, including direct substitution for labor, disruption in the way work is conducted as the workforce is getting changed, increased competition and reduced costs to consumers – but they will likewise decrease the salary of laborers and employments with low levels of social association, innovativeness, flexibility, mobility and skill are particularly vulnerable (Oliver, 2015). It is widely thought that the debate surrounding graduate skills has become more fine-grained over time (Green, Hammer & Star, 2009), and different stakeholders are being asked to detail the skills and other attributes that make graduates more employable (Velasco, 2012), particularly in case of Industry 4.0.

Although there is a hub of talent in all the parts of the world but that talent needs to be refined, reshaped and reframed in order to make it compatible according to the fast, technological advancements. 'Success' in the graduate labor market is typically defined as graduates securing employment in jobs which make appropriate use of the skills and knowledge developed in the course of their university studies. Computers are reshaping the labor market in many ways, including direct substitution for labor, disruption in the way work is conducted as the workforce is getting changed, increased competition and reduced costs to consumers – but they will likewise decrease the salary of laborers and employments with low levels of social association, innovativeness, flexibility, mobility and skill are particularly vulnerable. In such a case, the young students and graduates need to ensure that they have the skills and competences in accordance with the dynamically advancing world.

NEEDED: UPSKILLING OF WORKFORCE

India has low vocational training capacity and low percentage of formally skilled workers

Vocational training capacity as a percentage of total workforce

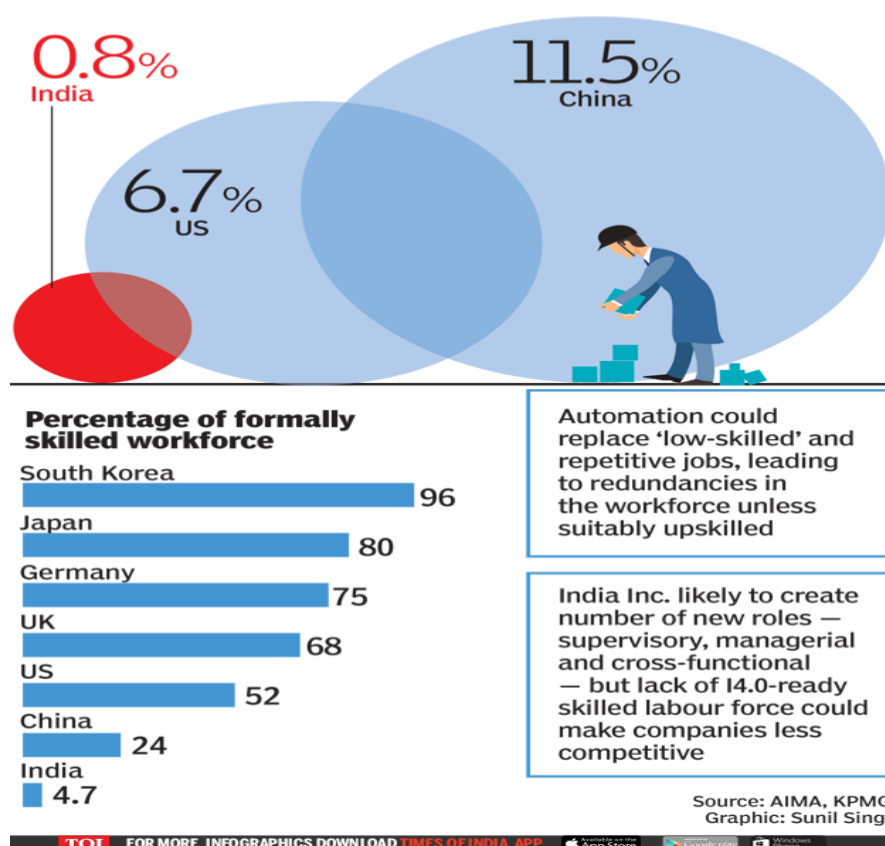


Fig 1: Upskilling of labor

In the last decades our society has changed from an industrial to an information society, thanks to information and communication technology. Now a major characteristic for the new demands of competences on individuals is the

need of being able to learn quickly and self-organize the core content of specific knowledge fields while managing and mastering the vast amount of information, and the influence of technology on life in general. In addition, current challenges in work life not only demand domain knowledge, but also require abilities to successfully communicate and collaborate, to make appropriate decisions and to solve problems.

Companies, industrial organizations, policy makers, and universities all over the world are considering advanced and flexible productions systems for the future as a way forward to Industry 4.0. Talking about the digital revolution which has changed the conventional styles of doing almost everything has been one of the key factors which has threatened the low skilled employees and increased the threshold for the new employees in terms of skill-set and knowledge. The era we are currently living in has to use the digitalization not only as a new way to teach and learn but also as a badly needed necessity because of the ever-growing need of information and to some extent, self-learning to have the job security against the automation process prevailing in the current times.

LITERATURE REVIEW

Industry 4.0: What It Is All About

First came steam and the first machines that mechanized some of the work our ancestors did. Next was electricity, the assembly line and the birth of mass production. The third era of industry came about with the advent of computers and the beginnings of automation, when robots and machines began to replace human workers on those assembly lines. And now we enter Industry 4.0, in which computers and automation will come together in an entirely new way, with robotics connected remotely to computer systems equipped with machine learning algorithms that can learn and control the robotics with very little input from human operators (Forbes, 2016). Industry 4.0 is a name given to the current trend of automation and data exchange in manufacturing technologies. It includes cyber-physical systems, the Internet of things, cloud computing and cognitive computing. Industry 4.0 is commonly referred to as the fourth industrial revolution.

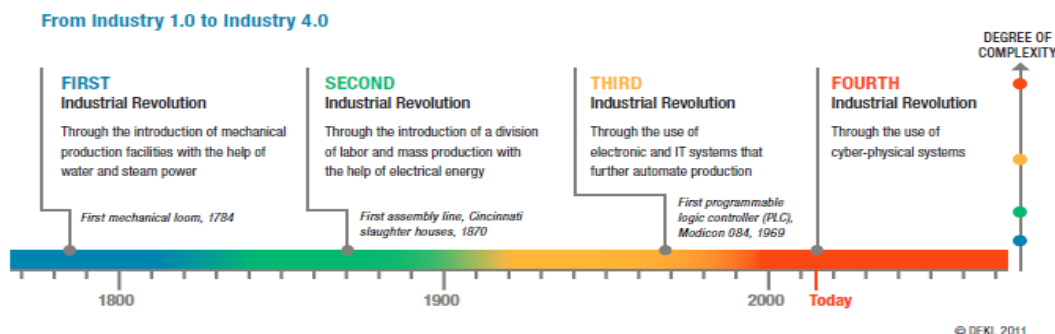


Fig 2. Evolution of Industrial Revolution

The term cyber-physical systems (CPS) refers to a new generation of systems with integrated computational and physical capabilities that can interact with humans through many new modalities (Baheti & Gill, 2011). In cyber-physical systems, physical and software components are deeply intertwined, each operating on different spatial and temporal scales, exhibiting multiple and distinct behavioral modalities, and interacting with each other in a lot of ways that change with context ("US National Science Foundation, Cyber-Physical Systems (CPS)). CPS involves trans-disciplinary approaches, merging theory of cybernetics, mechatronics, and design and process science. The process control is often referred to as embedded systems (Wikipedia, 2019). Industry 4.0, in its very construct, envisages that both hardware and software will work hand in hand, stitched together seamlessly and powered by analytics.

Industry 4.0 is the least understood 'buzzword'. While industry leaders want to jump onto this bandwagon due to high expectations of gains in terms of differentiation, competitiveness and productivity, hardly anyone understands the investments involved or the preparations required to adopt IoT. Generally, there seems to be an increased drive towards automation and computerization, which is Industry 3.0, amongst the bigger players (INDUSTRY 4.0 AND IIOT: IS INDIA READY, 2017).

KEY ELEMENTS AND FRAMEWORK OF INDUSTRY 4.0

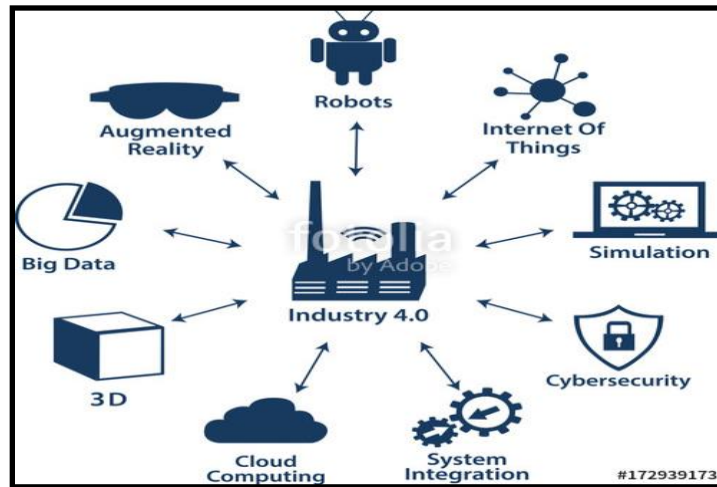


Fig 3. Framework of Industry 4.0

The above figure shows the collaboration of different tools and techniques required for the mechanism of Industry 4.0. The vertical integration of various components inside a factory to implement a flexible and reconfigurable manufacturing system, i.e., smart factory, is one of the key features of Industry 4.0. The autonomous decision and distributed cooperation between agents lead to high flexibility. Moreover, this kind of self-organized system leverages the feedback and coordination by the central coordinator in order to achieve high efficiency (Wang, Wan, Zhang & Zhang, 2016). The Cyber Physical Systems can arm the Multi Agent System (Tao, Zuo, Da Xu & Zhang, 2014) with the emerging technologies (e.g., Internet of Things (IoT), wireless sensor networks (WSN), big data, cloud computing, embedded systems, and mobile Internet) (give proper citation for each factor listed). Consequently, a strategic initiative called “Industrie 4.0” (Industry 4.0) has been proposed and adopted by the German government as part of the “High-Tech Strategy 2020 Action Plan”. Similar strategies have also been proposed by other main industrial countries, e.g., “Industrial Internet” (Industry IoT in Action, 2019) by USA and “Internet +” (Internet Plus, 2019) by China. The Industry 4.0 describes a CPS oriented production system (Riedl, Zipper, Meier & Diedrich, 2014; Henning, 2013; The Industrial Internet Consortium, 2014) that integrates production facilities, warehousing systems, logistics, and even social requirements to establish the global value creation networks (Frazzon, Hartmann, Makuschewitz & Scholz-Reiter, 2013). The core of distributed automation systems is essentially the reliable exchange of information. The new technologies, Ethernet, wireless networks, or web technologies, created new opportunities for making information exchange more comprehensive. Consequently, automation systems could grow more complex, too. The latest trends influencing automation technology are the IoT, CPS, and the emerging tactile Internet (Wollschlaeger, Sauter & Jasperneite, 2017). Recently, however, they are penetrating industrial automation and changing the angles from which people look at automation systems (Colombo, Karnouskos, Shi, Yin & Kaynak, 2016; Trappey, Trappey, Govindarajan, Sun & Chuang, 2016). Moreover, they support recent trends, such as achieving a higher degree of interconnection, cognitive automation, and shifting information collection and processing into cloud-based applications (Weinman, 2016; Georgakopoulos, Jayaraman, Fazia, Villari & Ranjan, 2016; Chenaru, Stanciu, Popescu, Sima, Florea & Dobrescu, 2015).

Threats to Employment

The technological foundations of Industry 4.0 such as general connectivity, the internet, sensors, actors and “intelligent” CPS have resulted in a massive push for efficiency and a reduction of costs for products. Moreover, with the extensively increasing expectations and demands of customers demanding more of customized products have forced the industries to put forward the smart production systems to have sufficient flexibility and capacity resulting in loss of the less skilled processes and increasing the threshold for the more skilled ones (UK Digital Skills Taskforce, 2014). According to the World Economic Forum, over one-third of skills (35%) that are considered important in today’s workforce will have changed after five years from now. We are living in an era where working operations have started getting automated, resulting in the loss of jobs of those doing the same operations previously, hence for

the job security, there has to be job specific skills and competences in the employees. Some suggest that the safeguard is that everyone should learn to code a computer, while others suggest that we need more nuanced literacies as either digital citizens who use the internet, process simple word documents and find information online; digital workers who can use more sophisticated tools directly related to a particular occupation; or digital makers who can build digital technology (UK Digital Skills Taskforce, 2014). Production systems will be able to direct and optimize themselves fairly autonomously with little human intervention, leveraging to a large extent on a seamless interconnectivity and huge amounts of available information data (Bauernhansl, Hompel & Vogel-Heuser, 2014; Hirsch-Kreinsen, 2014). The main findings indicate that Industry 4.0 would lead to a substantial decrease in standardized low-skill and an increase in high-skill activities, embracing planning, control and IT-related tasks (Bonekamp & Sure, 2015). It is possible that in the near future such systems may imply huge impacts on both labor content and work organization and may change the way the human factor is taking part and adding value in many industrial value chains (Bauernhansl, Hompel & Vogel-Heuser, 2014; Hirsch-Kreinsen, 2014). This may not only have consequences for low-skilled workers and their operational shop floor activities, but also for high-skilled white collar and management representatives. Technologies such as artificial intelligence, machine learning and software automation applications would no longer primarily impact low-wage, uneducated workers, but would also increasingly enable computers to fulfill jobs that require significant training and education. Consequently, university graduates who perform highly skilled jobs would find themselves threatened by machines and software algorithms that would be able to perform sophisticated analysis and decision making (Ford, 2009). Technological advancements would not only tend to eliminate routine jobs, but also high-skilled jobs defined by pattern recognition and cognitive non-routine tasks (Bowles, 2014; Brynjolfsson & McAfee, 2014). According to Frey and Osborne, robots would not only be able to perform standardized programs, but also sophisticated tasks beyond routine in future times. The main result of their study is that 47 percent of US jobs are exposed to the risk of becoming redundant through computerization. They further provided evidence of a strong negative correlation between an occupation's computerization probability and its wages and educational attainment, promoting the argumentation of other authors that computerization risk is particularly apparent for low skilled jobs (Frey & Osborne, 2013). As a consequence, most of the lower skilled human jobs would be eliminated and replaced through technology, leading to the remaining human jobs becoming more complex and comprehensive.

Skills and Competences to Survive in Industry 4.0 in the Indian Context

The World Economic Forum says that many jobs could be delivered by robots or driven by artificial intelligence in the future. Conversely, the use of technology and need to innovate could create more jobs than ever before. The industrial revolution of the 18th and the 19th century changed the world forever. It substituted human labour for machines, and gave rise to the first factories. After almost two centuries since the world first witnessed the power of machines, today, we stand at a juncture where machines in harmony with other forces like the internet are on the path to give rise to a new kind of production industry altogether: Industry 4.0. One should however not forget that India is yet to become a major powerhouse in Asia. Its developed counterparts in South Korea, Singapore, and Japan already have a ready infrastructure that would allow them to realise the full potential of the fourth industrial revolution. In fact, India's neighbor China has also made a name for itself on the global stage. Latest data shows that India is way behind the three developed nations and its neighbor in terms of industrial automation. While on the policy and capital front, India need not be worried about much, the biggest problem in India today remains its lack of a skilled workforce. The number of trained people that can understand the sophistication of the cutting edge robotic technology coupled with other technologies like the Internet of Things (IoT) and big data is far inferior compared to some other developing and developed countries. According to consultancy firm KPMG, India currently has one of the worst number of formally skilled workforce. In South Korea, for instance, the percentage of formally skilled work force is 96 per cent, while in India, it is a meagre 4.7 per cent. China's skilled workforce makes up for 24 per cent of its population, that is almost six times more than India (Is India Ready for Industry 4.0, 2018).

HOW READY IS INDIA FOR FOURTH INDUSTRIAL REVOLUTION?

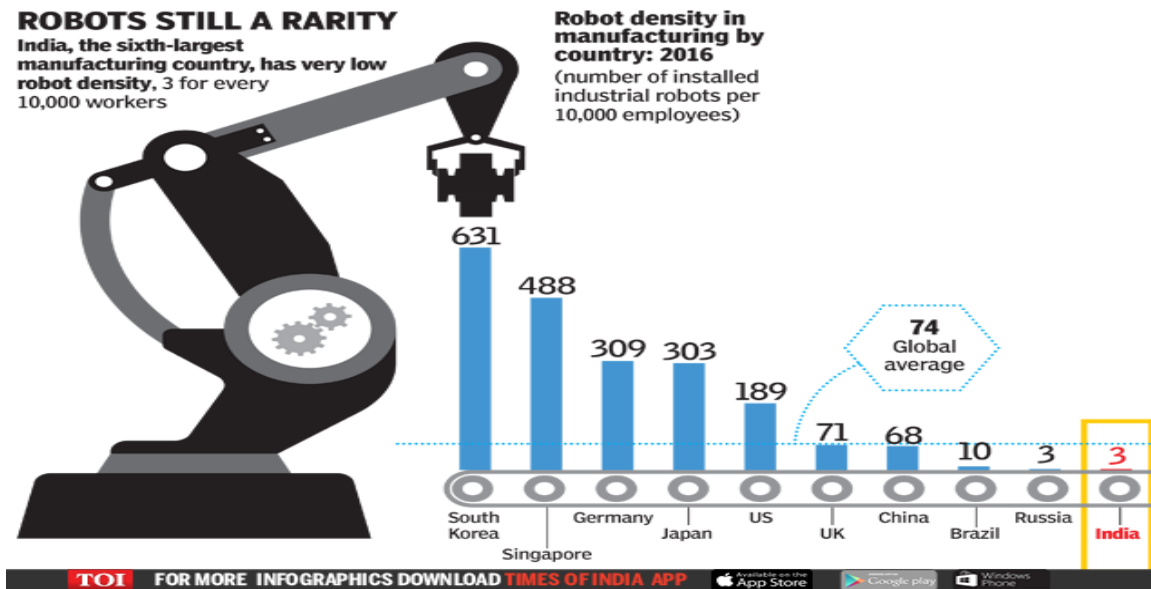


Fig 4. Readiness of India for Industry 4.0

This container-based farming, as opposed to land-based farming, can grow any food (grain, vegetables or fruits) or fodder with the use of precise levels of light, temperature, humidity and nutrients. All these inputs are controlled by smart sensors and computers.

The Indian manufacturing sector employs over 30 million people and contributes about 16% to its GDP but only 2.9% to the world manufacturing value add. Almost 85% of industries in India are in the micro sector (employs less than 10 people). Our manufacturing industry has long depended on low cost inefficient labour and continues to rely on them to run organizations that are largely low in scale and integration and focus on low value or commodity products. In other words, we are still running Industry 2.0 at a very inefficient level. The next step of evolution to Industry 3.0 has been attempted by a minority who are competing in the global market but to a limited extent, since they can still afford low-cost labor due to favorable demographics. As such there is still a large scope of improving efficiencies (low hanging fruits) in the vast majority of players by extensive use of productivity tools such as TPM, TQM, Six Sigma, TOC, Lean (Damodaran).

Some focus more on creativity as a safeguard against computerizability while some emphasize entrepreneurial, scientific and emotional skills (Dolphin, 2015). Phillips claims that there has been a 45 per cent increase in self-employment in Europe in the past decade, with similar trends elsewhere, increasingly among older, high skill professionals (Phillips, 2015). The report, *The Future of Jobs*, World Economic Forum (2016), looks at the employment, skills and workforce strategy for the future, by asking the chief human resources and strategy officers from leading global employers what the current shifts mean, specifically for employment, skills and recruitment across industries and geographies. The major responses for having the job securities for graduates came out as Complex problem solving, critical thinking, creativity, people management, coordinating with others, emotional intelligence, judgement and decision making, service orientation, negotiation, cognitive flexibility. Creativity will become one of the top three skills workers will need.

The report further emphasized the incapability of Robots in becoming as creative as humans. Hamlin and Stewart conducted an extensive literature review and derived the following main goals for human resource development: Improving individual/group effectiveness & performance, improving organizational effectiveness & performance, developing knowledge, skills & competencies, Enhancing human potential & personal growth. It is expected that a growing complexity is going to arise in many job profiles, along with an increasing need for cross-functional work organization and cross-company partner networks. They also project a growing importance of continuous learning, training and education in order for the workforce to be able to adapt to future qualification requirements derived from

Industry 4.0 technologies (Bonekamp & Sure, 2015). The major enabling factor for such developments has been the continuous improvement of computer technology, basically doubling its performance every 18-24 months, confirming Moore's law. Brynjolfsson and McAfee (2014) bring forward a set of measures to mitigate negative impacts from cyber physical systems and to compensate for job losses arising from ever advancing computer and software technologies, such as better education, more focus on entrepreneurship and startups, more support for academic research or the introduction of Pigouvian and negative income taxes.

Boston Consulting Group, in an exclusive study for a German management journal, projected a rather positive future scenario on the consequences of Industry 4.0. They estimated that based on implications derived from Industry 4.0 technologies, more than 100,000 new jobs could be created in mechanical engineering and construction within a period of 10 years. They built their logic on the fact that the introduction of cyber physical systems would require a significant amount of additional employees with specialized technical expertise. Boston Consulting Group also hinted in this context the growing importance of IT and programming skills for employees (Maier, Student, 2014). There is agreement among the participants that Industry 4.0 technologies would not only eliminate jobs but also create new ones. This is particularly projected for the area of planning and control and for IT jobs (Brynjolfsson and McAfee, 2014). There is also consensus on the fact that digitalization and internet of things would result in a generally higher degree of complexity in work processes, which would coincide with a growing demand for higher skilled specialists. In this respect, participants also argue that continuous learning, training and education would automatically boost employability and therefore reduce the risk of long-term unemployment for employees, even if they were to be made redundant temporarily. In addition, a growing importance of teamwork, interdisciplinary cooperation and partner networks is expected, along with an increase in flexibility of individual work life, attention towards social media risks and IT and programming capability requirements for all levels. Madsen, Bilberg & Hansen (2016) says that Industry 4.0 and digitalization call for vocational skills, applied industrial engineering, and less for pure academics. They also found that maintenance tasks and identifying and solving malfunctions called for a number of vocational skills in which employees needed to have a holistic view when different technologies were merged together in manufacturing equipment.

The vocational system of UK has proven to be strongly employer-led, an output-based approach where the focus is on direct employability for specific jobs (Leitch, 2006). Research conducted in the European Union (Cedefop, 2012) explains how a shift towards more skill-intensive jobs will require a demand for people who are highly qualified and concludes that more vocational skills and education will be needed to handle the more complex manufacturing facilities of the future's Industry 4.0 hence putting pressure on universities to supplement education of pure academics. Needs are wider than just skills, there is also a well-being component, supporting ergonomic and healthy behavior at the workplace (Ras, Wild, Stahl & Baudet, 2017). They enlist some challenges in the implementation of Industry 4.0 which can be solved only with the human effort, which are i) The workforce needs to understand the underlying processes, their dependencies, and develop the knowhow needed in the intelligent production of smart products with flexible lot sizes. ii) Tasks needed in the Industry 4.0 context are more interdisciplinary and combine to revise existing job profiles, build development and appraisal procedures for the existing workforce, and predict which new skills need to be developed in addition to be future proof. In order to implement this research roadmap, an interdisciplinary research community needs to be established.

Five key competences have been identified that are highly relevant for employees in Industry 4.0 related workplaces. These five competences are namely self-reflective learning, creativity, problem solving, cooperation, and communication (Kiesel & Wolpers, 2015). 21st century skills or critical skills are those which include skills such as knowledge construction; adaptability; finding, organizing and retrieving information; information management; critical thinking and teamwork (Anderson, 2008). Tóth-Téglás et al. (2016) found in their research that the most important competencies appeared to be precision, self-reliance, high work endurance, ability to work in teams and ability to achieve goals [36]. Teijeiro et al. (2013) classifies the skills as instrumental, interpersonal, and systemic. García-Aracil & van der Velden (2008) identified six types of skill from their factor analysis, namely organizational (ability to work under pressure, autonomy, and attention to detail); specialized (performance of activities and tasks in own field of work); methodological (dealing with problems and solving them); generic (critical thinking and oral and written communication skills); participative (planning, decisions, responsibility); and socio-emotional (interpersonal, team-working). Olivier et al. (2014) condensed the skills required by employers into six broad clusters: foundation skills, which include written and oral communication, problem solving, and critical analysis; adaptive capacity, which involves the ability to adapt to new situations and foreign workplaces, learn autonomously, develop new ideas, and innovate; team working and interpersonal skills; IT skills; employability skills related to coping with pressure and

stress, being flexible and adaptable, and meeting deadlines; and technical- and domain-specific skills. Unlike more stable content and goals for other areas of school study, technology keeps on advancing, setting new aims for how learning should be served and what students should know about technology (Fulton 1998). Therefore, concepts of key and generic skills and competencies are important that allow for continuous adaption and upgrade and that can be transferred readily across different settings (Kiesel & Wolpers, 2015). In a recent survey conducted by Fraunhofer IAO, 518 representatives in industrial companies were asked about their views on the consequences of Industry 4.0. 51 percent expected fewer manual activities while 54 percent of the respondents anticipated an increase in planning and control activities. 86 percent of the surveyed representatives estimated an increasing importance of life-long learning, while 77 percent expected a higher importance of interdisciplinary cooperation and 76 percent anticipated higher standards for IT competence. In view of these findings, Fraunhofer scientists expect workforces to shrink as a result of cyber physical systems, but they do not believe in a future scenario where factories will operate completely without the intervention of human beings (Fraunhofer IAO & Ingenics AG, 2014).

RESEARCH METHODOLOGY

Type of Research and Objective

The research methodology follows an exploratory approach as we are trying to find out new chances and challenges for education, skills and employment with regard to the young students and graduates. The motive of this research is to find out the challenges for skills and competences for young students and graduates arising due to the Industry 4.0 processes prevailing in the world and how to acquire them. Hence the main focus here is to identify the best possible set of skills and competences for the graduates to enhance their visibility as employable in the phase of Industry 4.0. The study aims at modelling how the young students and graduates can get utilize their talent to the maximum extent possible to have the best possible skill-set accompanied with their academic educational threshold and hence grab the best employment opportunities and have their job securities in the Industry 4.0 phase. Nowadays many graduates are under-employed or un-employed just because they don't have the appropriate combination of skills and academic education, hence this problem has been targeted in the paper.

Method

The paper points out the human resources required during the phase of Industry 4.0 and the competence development strategy. Doing an extensive literature of 11 literatures in the same field, the list of essential core skills and competences has been derived. After that, the data regarding what the young graduates think about core and essential competences has been collected via an online survey done in the form of Google Forms. The outcomes of the survey have been assimilated with the list of the competences derived from the literature survey and the preference order for the different competences has been derived using statistical analysis.

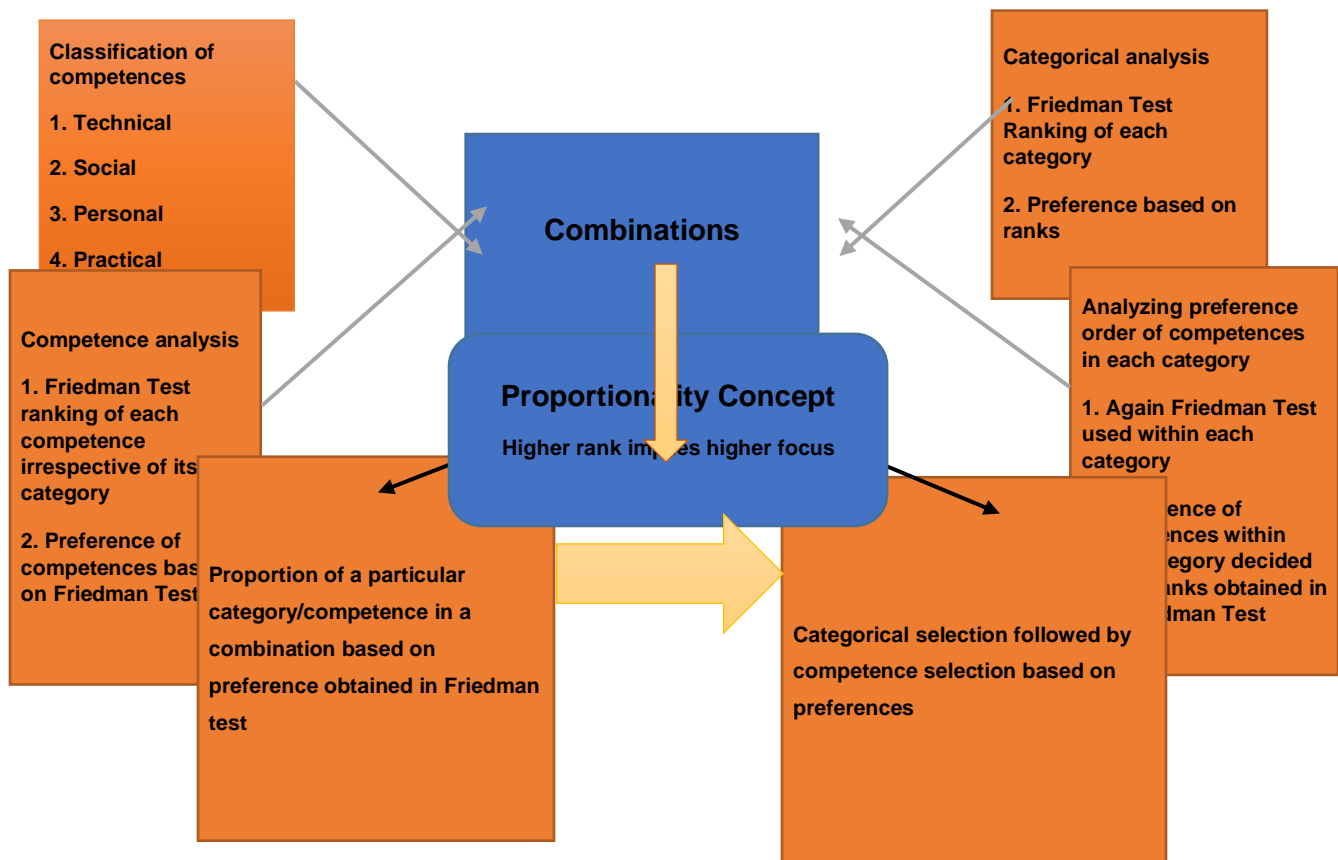
DATA COLLECTION AND QUESTIONNAIRE DESIGN

The primary data was collected via questionnaire. The questionnaire was floated in the form of Google Forms and was communicated via email. The potential respondents received a link on their email which redirected them to the Google Form. The primary data was collected between September 5, 2018 and September 8, 2018 after which the response reception was discontinued. Some other data regarding the skill requirement trends in the current decade were collected by the literature reviews of relevant literatures in the same context. The questionnaire consisted of various types of questions regarding open ended questions, descriptive questions, and short answer type questions. The term 'Employability' was first clearly explained at to the respondents at the beginning of the questionnaire and the respondents were asked to respond accordingly. The questionnaire aimed to gather the opinions of the respondents about what they think of the skills and competencies necessary for getting their desired employment. The set of questions was broken down into a series of questions covering the sections: Necessary skills and competences for the current period, Industry 4.0 in general, objections and fears regarding Industry 4.0, preparations against Industry 4.0 and use of digital tools to survive in the phase of Industry 4.0. The respondents answered some of the questions in the form of five-word points and the rest of the questions were answered in descriptive way.

Respondents and Sampling Method

The respondents of the study comprised of 281 students of a graduation institution of India enrolled in different streams of graduation studies. The respondents ranged between 17 to 25 years of age. The sample consisted of first year students. The selection of the respondents is based on the purpose of the research. Since the challenges for skills and competences for young students and graduates was to be analyzed, hence only the graduated enrolled in various graduation programs have been selected for the survey. The sampling method used here is **Homogeneous Purposive Sampling**. This is because only that sample has been chosen who have been enrolled in various graduate programs. All the respondents were asked to fill the questionnaire sent to them as Google Form via email. They were informed that the data could be used for research purpose. Hence the only source of primary data collection was through the mail in the form of Google Forms. The data was received in the Comma Separated File (.csv) format.

Research Proposition and Model



More or less, all the competences should be there, but the combinations from the model are targeted to provide better results in lesser span of time.

STATISTICAL TOOLS AND TEST

Skills and Competences Model for Graduates in Industry 4.0

Deriving competences from literature survey

| Category | Competences | References |
|------------------|---|---------------|
| Technical | IT Skills Continuous Learning Vocational Skills Applied Industrial Engineering Self-Reflective Learning | To be written |
| Social | People Management Coordinating With Others Cooperation Communication Adaptability Teamwork | To be written |
| Personal | Emotional Intelligence Leadership Judgement Decision Making Self-Reliance High Work Endurance | To be written |
| Practical | Entrepreneurship Scientific Complex Problem Solving Critical Thinking Creativity Service Orientation Commitment Enthusiast Interdisciplinary-knowledge | To be written |

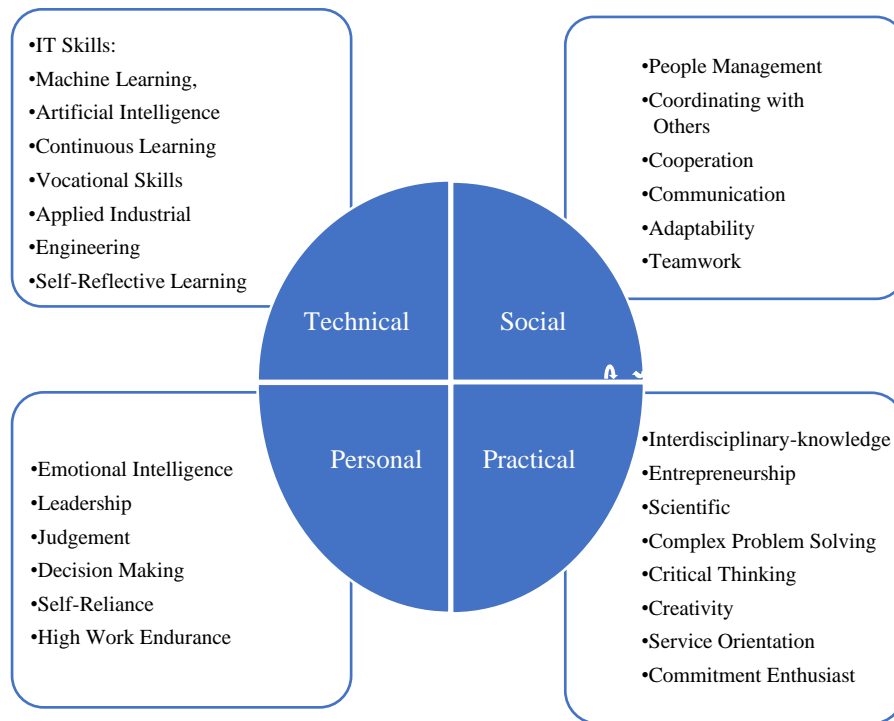
DATA ANALYSIS

The responses for competences received from the survey were grouped with those derived from the literature review, and then were analyzed to get a preference order of the different competences. The competences have been categorized in four categories, hence the analysis performed were:

- Preference order of different competences under each category
- Highest priority competences in each category: t1,s1,p1,p1.....t2,s2,p2,p2
- Preference order of each category as a whole
- Overall preference order of the competences irrespective of the category

Integration of the data was done using **Concept Mapping** and the survey data was integrated with the major four categories in the above table which was followed by statistical analysis.

CONCEPT MAPPING OF THE SURVEY DATA



RESULTS AND DISCUSSIONS

Friedman test is applied using Statistical Package for the Social Sciences (SPSS) tool to get preference order of competences, based on their mean ranks, higher rank implies higher preference, in three ways:

- Preference order based on each category
- Preference of competences: category-wise
- Preference of competences: overall basis

Table 1
Ranks of competences from the Friedman Test

| Competences | Mean Rank |
|---------------------|-----------|
| IT_Skills | 7.72 |
| Continuous_Learning | 10.79 |
| Vocational_Skills | 5.18 |
| People_Management | 4.26 |
| Adaptability | 5.46 |
| Teamwork | 3.41 |
| Leadership | 3.99 |
| Decision_Making | 10.58 |

| | |
|-----------------------------|-------|
| High_work_endurance | 7.56 |
| Interdisciplinary_knowledge | 10.66 |
| Entrepreneurship | 7.11 |
| Critical_thinking | 9.84 |
| Service_orientation | 4.44 |

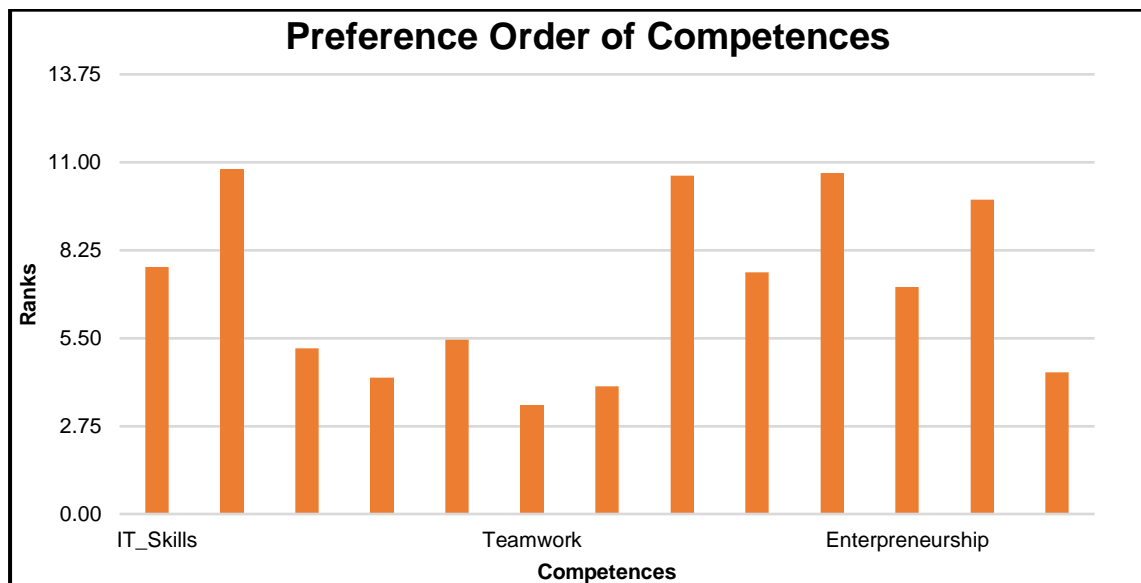


Table 2
Friedman Test Statistics

| | |
|-------------------------|----------|
| N | 302 |
| Chi-Square | 1909.932 |
| df | 12 |
| Asymptotic-Significance | 0.000 |

As seen in Table 1 and Table 2, significant difference is there among the preferences of competences as Asymptotic-Significance is less than 0.05 with Continuous Learning, Interdisciplinary Knowledge, Critical Thinking and Decision-Making being most preferred.

Table 3
Ranks of Categorized Skill-Sets from Friedman Test

| Skill-Set | Mean Rank |
|------------------|------------------|
| Technical_Skills | 3.73 |
| Social_Skills | 1.18 |
| Personal_Skills | 2.51 |
| Practical_Skills | 2.59 |

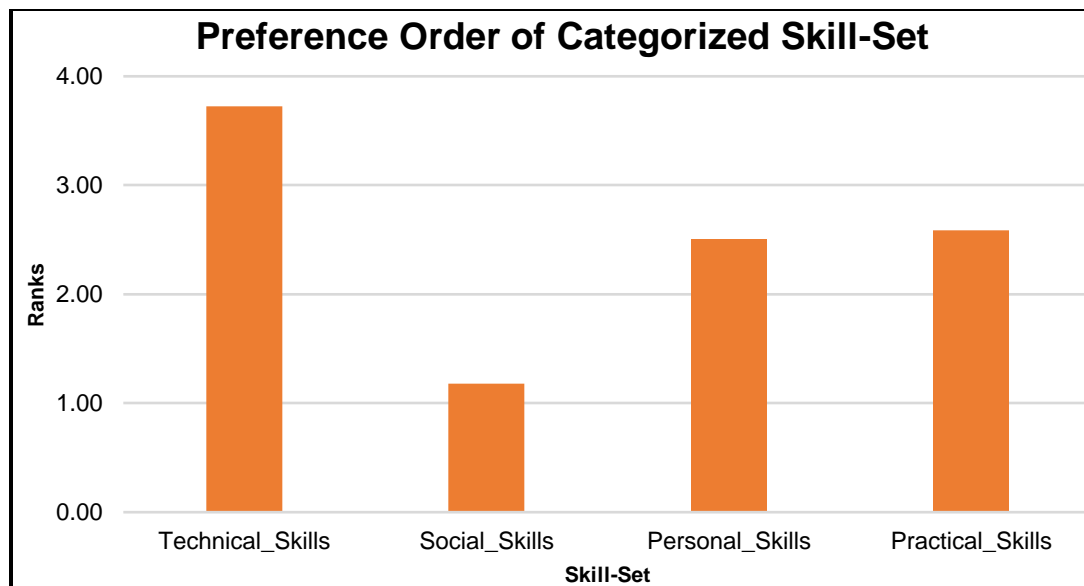


Table 4
Test Statistics of Friedman Test

| | |
|-------------------------|---------|
| N | 302 |
| Chi-Square | 614.056 |
| Df | 3 |
| Asymptotic-Significance | 0.000 |

As seen in Table 3 and Table 4, significant difference is there among the preferences of categorized skill-set with Technical and Practical skill-sets being most preferred.

This paper endorses Continuous Learning, Interdisciplinary Knowledge, Critical Thinking and Decision Making as the most preferred competences for young graduates to prepare themselves against the challenges coming up due to Industry 4.0 but the social and personal skill-set also need to be developed to have a better humane approach for future.

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APPENDIX
Questionnaire
Building Competences Against Technological Shift
"NON-DISCLOSURE FORM"

(Data collected from this questionnaire can be used for Academic and Research purpose but not for Profit purpose).

The advancements in the technology have been happening at an unimaginable pace. The advancements bring with them new challenges for the aspirants and the employed people, in terms of the knowledge, skills and competences, leading to a risk of job insecurity. The survey aims to identify the skills and competences the current employees and the employees to be (aspiring students) need to have to have their job security in this era.

Your email address will be recorded when you submit this form

[Sign out](#)

* Required

1. Name *

2. Enrollment Number *

3. Section *

Mark only one oval.

☐

A

☐

B

☐

C

4. Branch *

Mark only one oval.

☐

IT

☐

ECE

☐

DUAL DEGREE

5. Year of study *

Mark only one oval.

☐

FIRST

☐

SECOND

☐

THIRD

☐

FOURTH

☐

FIFTH

6. What skills/expertise would you like to acquire and develop in yourself to grab the best offers from the industry? List any 7 of them. *

7. Based on the answer of the previous question, rate the skills/expertise on a scale of 1 to 7 where 1 means very less preferred and 7 means very highly preferred. *

Mark only one oval per row.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| SKILL1 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL2 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL3 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL4 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL5 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL6 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL7 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

8. What challenges do you face while learning these skills and competences? *

9. In sync with the previous question, what kind of learning, competences or approach have you acquired to deal with the challenges? *

10. In the era of automation and Internet of Things, where maximum work is targeted to be done by automated systems using Artificial Intelligence, Machine Learning, Embedded systems and many more technologies, which skills/competences do you need to develop in order to have your job security against these advancements? List any 7 of them. *

- 11. Based on the answer of the previous question, rate the skills/expertise on a scale of 1 to 7 where 1 means very less preferred and 7 means very highly preferred. ***

Mark only one oval per row.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| SKILL1 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL2 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL3 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL4 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL5 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL6 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| SKILL7 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

- 12. Work Integrated Learning refers to the learning/teaching patterns where the subject knowledge is also necessary along with the practical knowledge and competences required in the workplace. According to you, what innovative ways should be adopted in academic domain for betterment of Work Integrated Learning approach in your alma mater? List any five of them. ***

- 13. Based on the answer of the previous question, rate the topics/academic domains based on your preference on a scale of 1 to 7 where 1 means very less preferred and 7 means very highly preferred. ***

Mark only one oval per row.


| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| TOPIC1 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| TOPIC2 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
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- 14. With the rapid automation in industries and decrease in the demand for human labor, what factors do you consider to be threatening for the mankind at present and in future? List any five of them. ***

- 15. Based on the answer of the previous question, rate the threats based on your perception on a scale of 1 to 7 where 1 means very less influencing and 7 means very highly influencing. ***
Mark only one oval per row.

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A NOTE ON TEACHING SYSTEMS DEVELOPMENT

Timothy J. Stanton, Mount St. Mary's University

ABSTRACT

Students in various business curriculums routinely take an introductory course in information systems, in which they are exposed to the concept of designing and building a working information system. As such, the course seeks to convey the practical approach to developing a new or improved information system. The information systems discipline additionally pursues research to push the boundaries of knowledge, as is common to all academic disciplines. Within these introductory courses, however, the instructor should keep students focused on the former, the practical endeavor, and not the latter, the advancement of the frontiers of the discipline. To that end, this paper suggests a focus on defining the former as method and the latter as methodology.

Keywords: systems development, method, methodology, MIS

INTRODUCTION

While information systems (IS) is still a relatively new academic discipline, business programs at colleges and universities across the country typically offer it as an introductory course for business and other majors. It is not uncommon for the course to be titled something like Management Information Systems, and, accordingly, publishers have supplied the market with a large variety of texts. As would be expected, content of these texts tends to be similar. In particular, texts typically include a chapter on systems development, understood as how to analyze and design a new or improved information system.

This paper investigates a very specific issue commonly found in that systems development chapter. It addresses language generally included, that, this paper argues, can be misleading for beginning learners in IS. Specifically, texts tend to use the word methodology, or sometimes interchange the terms method and methodology, to describe approaches for developing information systems. While such language likely does not confuse seasoned academicians, beginners could struggle with this imprecision in wording. Even if this were not true, precise use of words is preferred over imprecise usage in virtually all instances.

After this introductory section, this paper proceeds to argue that indeed method and methodology have differing meanings. It next expands this discussion specific to information systems. The conclusion discusses implications for teaching.

DEFINITIONS

Webster defines method as “1. A procedure, technique, or way of doing something, especially in accordance with a definite plan. 2. A manner or mode of procedure, especially an orderly, logical, or systematic way of instruction, inquiry, investigation, experiment, presentation, etc.” (method, 2001, p. 1209). Anyone who has ever formally studied a musical instrument undoubtedly used a book on method. These types of methods present a ‘systematic way of instruction.’ Aspiring actors or actresses likely would study a method of acting. There can be methods, “a way of doing something,” for repairing an automobile, programming a DVD, etc. Generally, the meaning of method casts a broad sweep; many procedures can be thought of as methods. Beyond these first two meanings, further meanings of method can be used as a synonym for methodology, but the argument of this paper is that systems development is best defined by meaning (1) and (2) above.

The definition of methodology relevant for this current paper is more focused. Webster’s definition states “1. A set or system of methods, principles, and rules for regulating a given discipline, as in the arts and sciences. 2. The underlying rules of an organization of a philosophical system or inquiry procedure.” (methodology, 2001, p. 1209). Academic disciplines have methodologies. Scientists investigate an issue or problem with an “inquiry procedure.” Likewise, economists have a way of thinking when investigating an issue of interest. While academics, even within a specific discipline, can have quite heated debates about methodology, most of the methodologies of the various disciplines have much in agreement. Generally, they employ some sort of deductive process, moving from theory to empirical results, in their pursuit of extending the frontiers of the discipline. The goal of this method of inquiry is typically new knowledge, an extension of the way the discipline perceives the world.

Information systems (IS), a discipline of quite recent origin, undertakes academic inquiry just as the other disciplines do. Academics in this discipline seek new ways of understanding, new knowledge, and new perspectives on the world. Given its recent emergence as a separate discipline, methodology is articulated somewhat less precisely than it is in other disciplines. To a certain extent, important empirical results arise without clear grounding in theory. While this can and does happen in other disciplines, it tends to happen more frequently in IS.

THE CURRENT STATE OF TEXTBOOKS

Table 1 presents the texts reviewed, but the purpose of this paper is not to provide a rigorous review or critique but rather to use a non-exhaustive list of texts as illustrations. Each has a chapter on systems development, and it is common to see the use the word methodology when method would be preferred. Coverage includes a discussion, albeit abbreviated, of structured approaches such as Systems Development Lifecycle (SDLC), object oriented (OO) approaches, agile methodologies, and a variety of other topics. Each of these approaches, however, has as its goal the practical effort of analyzing and designing a new or improved information system. As such, these approaches would better be called methods (a ‘systematic way’ of systems development). The end goal of these methods is a functioning information system, not applying a ‘philosophical system’ to research the boundaries of current knowledge in an academic discipline ‘philosophical system.’ The latter is certainly done in the IS discipline, but the intention of these chapters in beginning texts is to provide the student with an understanding of how to create a working information system, not an understanding how academics pursue research to extend the boundaries of the discipline. Such discussion of methodology for IS students does typically happens at the undergraduate level, but it likely occurs in higher-level courses in the IS major, not introductory courses for business majors.

| Table 1 |
|---|
| A Representative List of MIS Texts |
| Bidgoli, Hossein, 2016, <i>MIS</i> ⁶ , Cengage Learning. |
| Haag, Stephen and Maeve Cummings, 2013, <i>Management Information Systems for the Information Age</i> , 9 th edition, McGraw-Hill Irwin. |
| Kroenke, David M. and Randall J. Boyle, 2016, <i>Experiencing MIS</i> , 7 th edition, Pearson Education Inc |
| Laudon, Kenneth C. and Jane P. Laudon, 2015, <i>Essentials of MIS</i> , 11th edition, Pearson Education Inc. |
| Stair, Ralph M. and George W. Reynolds, 2016, <i>Fundamentals of Information Systems</i> , 8th edition, Cengage Learning. |

METHOD VERSUS METHODOLOGY

As a starting point, consider methodology for a different discipline, economics. Economists do have heated debates about nuances in their methodology, but for our purposes, a general understanding suffices. Table 2 presents a rather straightforward explanation of methodology for economics:

| Table 2 |
|--|
| A Simplified Methodology |
| 1. Motivation: Some starting point is needed – why is the researcher pursuing this investigation? Famously, the apple hit Isaac on the head, which got him thinking. |
| 2. Theory or model: To understand the complexity of the issue at hand, the researcher needs to abstract from reality; that is, he/she needs to model the situation, focusing on essential variables. |
| 3. Hypotheses: With an appropriate model chosen, the researcher next deduces hypotheses, testable implications of the theory, specific the issue under investigation. |

4. Quantification: For empirical issues, the researcher needs to collect and analyze data. Sometimes, the intent might be to quantify existing theory as applied to the topic of investigation while at other times the researcher might be testing the validity of the theory itself.

5. Results: The methodology presumably leads to some conclusions, either expected or not. The researcher needs to explain the results of his/her investigation. In most cases, good research answers some questions, but it also suggests future research, hence providing motivation for this or other researchers to begin the process again.

Countless journal article serve as examples of this process (see Gabriel, et. al. 1995, Stanton 1993, and many more). Variations exist, but the above outline captures the essence of methodology in economics, the pursuit of new knowledge in the discipline.

When economists pursue practical research, not intended to expand the frontiers of knowledge but instead intended to provide an empirical answer to a specific question using accepted practices, they employ a method not unlike the one described above as methodology. For economics, method and methodology are largely similar, with little need for a rigorous distinction between the two. Here, however, lies a relevant distinction between economics and IS. The economist's methodology for expanding the frontiers of the discipline is essentially the same as his/her method for investigating a practical issue to shed light on a particular topic.

In contrast, IS cannot make the same claim. Its methodology for pushing the frontiers of the discipline is similar to the one explained in Table 2 (see Weiss et. al. 2002, Sears, et. al. 2000, and many more); however, when attacking the practical problem of analyzing and designing a new information system, a much different approach is needed. For instance, the investigator might employ the SDLC method, whose ultimate goal is a functioning information system. Beginning learners of IS, whether they are business majors, information systems majors, or other majors, first learn method (SDLC, for instance) in introductory classes. Higher-level courses in the IS major likely begin teaching methodology for an understanding of the pursuit of new knowledge in the discipline; this process accelerates for those attending a graduate program in IS. For those who plan to take only one course in IS as well as for those who plan to pursue further understanding of the discipline, a clear distinction between method and methodology seems warranted.

CONCLUSION

In introductory information systems texts, the chapter on systems development seeks to explain a process by which practitioners can design and build working information systems. Those teaching the course undoubtedly understand that purpose, but beginning learners might confuse this practical approach to building systems with an approach for advancing the boundaries of the discipline, to which they are exposed in various courses across the curriculum. At a minimum, instructors should take care that students understand this distinction. To achieve this goal, precise use of language helps. To that end, this paper suggests that using method, with specific use of the definitions quoted in this paper, should be preferred to using methodology. In certain contexts, these two words can be interchanged. In the context of an introductory information systems course, focus on the meanings quoted in this paper will serve to advance student understanding.

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THEORETICAL MODELS OF BUDDHISM-BASED BUSINESS OPERATIONS

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ABSTRACT

Buddhism-based business operations have been popular among business persons. Nevertheless, we have not had a generally accepted model of Buddhism-based business operations. As a result, there are so many studies of Buddhism-based business operations based on the subjective criteria of researchers (Weerasinghe, Thisera, & Kumara, 2014; Ashtankar, 2015; Shakya, 2017).

Without the generally accepted model, most researchers have focused on case studies that analyzed the relationship between managers' Buddhist philosophy and their ways of business (Abe, 2007). Such case-by-case studies will never contribute to developing the generally accepted model.

In this paper, we will suggest a generally accepted model of Buddhism-based business operations by integrating all essences of Buddhism-based business from not only published studies but also teachings of the historical Buddha called pre-sectarian Buddhism.

LITERATURE REVIEW

Buddhism and Business

Business scholars and business persons have studied business-related teachings and sermons of the historical Buddha. Of course, they want to find business essences and lessons which they can apply to their businesses. However, they have studies because they know Buddhism includes a great sense of business and management of the historical Buddha who organized Buddhist groups and successfully expanded the groups (Mathieu & Peeters, 2016). Mathieu and Peeters (2016) supported this by saying that the historical Buddha, a prince of a small clan, was so well trained to be the clan head since his childhood. Such a sense of business and management was summarized as “b-elements” by Guruge (2006). According to Guruge (2006), b-elements are generosity, moral practice, patience, zeal, mindfulness, and wisdom.

Studies of Field (2007) and Essen (2010) have tried to see if the Buddha's sense of business and management can be effectively applied in modern business principles. Their studies concluded that the Buddha's sense would not conflict with the modern business principles because Buddha supported the modern business principles such as profit orientation, private ownership of property, free trade, and limited government intervention.

Other studies found the modern business principles in teachings and sermons of pre-sectarian Buddhism (Puntasen, 2004; Field, 2007; Essen, 2010; Mathieu & Peeters, 2016). According to the studies, four elements of the pre-sectarian Buddhism that are the law of dependent origination, the middle path, the four noble truths, and the noble eightfold path would tell us business principles that are especially important for the current business environment. For example, the law of dependent origination says that the right actions of business persons will naturally bring the right results to not only their companies but also our society, human beings, and nature. It also says that business persons must stand on the middle path to have the right intentions from the beginning to develop and maintain the right actions (Payutto, 1994; Guruge, 2006; Abe, 2009; Essen, 2010).

The four noble truths say that businesspersons should see situations objectively to find real problems. Then, they must find real causes of the problems to be mindful to develop the right intentions and actions. Finally, they must implement and monitor the actions through an implementation guideline called the noble eightfold path (Puntasen, 2004; Field, 2007; Essen, 2010; Mathieu & Peeters, 2016).

Buddhism and Management

Buddhism has insights for modern management. Studies by Payutto (1994), Guruge (2006), Abe (2009), and Essen (2010) found four management principle which is applied to modern management. According to the studies, managers

must maintain the profitability of organizations by continuously improving and monitoring industriousness, mindfulness, human relations, and livelihood of their employees.

Among the principles, the Buddha repeatedly emphasizing the importance of a balanced livelihood. He said that managers of any organization must let all members enjoy a healthy livelihood by offering them enough food, clothing, shelter, and medicines. He also said managers must try to improve the members' livelihood by allowing them to balance their work, private, and social life (Payutto, 1994; Guruge, 2006; Abe, 2009; Essen, 2010).

One of the reasons for the emphasis on a balanced livelihood will be the Buddha's view of the organization (Field, 2007; Gardiner, 2012). He told every leading follower to make mindful organizations where all members would be trained to be mindful of work-life, private life, and social life. Such mindful employees would be self-managing and self-motivated because they would be able to do self-corrections and be self-reliance towards self-actualization (Guruge, 2006; Field, 2007; Gardiner, 2012; Mathieu & Peeters, 2016; Prayukvong, 2017).

Buddhism and Managerial Functions

Buddha's teachings are also applied in modern managerial functions such as finance, human resource management (HRM), production, and marketing (Guruge, 2006; Field, 2007).

For HRM, Buddha said that human resource managers should ensure mindfulness and the balanced livelihood of all employees by appropriate work assignments accordingly to employees' capacity, compensations accordingly to their contributions, health care to every employee, occasional luxuries to every employees, and leave and time-off (Payutto, 1994; Essen, 2010; Zsolnai, 2013; Mathieu and Peeters, 2016). Buddha also suggested the managers pay attention to their job satisfaction, job enrichment, multi-task work assignments, job security, self-improvement, and self-leadership (Guruge, 2006).

For finance, Buddha emphasized the importance of profit orientation and financial health. He repeatedly told his followers to maintain enough profitability to compensate employees, invest for growth, save for the future, and support our societies including nature (Schumacher, 1974; Payutto, 1994; Field, 2007; Essen, 2010; Zsolnai, 2013).

Even though Buddha supported the profit orientation and financial health, he never supported extreme orientations such as profit maximization, stock price maximization, growth maximization, and cost minimization. This is because he believed that business operations and management based on the extreme orientations would create bad desire (Tanha) of human beings. Buddha suggested his followers have the total profit optimization to maximize the total wellbeing of all stakeholders including nature to prevent the bad desire (Schumacher, 1974; Payutto, 1994; Field, 2007).

Achieving the total profit maximization is indeed important; however, a more important thing is how to maintain the appropriate level of profit. To maintain the level, managers must allocate profits wisely. According to Buddha's sermons, he suggested followers to use profit to bring happiness to a firm, employees, and all stakeholders including nature; to make a firm secure against misfortunes; and for philanthropic activities as practice (Schumacher, 1974; Payutto, 1994; Field, 2007; Essen, 2010; Zsolnai, 2013).

Buddha's ideas about the right products and services were found in his sermons. In the simplest form, he said products and services had to be consumed to remove suffering from all stakeholders including nature (Hipsheer, 2011). This simple statement is discussed in more detail by Schumacher (1974), Payutto (1994), Guruge (2006), and Mathieu and Peeters (2016).

According to Schumacher (1974), there are three principles of products and services. First, companies must produce products and services that can improve incommensurable quality of life such as health, inner-beauty, and good livelihood. Second, products and services should focus on not only the cost but human beings and ecology. Third, products and technology must be designed not to eliminate jobs but to support workers. According to Payutto (1994), the historical Buddha also strongly pointed out that companies must not encourage consumers' materialism through products.

Guruge (2006) and Mathieu and Peeters (2016) discussed Buddha's ideas of products and services from the consumers' point of view. According to the discussions, all products and services should give consumers five types of happiness

which are the happiness of appropriate material comfort, using, being harmless to others and nature, buying, and using for a long time.

ELEMENTS OF A GENERAL MODEL OF BUDDHISM-BASED BUSINESS OPERATION

We have discussed business essences and principle which can be applied in the modern business environment. Our discussions are enough to find elements of a general model of Buddhism-based business. Table 1 summarized the characteristics.

First, managers must pay attention to multiple relations between their companies and all stakeholders including nature. Especially, they must figure out the right interests of each of them to make the best possible decision for the maximization of total welfare. Also, they must correctly predict the consequences of their decisions with a long-term view.

Second, managers must discipline themselves to be able to reject extreme orientations in business to make the best possible decisions. Instead, they must honor neutrality to assess business environments objectively without own interests and extreme orientations. Such neutrality must be maintained throughout the tenure of a manager.

Third, managers must be great motivators and supporters for employees to make them self-leaders who are not only productive but also mindful of all stakeholders. Managers are also expected to continuously improve the industriousness of each employee through encouragement, job-rotations, appropriate job assignments, mentoring, attainable expectations, and giving opportunities for spiritual advancement.

Fourth, managers should be mindful of employees' work livelihood. The work livelihood could be improved through teamwork, effective conflict management, fair competition, fair treatment, and fair compensations. At the same time, the managers' mindfulness must be extended to employees' private and social livelihood. Especially, giving fair compensation with fringe benefits will make employees' private and social livelihood satisfactory.

Fifth, managers should maintain the appropriate size of organization and employment, appropriate work assignments and job enrichment for higher job satisfaction, appropriate compensations with fringe benefits, and various incentives to employees.

Sixth, managers should allocate profit appropriately to maximize total welfare. With the appropriate allocation, profit will be used for the happiness of all stakeholders happy, protections from misfortunes, and social contributions and philosophic activities.

Finally, products and services should be consumed to remove suffering from consumers. Especially, products and services will remove the suffering if these are high quality, durable, user-friendly, and ecology.

Table 1: Elements of a General Model of Buddhism-based Business

1. Know and mindful of multiple relations between companies and all stakeholders including nature.
2. Know and maintain the right interests of companies and all stakeholders including nature to make decisions to maximize the total welfare of all of them.
3. Predict the long-term impact of the decisions on companies and all stakeholders including nature.
4. Maintain long-term orientation in business planning.
5. Maintain neutrality to assess business environments objectively without own interests and extreme preferences such as profit maximization or cost minimization.
6. Maintain neutrality throughout a process of decision making.
7. Managers as role models, mentors, great motivators, and supporters to encourage employees' self-leadership and confidence.
8. Offer encouragement, job-rotations, appropriate job assignments, mentoring, attainable expectations, and giving opportunities for spiritual advancement to maintain employees' industriousness.
9. Develop mindful organization through teamwork, conflict management, fair competition, fair treatment, and fair compensations.
10. Extend mindfulness to employees' private and social livelihood.

11. Give employees fair compensation which includes not only monetary compensation but also various fringe benefits.
12. Maintain appropriate sizes of organizations and employees to maintain healthy growth without sacrificing job security.
13. Right work assignments and job enrichment for a higher level of job satisfaction.
14. Allocate profit to make all stakeholders cheerful and happy, protect organizations from misfortunes, and do social contributions and philosophic activities.
15. High quality, long-life, human-friendly, and ecology friendly products and service to support consumers to remove suffering.

SUMMARY

We developed a general model of Buddhism-based business operations. What the model will tell us is to be mindful of all stakeholders including nature. This means managers must understand business and organization re just some parts of our universe. Therefore, any business decisions and governance will be interrelated and influence all stakeholders directly or indirectly.

The Buddhism-based business may not bring a large profit or make billionaires. However, the business will create better living environments for now and in the future. Managers will not need to live with the bad consequences of their decisions. They will be able to proud themselves as good human beings who contribute to improving our universe. We believe that we are living in an era in which the Buddhism-based business is needed.

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USING DATA ANALYTICS TO INCREASE THE ACADEMIC SUCCESS OF BUSINESS STUDENTS

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ABSTRACT

Retention of students is one of the significant challenges the universities face. To a large extent, it depends on the ability the students to successfully pass the courses. We had anecdotal evidence that that a combination of some courses increases the chance of failure, while taking the courses in different semesters is successful. To evaluate this evidence, we applied two data analytics methods - FP-Growth and Collaborative Filtering over an anonymized dataset which provided student aliases with academic difficulties, the semester of academic difficulty, the GPA of the student for that semester of academic difficulty, as well as the courses the students were taking that same semester, along with the grades of that student in all courses of that semester. The dataset was for the past several years.

As a result of the applied data analytical methods, coupled with a qualitative review of the results by anonymous students, we identified courses that appeared to be problematic with regard to concurrent enrollment; we additionally determined that student interest in course material played a role in doing well in some courses. The results led to a better advising plan. The applied approach could be extended to other programs and disciplines.

INTRODUCTION

Recruitment and retention are recognized strategic imperatives of colleges and universities (Elliott & Healy, 2001) (Walters & Seyedian, 2016). Indeed, without these two notions, a college or university cannot survive, let alone thrive. Academic advising has been shown to play a critical role in retention (Tetens et al, 2016). As a result, it is important for institutions to evaluate their academic advising processes to facilitate retention. One consideration to strengthen academic advising is to learn what types of courses or course combinations lead to academic failure which may put a student at risk for attrition.

A mechanism to identify such courses or course combinations is data mining, which is an essential business tool in these days of big data. By mining existing available course data on students who are at risk for attrition, that is, those who demonstrate a grade point average (GPA) of 1.9 or below for semester, it is possible to identify such courses or course combination.

DATA MINING TOOLS: A BRIEF INTRODUCTION

Several algorithms exist, with the Apriori algorithm noted as a classical algorithm that can be used for different sorts of combinations, such as identification of detrimental course combinations. In this way, the algorithm “recommends” combinations, so such algorithms are termed “recommender engines,” as they mine frequent item sets and relevant association rules.

In data mining, the task of finding frequent patterns in large databases is very important and has been studied in large scale in the past few years. Unfortunately, this task is computationally expensive, especially when a large number of patterns exist.

The FP-Growth Algorithm, proposed by Han et al (2000), is an efficient and scalable method for mining the complete set of frequent patterns using pattern fragment growth, by way of an extended prefix-tree structure for storing compressed and crucial information about frequent patterns known as a frequent-pattern tree (FP-tree). Here a threshold is set, and positive measures must meet or exceed the threshold to be considered as part of the association. It was proven that this method outperforms other popular methods for mining frequent patterns, such as the Apriori Algorithm. Thus, this FP-Growth Algorithm can be used to identify the detrimental course combinations.

A third method exists that may be used to identify these course combinations; this method is the Collaborative filtering Algorithm. Collaborative filtering is a method of making automatic predictions (filtering) about the interests of a user by collecting preferences or taste information from many users (collaborating). The underlying assumption of the collaborative filtering approach is that if a person A has the same opinion as a person B on an issue, A is more likely to have B's opinion on a different issue than that of a randomly chosen person. Thus, this method can be used with

students' course titles and grades as their interests, and match students with similar interests and making recommendations on courses to avoid on this basis. Relationships between different courses based on the recommendations may then be sought.

THE DATA SET DETAILS

Data were requested from the Institutional Research department at the college for all business administration students from fall 2010 through spring 2018 who demonstrated a GPA for that semester of 1.9 or below. Although 1.9 GPA is not technically a C-, the minimum grade required by the business administration department, it was selected as the student with less than a GPA of 2.0 is probably in a weaker position for continued academic success going forward (Sarner, 2018). In addition, the query includes all subject codes, course numbers, course titles, and grades for each course taken by each student.

This query resulted in a total student number of 1,303, and 521 courses associated with those students. The data were provided from Institutional Research in csv format, which was managed using computer programming by Python using the Pandas: Python Data Analysis Library. To protect the identify of students, providing a screen shot of the data entry is not possible.

DATA PROCESSING USING TWO ALGORITHMS: FP-GROWTH AND COLLABORATIVE FILTERING

The goal of this research is to determine what course combinations may be academically detrimental for business administration students to take simultaneously. Thus, the two algorithms discussed above (FP Growth and Collaborative Filtering) were used.

FP-Growth Algorithm

Recall that this algorithm is contingent on a set threshold, which must be identified by the data scientist. For this research, we determined the threshold to be those course combinations where more than 10 students received a poor grade, where a poor grade is defined as less than a C-. Ten was selected as this threshold appeared to return an adequate amount of course; this threshold resulted in 62 courses.

The dataset was pre-processed as follows:

- 1) Semester and course title were combined to form a new identification so that it was clear what courses were selected in what semester.
- 2) Data were filtered so that courses where students received a C- or lower remained in the dataset. This filter is to accommodate the supposition that receiving good grades on some courses has no relationship with receiving bad grades on other courses. Thus, if a student received lower than a C- in any course during that semester, that student was included.
- 3) The threshold was set as described, and the model was built. The result is illustrated below as Figure 1: Course Combinations per the FP-Growth Algorithm.

Figure 1: Course Combinations per the FP-Growth Algorithm

| Course Combinations | Support |
|--|-------------|
| Principles of Microeconomics - Survey of Calculus I | 0.0453149 |
| Principles of Macroeconomics - Survey of Calculus I | 0.039170507 |
| Intro to Information Systems - Principles of Macroeconomics - Survey of Calculus I | 0.035330261 |
| Fund of Statistics for BA & EC - Principles of Microeconomics | 0.033026114 |
| Principles of Macroeconomics - Precalculus | 0.032258065 |
| Intro to Information Systems - Principles of Macroeconomics | 0.031490015 |
| Intro to Information Systems - Survey of Calculus I | 0.028417819 |
| Principles of Macroeconomics - Craft of Writing | 0.028417819 |
| Princ. of Financial Accounting - Survey of Calculus I | 0.02764977 |
| Principles of Microeconomics - Precalculus | 0.02764977 |
| Accounting Processes - Intermediate Accounting I - Taxation I | 0.024577573 |
| Intermediate Accounting I - Taxation I | 0.023041475 |
| Princ. of Financial Accounting - Fund of Statistics for BA & EC | 0.022273425 |
| Princ. of Financial Accounting - Principles of Microeconomics | 0.022273425 |
| Intro to Information Systems - Principles of Microeconomics | 0.021505376 |
| Principles of Microeconomics - Craft of Writing | 0.021505376 |
| Princ. of Financial Accounting - Principles of Macroeconomics | 0.020737327 |
| Prin of Managerial Accounting - Survey of Calculus I | 0.019969278 |
| Accounting Processes - Intermediate Accounting I | 0.019969278 |
| Foundations of Biology - Principles of Macroeconomics | 0.019969278 |
| Intro Microcomputer Software - Principles of Macroeconomics | 0.019201229 |
| Intro Microcomputer Software - Principles of Microeconomics | 0.019201229 |
| Fund of Statistics for BA & EC - Survey of Calculus I | 0.019201229 |
| Survey of Calculus I - Introduction to Philosophy | 0.016897081 |
| Information Systems Structures - Survey of Calculus I | 0.016129032 |
| Principles of Macroeconomics - Western Cultures | 0.016129032 |
| Principles of Microeconomics - World Cultures | 0.016129032 |
| Craft of Writing - Precalculus | 0.016129032 |
| Craft of Writing - Survey of Calculus I | 0.016129032 |
| Accounting Processes - Taxation I | 0.015360983 |
| Managerial Finance - Operations Management I | 0.015360983 |
| Managerial Finance - Marketing Foundations | 0.015360983 |
| Fund of Statistics for BA & EC - Principles of Macroeconomics | 0.015360983 |
| Principles of Macroeconomics - World Cultures | 0.015360983 |
| Principles of Microeconomics - Introduction to Philosophy | 0.015360983 |
| Intermediate Accounting I - Accounting Info Systems I | 0.014592934 |
| Foundations of Biology - Principles of Microeconomics | 0.014592934 |
| Intro Microcomputer Software - Precalculus | 0.014592934 |
| Prin of Managerial Accounting - Information Systems Structures | 0.013824885 |
| Intro Microcomputer Software - Craft of Writing | 0.013824885 |
| Intro to Information Systems - Fund of Statistics for BA & EC | 0.013824885 |
| Intro to Information Systems - Precalculus | 0.013824885 |
| Princ. of Financial Accounting - Information Systems Structures | 0.013056836 |
| Prin of Managerial Accounting - Fund of Statistics for BA & EC | 0.013056836 |
| Information Systems Structures - Principles of Microeconomics | 0.013056836 |
| Principles of Macroeconomics - Foundations of Psychology | 0.013056836 |
| Principles of Microeconomics - Music Appreciation-online | 0.013056836 |
| World Cultures - Survey of Calculus I | 0.013056836 |
| Statistical Analysis2 - Managerial Finance | 0.012288786 |
| Intro Microcomputer Software - Survey of Calculus I | 0.012288786 |
| Information Systems Structures - Fund of Statistics for BA & EC | 0.012288786 |
| Principles of Macroeconomics - Principles of Microeconomics | 0.012288786 |
| Principles of Macroeconomics - Planet Earth | 0.012288786 |
| Principles of Microeconomics - Foundations of Psychology | 0.012288786 |
| Prin of Managerial Accounting - Principles of Microeconomics | 0.011520737 |
| Legal Environment of Business - Survey of Calculus I | 0.011520737 |
| Managerial Finance - Survey of Calculus I | 0.011520737 |
| Principles of Macroeconomics - World History II | 0.011520737 |
| Principles of Macroeconomics - Introduction to Philosophy | 0.011520737 |
| Survey of Calculus I - Music Appreciation-online | 0.011520737 |
| Princ. of Financial Accounting - Legal Environment of Business | 0.010752688 |
| Princ. of Financial Accounting - Intro to Information Systems | 0.010752688 |
| Prin of Managerial Accounting - Legal Environment of Business | 0.010752688 |
| Foundations of Biology - Survey of Calculus I | 0.010752688 |
| Intro Microcomputer Software - Fund of Statistics for BA & EC | 0.010752688 |
| Precalculus - Foundations of Psychology | 0.010752688 |
| Survey of Calculus I - Foundations of Psychology | 0.010752688 |

In evaluating **Figure 1**, combining Principles of Microeconomics with Survey of Calculus represents a course combination where $.0453149 \times 1,303$ students received poor grades in both courses; that is 59 students. Similarly, Principles of Macroeconomics combined with Survey of Calculus resulted in $.039170507 \times 1,303$ students receiving poor grades in both courses; that is 51 students.

In further evaluation of **Figure 1**, it does appear that the course combinations that include two areas of quantification result in the highest number of low academic performance.

Collaborative Filtering

Recall that the underlying assumption of the collaborative filtering approach is that if a person A has the same opinion as a person B on an issue, A is more likely to have B's opinion on a different issue than that of a randomly chosen person. Thus, if Students A and B have difficulty in a particular course, Student A is more likely to struggle in the same courses as Student B.

The dataset was pre-processed as follows:

- 1) Letter grades were mapped to a different value, as assigned by the data scientist. These mappings are illustrated in Figure 2: Value Mapping of Letter Grades.

Figure 2: Value Mapping of Letter Grades

```
grade = {
    'A' : 0, 'A-' : 0.5, 'B+' : 1, 'B' : 2, 'B-' : 3, 'C+' : 4, 'C' : 5, 'C-' : 6, 'D+' : 7, 'D' : 8, 'D-' : 9, 'F' : 10,
    'I' : 0, 'IP' : 0, 'P' : 0, 'NP' : 0, 'E' : 0, 'S' : 0, 'U' : 0, 'W' : 0, 'WC' : 0, 'X' : 0, 'Y' : 0, 'Z' : 0,
}
```

- 2) Data were then selected that included letter grade values below a C; these data provided the research dataset.
- 3) The courses evaluated by the algorithm are those that were provided by the FP-Growth Algorithm via the 10-level threshold. These courses are identified in Figure 3: Courses Evaluated by Collaborative Filtering.

Figure 3: Courses Evaluated by Collaborative Filtering

| | | |
|------------------------------|----------|---|
| Novels and Tales | 0.012121 | |
| First-Year Seminar | 0.014719 | |
| Elementary French I | 0.013853 | |
| Drifting Continents | 0.01039 | Princ. of Financial Accounting 0.111688 |
| Blue Planet | 0.022511 | Prin of Managerial Accounting 0.075525 |
| Planet Earth | 0.047619 | Accounting Processes 0.021645 |
| Thirsty Planet | 0.011255 | Intermediate Accounting I 0.041558 |
| Weather and Climate | 0.011255 | Cost Management 0.01645 |
| Geographic Information Sys I | 0.012121 | Taxation I 0.028571 |
| World History II | 0.037229 | Accounting Info Systems I 0.018182 |
| United States History II | 0.033766 | Business Law I 0.012987 |
| Western Civilization I | 0.019048 | Introductory Anthropology 0.012121 |
| Western Civilization II | 0.011255 | Human Biology 0.012987 |
| American Cultures | 0.051082 | Foundations of Biology 0.073593 |
| Western Cultures | 0.048485 | Environmental Biology 0.012121 |
| World Cultures | 0.05974 | Statistical Analysis2 0.045522 |
| Precalculus | 0.095238 | Legal Environment of Business 0.056277 |
| Mathematics in Action | 0.018182 | Managerial Finance 0.064069 |
| Survey of Calculus I | 0.21039 | Organizational Behavior 0.025108 |
| Music Appreciation | 0.057143 | Operations Management I 0.028571 |
| Introduction to Philosophy | 0.074459 | Marketing Foundations 0.038627 |
| Intro to Astronomy | 0.01039 | Marketing Research 0.01039 |
| Politics in American Life | 0.0329 | Consumer Behavior 0.019913 |
| Foundations of Psychology | 0.055411 | Financial Investments 0.01039 |
| Introductory Sociology | 0.037229 | Corporate Finance I 0.019048 |
| Introduction to Spanish | 0.012121 | General Chemistry Lecture I 0.019048 |
| Statistical Methods I | 0.014719 | Fundamentals of Communication 0.017316 |
| Intro Performing Arts | 0.024242 | Intro Microcomputer Software 0.068398 |
| | | Web Programming I 0.01645 |
| | | Computer Science Overview 0.027706 |
| | | Intro to Information Systems 0.090909 |
| | | Information Systems Structures 0.066667 |
| | | Fund of Statistics for BA & BC 0.101299 |
| | | Principles of Macroeconomics 0.180147 |
| | | Principles of Microeconomics 0.180147 |
| | | Statistical Analysis 0.032035 |
| | | Interned Microeconomic Theory 0.011255 |
| | | Craft of Writing 0.082251 |

The Root Mean Square Error (RSME) is computed for various iterations of the model, which evaluates the standard deviation of the residuals in any prediction model, allowing an understanding of how tightly the residuals align with the line of best fit, allowing the researcher to compare models. The lower the error is, the better the fit among models. The data are loaded, and split into a training set, a validation set, and a test set. The training set is optimized using the validation set; the model is evaluated on the test set. The best model is then selected, which provides the recommendations, as illustrated in Figure 4: Examples of Detrimental Course Combinations as per Collaborative Filtering:

Figure 4: Examples Detrimental Course Combinations as per Collaborative Filtering:

| | | | | | |
|-----------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------|
| Accounting Processes:5.0 | Desktop Video | Child Abuse & Child Abduction | Basic Bowling | Piano Class | University Chorus |
| Accounting Processes:6.0 | Desktop Video | Child Abuse & Child Abduction | Basic Bowling | Piano Class | University Chorus |
| Accounting Processes:7.0 | Desktop Video | Child Abuse & Child Abduction | Basic Bowling | Piano Class | University Chorus |
| Accounting Processes:8.0 | Desktop Video | Child Abuse & Child Abduction | Basic Bowling | Piano Class | University Chorus |
| Accounting Processes:9.0 | Desktop Video | Child Abuse & Child Abduction | Basic Bowling | Piano Class | University Chorus |
| Accounting Processes:10.0 | Desktop Video | Child Abuse & Child Abduction | Basic Bowling | Piano Class | University Chorus |
| Geology I:5.0 | Desktop Video | Child Abuse & Child Abduction | Champs/Lifeskills | Running & Conditioning | Basic Bowling |
| Geology I:6.0 | Desktop Video | Child Abuse & Child Abduction | Champs/Lifeskills | Running & Conditioning | Basic Bowling |
| Geology I:7.0 | Desktop Video | Child Abuse & Child Abduction | Champs/Lifeskills | Running & Conditioning | Basic Bowling |
| Geology I:8.0 | Desktop Video | Child Abuse & Child Abduction | Champs/Lifeskills | Running & Conditioning | Basic Bowling |
| Geology I:9.0 | Desktop Video | Child Abuse & Child Abduction | Champs/Lifeskills | Running & Conditioning | Basic Bowling |
| Geology I:10.0 | Desktop Video | Child Abuse & Child Abduction | Champs/Lifeskills | Running & Conditioning | Basic Bowling |
| Managerial Finance:5.0 | Desktop Video | All-College Band | Champs/Lifeskills | Running & Conditioning | Child Abuse & Child Abdu |
| Managerial Finance:6.0 | Desktop Video | All-College Band | Champs/Lifeskills | Running & Conditioning | Child Abuse & Child Abdu |
| Managerial Finance:7.0 | Desktop Video | All-College Band | Champs/Lifeskills | Running & Conditioning | Child Abuse & Child Abdu |
| Managerial Finance:8.0 | Desktop Video | All-College Band | Champs/Lifeskills | Running & Conditioning | Child Abuse & Child Abdu |
| Managerial Finance:9.0 | Desktop Video | All-College Band | Champs/Lifeskills | Running & Conditioning | Child Abuse & Child Abdu |
| Managerial Finance:10.0 | Desktop Video | All-College Band | Champs/Lifeskills | Running & Conditioning | Child Abuse & Child Abdu |
| Music Appreciation:5.0 | Desktop Video | Advanced Conditioning | Class Appl Non-Majrs:Woodwinds | EDP Freshmen Orientation II | College Communication Sh |
| Music Appreciation:6.0 | Desktop Video | Advanced Conditioning | Class Appl Non-Majrs:Woodwinds | EDP Freshmen Orientation II | College Communication Sh |
| Music Appreciation:7.0 | Desktop Video | Advanced Conditioning | Class Appl Non-Majrs:Woodwinds | EDP Freshmen Orientation II | College Communication Sh |
| Music Appreciation:8.0 | Desktop Video | Advanced Conditioning | Class Appl Non-Majrs:Woodwinds | EDP Freshmen Orientation II | College Communication Sh |
| Music Appreciation:9.0 | Desktop Video | Advanced Conditioning | Class Appl Non-Majrs:Woodwinds | EDP Freshmen Orientation II | College Communication Sh |
| Music Appreciation:10.0 | Desktop Video | Advanced Conditioning | Class Appl Non-Majrs:Woodwinds | EDP Freshmen Orientation II | College Communication Sh |
| Principles of Microeconomics:5.0 | Child Abuse & Child Abduction | Accounting Theory & Research | Desktop Video | SpTp:Intro to CAD/Freshman Sem | Basic Bowling |
| Principles of Microeconomics:6.0 | Child Abuse & Child Abduction | Accounting Theory & Research | Desktop Video | SpTp:Intro to CAD/Freshman Sem | Basic Bowling |
| Principles of Microeconomics:7.0 | Child Abuse & Child Abduction | Accounting Theory & Research | Desktop Video | SpTp:Intro to CAD/Freshman Sem | Basic Bowling |
| Principles of Microeconomics:8.0 | Child Abuse & Child Abduction | Accounting Theory & Research | Desktop Video | SpTp:Intro to CAD/Freshman Sem | Basic Bowling |
| Principles of Microeconomics:9.0 | Child Abuse & Child Abduction | Accounting Theory & Research | Desktop Video | SpTp:Intro to CAD/Freshman Sem | Basic Bowling |
| Principles of Microeconomics:10.0 | Child Abuse & Child Abduction | Accounting Theory & Research | Desktop Video | SpTp:Intro to CAD/Freshman Sem | Basic Bowling |
| Organizational Behavior:5.0 | Quantitative Methods | Facility Management | First-Year Seminar | Advanced Conditioning | Child Abuse & Child Abdu |
| Organizational Behavior:6.0 | Quantitative Methods | Facility Management | First-Year Seminar | Advanced Conditioning | Child Abuse & Child Abdu |
| Organizational Behavior:7.0 | Quantitative Methods | Facility Management | First-Year Seminar | Advanced Conditioning | Child Abuse & Child Abdu |
| Organizational Behavior:8.0 | Quantitative Methods | Facility Management | First-Year Seminar | Advanced Conditioning | Child Abuse & Child Abdu |
| Organizational Behavior:9.0 | Quantitative Methods | Facility Management | First-Year Seminar | Advanced Conditioning | Child Abuse & Child Abdu |
| Organizational Behavior:10.0 | Quantitative Methods | Facility Management | First-Year Seminar | Advanced Conditioning | Child Abuse & Child Abdu |

With regard to Figure 4, the first column is the input--course title and grade--that resulted in a poor grade; the other columns represent courses that should not be taken simultaneously. However, in closer evaluation of these courses by a number of students, no clear relationships among the courses are notable. Thus, this model is not very useful. The question is "why?"

The Collaborative Filtering Algorithm matches students with similar courses and grades, and then made recommendations on this basis. However, it does not account for assignable variation, such as students who might not just work too hard, or have other extenuating circumstances, no matter what the course. For example, there are several courses within the returned recommendations that are not necessarily heavily quantitatively, such as bowling. In an effort to return more reasonable results, a filter is set to eliminate students that may be experiencing a lack of motivation, for whatever the reason.

By visually evaluating the number of courses failed by a student for the period under review, it was noted that many students get poor grades on 11 or less courses. The data were filtered and data were removed for students who received poor grades on more than 10 courses. The result is Figure 6: Detrimental Course Combinations Using Collaborative Filtering After Data Removal.

Figure 6: Detrimental Course Combinations Using Collaborative Filtering After Data Removal

| | | | | | |
|---------------------------------------|-----------------------------------|--------------------------------|--------------------------------|-----------------------------------|-----------------------------------|
| Corporate Finance I:8.0 | Independent Study | Magic Realism Latin Amer. Lit. | Legal Environment of Business | Art inCult:1400 to Pres-N MJRS | Intermediate Accounting I |
| Novels and Tales:8.0 | Discourses of Enlightenment | Islamic Civilization | University Calculus I | SpTp: Civil Rights Movement | Magic Realism Latin Amer. Lit. |
| Fundamentals of Communication:8.0 | Rhetoric of Vision and Sound | Plagues And Peoples | Mass Media and Society | Magic Realism Latin Amer. Lit. | Art inCult:1400 to Pres-N MJRS |
| Marketing Research:8.0 | Legal Environment of Business | Web Programming II | Internship | Intermediate Microeconomic Theory | Environmental/Natural Resource |
| Consumer Behavior:8.0 | Marketing Research | Legal Environment of Business | Web Programming II | Internship | Intermediate Accounting II |
| Cost Management:8.0 | Introductory Anthropology | Magic Realism Latin Amer. Lit. | Accounting Info Systems I | Intro to African Am Studies | University Calculus I |
| Introduction to Spanish:8.0 | Magic Realism Latin Amer. Lit. | Independent Study | Legal Environment of Business | Intermediate Accounting I | Art inCult:1400 to Pres-N MJRS |
| Business Law I:8.0 | Magic Realism Latin Amer. Lit. | Legal Environment of Business | University Calculus I | Human Biology | Independent Study |
| Information Systems Structures:8.0 | Analyt Chem | Analytical Chem I Lab | Legal Environment of Business | Art inCult:1400 to Pres-N MJRS | Human Biology |
| Western Civilization II:8.0 | University Calculus I | Art inCult:1400 to Pres-N MJRS | Intro Liberal Arts in P.R. | Human Biology | Magic Realism Latin Amer. Lit. |
| Statistical Analysis:8.0 | International Finance | Introductory Anthropology | University Precalculus | Marketing Foundations | Intermediate Microeconomic Theory |
| Oceanography:8.0 | University Calculus II | University Physics I | University Calculus I | Principles of Biology II | Principles of Biology II Lab |
| Environmental Biology:8.0 | College Physics I | Geology II | Survey of Calculus I | Beginning Music Theory I | Introduction to Public Health |
| Intro to Information Systems:8.0 | University Calculus I | Art inCult:1400 to Pres-N MJRS | Foundations in 2D Form&Content | Principles of Biology II | Critical Thinking |
| Weather and Climate:8.0 | Plagues And Peoples | Art inCult:1400 to Pres-N MJRS | University Calculus I | Principles of Biology II | Foundations in 2D Form&Content |
| Accounting Info Systems I:8.0 | Magic Realism Latin Amer. Lit. | Legal Environment of Business | Discourses of Enlightenment | Introductory Anthropology | Accounting Processes |
| Western Civilization I:8.0 | Analyt Chem | Analytical Chem I Lab | Lifeguard Training | Principles of Biology I | University Calculus I |
| Intermediate Microeconomic Theory:8.0 | Environmental/Natural Resource | Advanced Accounting | Money/Banking/Monetary Econ | Magic Realism Latin Amer. Lit. | Legal Environment of Business |
| First-Year Seminar:8.0 | Art inCult:1400 to Pres-N MJRS | Plagues And Peoples | University Calculus I | Analyt Chem | Analytical Chem I Lab |
| Introductory Sociology:8.0 | Magic Realism Latin Amer. Lit. | American Identities | University Calculus I | Introductory Anthropology | Discourses of Enlightenment |
| Intro Microcomputer Software:8.0 | Lifeguard Training | Principles of Biology I | Analyt Chem | Analytical Chem I Lab | Social Psychology |
| Human Biology:8.0 | Legal Environment of Business | Magic Realism Latin Amer. Lit. | American Identities | Introductory Anthropology | Environmental/Natural Resource |
| Taxation I:8.0 | Magic Realism Latin Amer. Lit. | Introductory Anthropology | Accounting Info Systems I | Advanced Accounting | Environmental/Natural Resource |
| Intro Performing Arts:8.0 | Legal Environment of Business | Art inCult:1400 to Pres-N MJRS | Intro Liberal Arts in P.R. | Web Programming I | Plagues And Peoples |
| Computer Science Overview:8.0 | Art inCult:1400 to Pres-N MJRS | Analyt Chem | Analytical Chem I Lab | Social Psychology | Foundations in 2D Form&Content |
| Drifting Continents:8.0 | Art inCult:1400 to Pres-N MJRS | University Calculus I | Analyt Chem | Analytical Chem I Lab | Catastrophic Weather |
| Geology I:8.0 | University Calculus I | Art inCult:1400 to Pres-N MJRS | Principles of Biology II | Plagues And Peoples | Magic Realism Latin Amer. Lit. |
| Introduction to Ethics:8.0 | Magic Realism Latin Amer. Lit. | Advanced Accounting | Environmental/Natural Resource | Human Biology | Internship |
| Production & Oper Management I:8.0 | Intermediate Microeconomic Theory | Environmental/Natural Resource | Advanced Accounting | Money/Banking/Monetary Econ | Magic Realism Latin Amer. Lit. |
| Elementary French I:8.0 | Global Literary Landmarks | Art inCult:1400 to Pres-N MJRS | University Calculus I | Intro Liberal Arts in P.R. | Sport Psychology |
| Western Cultures:8.0 | Intro Liberal Arts in P.R. | Web Programming I | Scientific Revolutions | University Calculus I | Discourses of Enlightenment |
| Statistical Methods I:8.0 | Discourses of Enlightenment | Introductory Anthropology | Islamic Civilization | Legal Environment of Business | Analyt Chem |
| Fund of Statistics for BA & EC:8.0 | Global Literary Landmarks | Art inCult:1400 to Pres-N MJRS | Sport Psychology | University Calculus I | Analyt Chem |
| Intermediate Accounting I:8.0 | Magic Realism Latin Amer. Lit. | The Greek World | Independent Study | Intermediate Accounting II | Art inCult:1400 to Pres-N MJRS |
| Accounting Processes:8.0 | Magic Realism Latin Amer. Lit. | Intermediate Accounting I | The Greek World | Legal Environment of Business | Accounting Info Systems I |

The results appear to be better. Students who evaluated these course combinations were able to note that many combinations did appear to be problematic, in terms of quantitative content as well as abstract thinking. Additionally, student evaluation of the course suggested that interest in the subject plays a vital role in the success of the course, and poor performance is not necessarily contingent on degree of course difficulty.

For consistency, the FP-Growth Algorithm was applied to the filtered data so that students that demonstrate assignable variation as described above do not influence the final result. That final filtered result is found as Figure 7: Detrimental Course Combinations Using FP-Growth After Data Removal:

Figure 7: Detrimental Course Combinations Using FP-Growth After Data Removal:

| Course Combination | Support |
|--|-------------|
| Principles of Microeconomics - Survey of Calculus I | 0.045887446 |
| Principles of Macroeconomics - Survey of Calculus I | 0.042424242 |
| Principles of Macroeconomics - Precalculus | 0.035497835 |
| Intro to Information Systems - Principles of Macroeconomics - Survey of Calculus I | 0.035497835 |
| Intro to Information Systems - Principles of Macroeconomics | 0.033766234 |
| Fund of Statistics for BA & EC - Principles of Microeconomics | 0.033766234 |
| Principles of Microeconomics - Precalculus | 0.031168831 |
| Principles of Macroeconomics - Craft of Writing | 0.03030303 |
| Princ. of Financial Accounting - Survey of Calculus I | 0.029437229 |
| Intro to Information Systems - Survey of Calculus I | 0.025974026 |
| Princ. of Financial Accounting - Principles of Microeconomics | 0.024242424 |
| Accounting Processes - Intermediate Accounting I - Taxation I | 0.024242424 |
| Princ. of Financial Accounting - Fund of Statistics for BA & EC | 0.023376623 |
| Intermediate Accounting I - Taxation I | 0.022510823 |
| Foundations of Biology - Principles of Macroeconomics | 0.022510823 |
| Principles of Microeconomics - Craft of Writing | 0.022510823 |
| Princ. of Financial Accounting - Principles of Macroeconomics | 0.021645022 |
| Intro to Information Systems - Principles of Microeconomics | 0.021645022 |
| Intro Microcomputer Software - Principles of Macroeconomics | 0.01991342 |
| Intro Microcomputer Software - Principles of Microeconomics | 0.01991342 |
| Accounting Processes - Intermediate Accounting I | 0.019047619 |
| Fund of Statistics for BA & EC - Survey of Calculus I | 0.019047619 |
| Craft of Writing - Precalculus | 0.017316017 |
| Craft of Writing - Survey of Calculus I | 0.017316017 |
| Survey of Calculus I - Introduction to Philosophy | 0.017316017 |
| Prin of Managerial Accounting - Survey of Calculus I | 0.016450216 |
| Managerial Finance - Marketing Foundations | 0.016450216 |
| Information Systems Structures - Survey of Calculus I | 0.016450216 |
| Principles of Macroeconomics - World Cultures | 0.016450216 |
| Principles of Microeconomics - Introduction to Philosophy | 0.016450216 |
| Intermediate Accounting I - Accounting Info Systems I | 0.015584416 |
| Intro Microcomputer Software - Precalculus | 0.015584416 |
| Intro to Information Systems - Fund of Statistics for BA & EC | 0.015584416 |
| Intro to Information Systems - Precalculus | 0.015584416 |
| Principles of Macroeconomics - Western Cultures | 0.015584416 |
| Principles of Microeconomics - World Cultures | 0.015584416 |
| Managerial Finance - Operations Management I | 0.014718615 |
| Princ. of Financial Accounting - Information Systems Structures | 0.013852814 |
| Prin of Managerial Accounting - Information Systems Structures | 0.013852814 |
| Foundations of Biology - Principles of Microeconomics | 0.013852814 |
| Intro Microcomputer Software - Craft of Writing | 0.013852814 |
| Information Systems Structures - Principles of Microeconomics | 0.013852814 |
| Principles of Macroeconomics - Music Appreciation | 0.013852814 |
| Prin of Managerial Accounting - Fund of Statistics for BA & EC | 0.012987013 |
| Accounting Processes - Taxation I | 0.012987013 |
| Principles of Macroeconomics - Principles of Microeconomics | 0.012987013 |
| Principles of Macroeconomics - Foundations of Psychology | 0.012987013 |
| World Cultures - Survey of Calculus I | 0.012987013 |
| Princ. of Financial Accounting - Intro to Information Systems | 0.012121212 |
| Prin of Managerial Accounting - Principles of Microeconomics | 0.012121212 |
| Statistical Analysis2 - Managerial Finance | 0.012121212 |
| Intro Microcomputer Software - Survey of Calculus I | 0.012121212 |
| Information Systems Structures - Fund of Statistics for BA & EC | 0.012121212 |
| Principles of Macroeconomics - World History II | 0.012121212 |
| Precalculus - Foundations of Psychology | 0.012121212 |
| Survey of Calculus I - Foundations of Psychology | 0.012121212 |
| Princ. of Financial Accounting - Legal Environment of Business | 0.011255411 |
| Intro to Information Systems - Craft of Writing | 0.011255411 |
| Principles of Macroeconomics - Planet Earth | 0.011255411 |
| Principles of Macroeconomics - Introduction to Philosophy | 0.011255411 |
| Principles of Microeconomics - Foundations of Psychology | 0.011255411 |
| Foundations of Biology - Intro to Information Systems | 0.01038961 |
| Managerial Finance - Organizational Behavior | 0.01038961 |
| Intro Microcomputer Software - Fund of Statistics for BA & EC | 0.01038961 |
| Fund of Statistics for BA & EC - Precalculus | 0.01038961 |
| Principles of Microeconomics - World History II | 0.01038961 |
| Principles of Microeconomics - Music Appreciation | 0.01038961 |
| Survey of Calculus I - Music Appreciation | 0.01038961 |

A key point from Figure 7 is that some form of calculus and some form of economics is found in about 33 – 35% of the combinations. Additionally, a combination of both of those types of courses leads in terms of the proportion of students within the data set.

CONCLUSION

From the analysis, it appears that data mining techniques are valuable tools to determine relationships valuable to the course selection process. Indeed, insights gained from the evaluation of student data using the FP-Growth and the Collaborative Filtering algorithms include:

1. Students should be evaluated by some means, perhaps via entrance exam performance, before recommendations of scheduling into two quantitatively focused courses, particularly economics and calculus.
2. Student interest in a course may play a role in academic success within any given course.

LIMITATIONS AND FURTHER STUDY

This study has at least three limitations which may be further evaluated for study:

- 1) Not all students were entered into the data set. Students who did not experience academic difficulty were not entered into the data set. In doing so, it would be possible to identify if these course combinations existed in that data set thereby offsetting the resultant conclusion. Additionally, expanding the data set may also identify courses which should be recommended in combination.
- 2) The data were not linked to student year, with regard to freshmen, sophomore, junior or senior. As a result, we were unable to ascertain if freshmen may have a more difficult time with specific course combinations in contrast with students with more academic experience.
- 3) The quantitative capability of the students was unknown. It would be helpful to link the student outcomes to standardized evaluation of his or her quantitative aptitude to better understand the possible detrimental outcome of the specified course combinations.
- 4) Lastly, we were unable to determine what students withdrew from college from the dataset. This knowledge would provide us a more definitive impact on retention.

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CONSEQUENCES ON THE EXCESSIVE USE OF SMARTPHONE AND SOCIAL MEDIA AMONG COLLEGE FRESHMAN COMPARE TO NON-FRESHMAN IN FEAR OF MISSING OUT (FOMO) CONTRIBUTE TO THEIR ACADEMIC PROGRESS

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ABSTRACT

Almost all freshmen have the latest model of smartphone with Internet connection and full with different kind of apps. Most of them use their smartphone excessively at any place, time, and occasion. They even check on their smartphone during the lecture. It is not unusual several of them are even browsing websites or chatting on their smartphone while they are asking for help during faculty office hours. These behavior in the university environment could indicate that they would spend more time and effort in their daily live in accessing online information in the fear of missing out (FOMO) related interested information that are boiling among their peers.

This study aims to examine how freshman and non-freshman students use and uncover the relationship between smartphone and social media addiction level to their academic progress. A questionnaire on what, how, frequency, and consequences such as feeling anxiety and depress because the excessive use of smartphone and social media will be conducted.

INTRODUCTION

Social media is a popular informative and communicative platform among users across the globe (Dhir, 2018). Nearly half of Gen Zers use mediated inter personal communication or digital communication (via smartphone, social media, email, texting, instant messaging, etc.) most often than dace-to-face communication (Ahmed, 2019). A marketing strategist named Dan Herman claims to be the first to identify the phenomena that is Fear Of Missing Out (FOMO) in the 1990s. A Harvard MBA student, Patrick McGinnis, who is credited with popularizing it when he wrote about it in 2004 in *The Harbus*, the Harvard Business School's student newspaper. FOMO is an anxious feeling you get when you feel other people might be having a good time without you. In the digital age, FOMO often leads to a constant checking of social media to see what your friends or others are doing. There are 7 symptoms associated with FOMO (McGinnis, 2016).

DATA COLLECTION

The questionnaire of this study consists of 31 check-box and fill-in questions, and 31 questions using Likert scale selections. In addition, the participants may write their responses to two open ended, qualitative questions.

On the check-box questions, participants were asked to provide their age, gender, college rank, whether or not they have Internet access in their residence and in campus through smartphone or computer, what kind and how long they have accessed some social media channels, (while at school) how many time they access their smartphone or computer for school and non-school related activities.

On the Likert scale questions, participants were asked what activities they conduct on social media, why they are using smartphone or computer most of the time, and what they afraid to miss if they do not have access to the Internet.

On the open ended questions participants were asked what would be the benefits and disadvantages to be connected through smartphone and what would be the best ways to reduce their connection and dependability to the smartphone.

Survey Methods

All participants voluntarily involved in the study. No credit towards grade nor financial compensation were awarded to the participants. There were 69 freshman and 92 non-freshman students participated in it.

Table 1: Survey Participants

| Rank | Total | Male | Female |
|----------|-------|------|--------|
| Freshman | 69 | 64% | 36% |

| | | | |
|--------------|-----|-----|-----|
| Non-freshman | 92 | 70% | 30% |
| Total | 161 | 67% | 33% |

In total, there were more than twice the number of male (67%) than female (33%) participants. The gender percentage different will be solely attributed to the fact that male students are more willing to participate in the survey. The gender will not affect the data analysis. The non-freshman students consists of sophomore 30%, junior 47%, and senior 23%, in total, there are 70% non-freshman participants are junior and senior. The majority of freshman is 18 years old (70%), while the majority of non-freshman is 20 years old (37%) and the next group is 21 years old (30%). The majority of non-freshman participants are in average 2 to 3 years older than freshman participants.

The overwhelming participants (99%) specified that they have at least one personal computer, one smartphone, and Internet connection in their residence. Given the university provides Internet access to all across the campus, the availability of these facilities show that most of them have access to the Internet through their computer or smartphone from anywhere at any time.

However only 87% of freshman and 77% of non-freshman participants reported that they carry their smartphone around campus. Others reported that they carry backpack, computer, or textbook. More freshman than non-freshman carry their smartphone anywhere they go.

DATA ANALYSIS

Access to Social Media

Both freshman and non-freshman access different types of Social Media in their in and out campus. There are seven Social Media Network types and twenty social media names are listed in the questionnaire.

Table 2: Social Media Utilization

| Social Media | | | | Freshman | Non-Freshman |
|--------------|-----------------------|----|-------------|-----------|--------------|
| # | Types | # | Names | Avg-Years | Avg-Years |
| 1 | Social Network | 1 | Facebook | 4.23 | 5.30 |
| | | 2 | Twitter | 2.83 | 4.40 |
| | | 3 | Linkedin | 0.41 | 1.01 |
| 2 | Media Sharing Network | 4 | Instagram | 5.10 | 5.21 |
| | | 5 | Snapchat | 4.67 | 4.83 |
| | | 6 | YouTube | 7.33 | 7.53 |
| 3 | Discussion Forum | 7 | Reddit | 0.43 | 0.47 |
| | | 8 | Quora | 0.06 | 0.07 |
| | | 9 | Digg | 0.00 | 0.04 |
| 4 | Bookmarking & Content | 10 | Pinterest | 1.03 | 1.32 |
| | | 11 | Flipboard | 0.00 | 0.10 |
| 5 | Consumer Review | 12 | Yelp | 0.09 | 0.12 |
| | | 13 | Zomato | 0.00 | 0.02 |
| | | 14 | TripAdvisor | 0.03 | 0.04 |
| 6 | Blogging & Publishing | 15 | WordPress | 0.00 | 0.09 |
| | | 16 | Tumblr | 0.28 | 0.50 |
| | | 17 | Medium | 0.00 | 0.07 |
| 7 | Social Shopping | 18 | Polyvore | 0.00 | 0.07 |
| | | 19 | Esty | 0.22 | 0.34 |
| | | 20 | Fancy | 0.00 | 0.01 |

The most popular is YouTube, freshman have been utilized it in average of 7.33 years and non-freshman have been utilized it in average of 7.53 year. The second most popular is Instagram, freshman have been utilized it in average of 5.10 years and non-freshman have been utilized it in average of 5.21 years. The third most popular is Snapchat, freshman have been utilized it in average of 5.10 years and non-freshman have been utilized it in average of 5.21 years. The first three most popular media apps are all Media Sharing Networks type. In this network apps, their member activities are to find and share photos, video, live video, and other media online.

The average age different between freshman and non-freshman is between 2 to 3 years, but their average length of using YouTube, Instagram, and Snapchat are about the same. This indicate that freshman have started using them 2 to 3 years younger than non-freshman.

The fourth most popular is Facebook, freshman have been utilized it in average of 4.23 years and non-freshman have been utilized it in average of 5.30 years. The fifth most popular is Twitter, freshman have been utilized it in average of 2.23 years and non-freshman have been utilized it in average of 4.40 years. The fourth and fifth most popular media apps are Social Networks type. In this network, their member activities are to connect with people (and brands) online. The sixth most popular is Pinterest, freshman have been utilized it in average of 1.03 years and non-freshman have been utilized it in average of 1.32 years. Pinterest is Bookmarking & Content Curation Network type. In this network, their member activities are to discover, save, share, and discuss new and trending content and media.

Linkend surprisingly is the seventh most popular Social Media app. Freshman have been utilized it in average of 0.41 years and non-freshman have been utilized it in average of 1.01 years. Like Facebook and Twitter, LinkedIn is Social Networks type. LinkedIn helps its members to develop a strong digital footprint, research companies and industries, find and apply for jobs, and build a strong professional network.

The rest of Social Media apps in average were accessed and utilized by less than a year by both freshman and non-freshman participants.

Computer and phone activities on campus

There is a slight different on how freshman and non-freshman work around their computer and phone. Freshman check their computer 1.9 time while non-freshman check 1.6 times in an hour. However, they check their smartphone much more often, freshman check their smartphone 12.5 times and non-freshman spend 10.9 times in an hour.

Table 3: Computer and Smartphone Utilization

| Description | Freshman | Non-freshman |
|---|------------|--------------|
| Check your computer in an hour | 1.9 times | 1.6 times |
| Check your smartphone in an hour | 12.5 times | 10.9 times |
| Work on college related with computer in 24 hours | 4.0 hours | 3.6 hours |
| Work on college related with smartphone in 24 hours | 1.4 hours | 1.8 hours |
| Work on non-college related with computer in 24 hours | 2.1 hours | 2.3 hours |
| Work on non-college related with smartphone in 24 hours | 5.8 hours | 5.3 hours |

In 24 hours, both freshman and non-freshman spend almost the same amount of hours working in their computer and smartphone. Freshman spend about 4 computer hours and about 1.4 smartphone hours on college related works. Freshman also spend about 2.1 computer hours and about 5.8 smartphone hours on non-college related activities. Non-freshman spend about 3.6 computer hours and about 1.8 smartphone hours on college related works. Non-freshman also spend about 2.3 computer hours and about 5.3 smartphone hours on non-college related activities.

Therefore, in 24 hours, both freshman and non-freshman spend around 3.8 computer hours and 1.5 smartphone hours for college related works. They also spend around 2.2 computer hours and 5.6 smartphone hours for non-college activities. They spend more computer hours for college related works and spend more on smartphone hours for non-college activities.

Things first to check or to know early in the morning

Snapchat is the favorite app for both freshman and non-freshman (50.72% and 27.17% respectively) to checked first time in the morning. Snapchat is a mobile messaging application used to share photos, videos, text, and drawings. It's free to download the app and free to send messages using it. Therefore, it has become hugely popular in a very short space of time, especially with young people. The next most check apps is weather, follow by Message, Email, and News.

Table 4: First app that will be checked 1st time in the morning.

| College ranks | Snapchat | Weather | Message | Email | News |
|---------------|----------|---------|---------|-------|-------|
| Freshman | 50.72% | 10.14% | 8.70% | 1.45% | 1.45% |
| Non-freshman | 27.17% | 4.35% | 5.43% | 4.35% | 3.26% |

However, both freshman and non-freshman first check the messages that they received in the morning. The messages that were received through many apps including from Snapchat. The messages will include information such as who texted them, class cancellation, what friends are doing, plan for today, games scores, and the likes. The specific information they would like to know early in the morning are time, weather, and news. It is not a surprise that Email is the last app they will check for information. With so many more flexible, faster, and free messaging app with advanced data combination and exchange possibilities, Email becoming less attractive to its users.

Table 5: First information that will be checked 1st time in the morning

| College ranks | Time | Weather | Message | Email | News |
|---------------|-------|---------|---------|-------|--------|
| Freshman | 8.70% | 5.60% | 23.19% | 0.00% | 4.35% |
| Non-freshman | 8.70% | 6.52% | 20.65% | 1.09% | 13.04% |

Social Media activities

There are two activities that both freshman and non-freshman are very often and moderately conduct on social media. They are sending/receiving text and watching videos/movies. In both activities, freshman slightly do more than non-freshman. In sending/receiving text, freshman in average do 10% more than non-freshman (91.30% compare to 83.70%). While in watching videos/movies, freshman in average do 10% more than non-freshman (81.16% compare to 76.09%).

The next two activities that both freshman and non-freshman are very often and moderately conduct on social media are initiating/sending video and sending/receiving email. Both freshman and non-freshman are about the same interest initiating/sending videos than non-freshman (43.47% compare to 42.39%). Freshman in average slightly more in sending/receiving email than non-freshman (43.47% compare to 40.22%).

It is very encouraging to detect that both freshman and non-freshman less often and moderately in playing games. Non-freshman play game even spend less than freshman (23.91% compare to 33.33%).

However, both freshman and non-freshman less often and moderately in reading books/news/magazines online. Freshman read less than non-freshman (17.34% compare to 30.34%).

Table 5: Activities they do on the social media

| Freshman | Very Often | Moderate | Occasionally | Rarely | Never |
|---|------------|----------|--------------|--------|--------|
| text (sending and receiving) | 59.42% | 31.88% | 8.70% | 0.00% | 0.00% |
| video and video call (initiating and sending) | 11.59% | 31.88% | 36.23% | 17.39% | 2.90% |
| email (sending and receiving) | 10.14% | 33.33% | 43.48% | 13.04% | 0.00% |
| watching videos/movies | 49.28% | 31.88% | 15.94% | 1.45% | 0.00% |
| reading books/news/magazines | 1.45% | 15.94% | 36.23% | 39.13% | 7.25% |
| Play games | 14.49% | 18.84% | 18.84% | 28.99% | 18.84% |

| Non-freshman | Very Often | Moderate | Occasionally | Rarely | Never |
|---|-------------------|-----------------|---------------------|---------------|--------------|
| text (sending and receiving) | 50.00% | 33.70% | 14.13% | 2.17% | 0.00% |
| video and video call (initiating and sending) | 16.30% | 26.09% | 35.87% | 16.30% | 5.43% |
| email (sending and receiving) | 14.13% | 26.09% | 32.61% | 21.74% | 5.43% |
| watching videos/movies | 51.09% | 25.00% | 18.48% | 4.35% | 1.09% |
| reading books/news/magazines | 9.78% | 20.65% | 30.43% | 32.61% | 6.52% |
| Play games | 17.39% | 6.52% | 28.26% | 33.70% | 14.13% |

Reason for using smartphone/computer

Both freshman and non-freshman are strongly agree and agree that the reason they are using smartphone/computer is to communicate with friends and family. Freshman more than non-freshman in communicating with their friends (100% compare to 97.83%). While in communicate with family freshman is slightly more than non-freshman (98.55% compare to 95.65%).

The next key reason they are using smartphone/computer is to find interesting current news/situation reason. Non-freshman more interested than freshman (81.52% compare to 69.56%).

All survey participants are strongly agree and agree that they are not interested in their old friends' information and more detail about current friends' information.

Table 6: Why they are using smartphone/computer

| | Strongly | | Unable to | | Strongly |
|---|-----------------|--------------|------------------|-----------------|-----------------|
| Freshman | Agree | Agree | Judge | Disagree | Disagree |
| to communicate with family | 59.42% | 39.13% | 1.45% | 0.00% | 0.00% |
| to communicate with friends | 72.46% | 27.54% | 0.00% | 0.00% | 0.00% |
| to find interesting current news/situation | 33.33% | 36.23% | 21.74% | 8.70% | 0.00% |
| to look for my old friend's current information | 10.14% | 17.39% | 33.33% | 34.78% | 4.35% |
| to look for my friend's current information | 11.59% | 40.58% | 28.99% | 15.94% | 2.90% |
| to look for my prospective friend's information | 5.80% | 23.19% | 44.93% | 24.64% | 1.45% |
| Non-freshman | Strongly | Agree | Unable to | Disagree | Strongly |
| | Agree | Agree | Judge | Disagree | Disagree |
| to communicate with family | 55.43% | 40.22% | 3.26% | 1.09% | 0.0% |
| to communicate with friends | 70.65% | 27.17% | 2.17% | 0.00% | 0.0% |
| to find interesting current news/situation | 31.52% | 50.00% | 10.87% | 6.52% | 1.1% |
| to look for my old friend's current information | 9.78% | 27.17% | 20.65% | 35.87% | 6.5% |
| to look for my friend's current information | 11.96% | 44.57% | 19.57% | 17.39% | 6.5% |
| to look for my prospective friend's information | 8.70% | 18.48% | 33.70% | 28.26% | 10.9% |

What updates they afraid not to oversight

There are two group of information that the survey participants afraid to oversight: updates from related family/friends, and updates from related university/courses/professors. Both group of information are extremely and moderately important for them.

Freshman slightly more afraid than non-freshman in missing information from their family/friends (freshman average 73.19% and non-freshman 61.41%). In the updates from university/courses/professor. Freshman are also more afraid than non-freshman in missing information from university/courses/professors (freshman 76.33% compare to 72.10%).

Table 6: What updates they afraid to oversight

| | Extremely | Moderately | Neutral | Low | Not |
|--|------------------|-------------------|------------------|------------------|------------------|
| Freshman | Important | Important | Important | Important | Important |
| any updates from your family | 44.93% | 28.99% | 18.84% | 7.25% | 0.00% |
| any updates from your friends | 24.64% | 47.83% | 21.74% | 5.80% | 0.00% |
| any updates from your neighbors | 4.35% | 10.14% | 42.03% | 17.39% | 26.09% |
| any updates from your music starts | 0.00% | 10.14% | 26.09% | 23.19% | 40.58% |
| any updates from your movie stars | 1.45% | 2.90% | 26.09% | 23.19% | 46.38% |
| any updates from your nfl/nba/nhl, etc stars | 5.80% | 13.04% | 23.19% | 24.64% | 33.33% |
| any updates from your courses | 37.68% | 37.68% | 20.29% | 4.35% | 0.00% |
| any updates from your teacher/professor | 39.13% | 40.58% | 17.39% | 2.90% | 0.00% |
| any updates from your school/university | 34.78% | 39.13% | 15.94% | 10.14% | 0.00% |
| any updates from your political representative | 1.45% | 14.49% | 42.03% | 21.74% | 20.29% |
| | Extremely | Moderately | Neutral | Low | Not |
| Non-freshman | Important | Important | Important | Important | Important |
| any updates from your family | 36.96% | 28.26% | 26.09% | 6.52% | 2.17% |
| any updates from your friends | 22.83% | 34.78% | 28.26% | 10.87% | 3.26% |
| any updates from your neighbors | 5.43% | 7.61% | 38.04% | 23.91% | 25.00% |
| any updates from your music starts | 6.52% | 6.52% | 26.09% | 29.35% | 31.52% |
| any updates from your movie stars | 4.35% | 4.35% | 26.09% | 28.26% | 36.96% |
| any updates from your nfl/nba/nhl, etc stars | 9.78% | 11.96% | 22.83% | 20.65% | 34.78% |
| any updates from your courses | 43.48% | 33.70% | 18.48% | 2.17% | 1.09% |
| any updates from your teacher/professor | 36.96% | 35.87% | 22.83% | 3.26% | 1.09% |
| any updates from your school/university | 35.87% | 30.43% | 26.09% | 4.35% | 3.26% |
| any updates from your political representative | 10.87% | 13.04% | 35.87% | 19.57% | 20.65% |

DISCUSSION

The most popular social media app is YouTube, follow by Instagram, Snapchat, Facebook, Twitter, Pinterest, and Linkedn. Both freshman and non-freshman spend many hours in a day on computer and smartphone. The study shows that they spend more computer hours for college related works and spend more on smartphone hours for non-college activities. Snapchat is the favorite app for both freshman and non-freshman to check message first time in the morning. With so many more flexible, faster, and free messaging app with advanced data combination and exchange possibilities, Email becoming less attractive to its users.

There are two activities that both freshman and non-freshman conduct on social media. They are sending/receiving text and watching videos/movies. They agree that the reason they are using smartphone/computer is to communicate with friends and family. The next key reason they are using smartphone/computer is to find interesting current news/situation reason. Also, there are two group of information that the survey participants afraid to oversight: updates from related family/friends, and updates from related university/courses/professors.

SUMMARY

Participants of this study were limited to Business College students. With their diverse backgrounds and the total number of volunteered participants, this study can be approached as normal distribution. This study shows that given the Internet access availability, the students spend excessive hours to access social media through their smartphone and computer. The main reasons for them to access information through social media because they are afraid to miss updates from their family, friends, and any updates related to their school.

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REFLECTIONS ON A GREEN NEW DEAL: SWEDISH SUSTAINABILITY

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ABSTRACT

Presently, there has been a discussion of a “Green Bill of Rights” in the U.S. Two of the elements in this discussion include affordable housing and ecological sustainability, areas in which Sweden is an acknowledged leader. That is, Sweden is perceived as sustaining a high level of competitiveness while producing a pleasant environment in which to live. In effect, the Swedish State is involved in municipal public housing, and sustainability is the responsibility of Government Offices as a whole, which produces proactive programs in these sectors. The task of implementing Sweden’s strategy for sustainable development has illustrated a holistic approach, and the State has played a major role in its development. Insofar as Sweden might be a model for other countries interested in extending their efforts in sustainable development (perhaps the U.S.), observations here provide some insights into possible approaches and results. Put another way, the paper involves some consideration of “how did we get here and where are we going?” The framework for this paper associates sustainability with Zhang and London’s (2013) modified Porter model and treats elements of municipal public housing, domestic airline travel and forest products in construction.

INTRODUCTION

Last fall, the Swedish government announced it would offer a refund to citizens buying a bicycle with an integrated electric motor (Radosevich, 2018). People there can receive 25 percent, or up to 10,000 kronor, back on the price of their bike. As a further example of concern for the ecology, Umeå in the north encourages not only bicycle usage in its “smart city” approach but has announced plans to operate an electric ferry service between itself and Finland (Lewitschnik, 2019). One might ask, what is the significance of these two announcements? Simply put, they reflect Sweden’s commitment to environmental sustainability. As a point in fact, the country is perceived as sustaining a high level of competitiveness while producing a pleasant environment in which to live (Robecosam, 2018).

Presently, there has been some discussion of a Green Bill of Rights (GBR) in the U.S. (*cf.* Summary, 2019), which makes some Swedish observations relevant. That is, the GBR concept has been cast as a “new deal” among certain elements of our political representation. Insofar as Sweden might be a model for other countries interested in extending their efforts in sustainable development, observations here provide some insights into possible approaches and results. Put another way, as opposed to a new deal, Swedish progress and practice represents the “real deal”. In an apolitical way, citations of current Swedish practice conceivably represent the future state of any country that places itself on a path of sustainable development.

Although not experts, we are not novices in the area of sustainability, and this paper builds upon previous publications. Our most recent work has dealt both with Swedish sustainability in general (Lindbergh et al., 2016) and with municipal housing in particular (Lindbergh et al., 2019, 2018). As a foundation of the 2016 paper, it was suggested that Sweden has pursued a dedicated path toward greater sustainability and indicated some examples of sustainable developments in that progress. With regard to municipal housing, both management’s intentions (2018) and actual results (2019) indicated a strong support for the development of sustainability within that sector. The purpose of this paper is to put present Swedish activities into some perspective. The approach basically follows Siggelkow’s (2007) definition of the use of cases as illustrations. That is, there is, or should be, some natural curiosity of what a green new deal might be like and where it might lead. Insofar as Sweden is an acknowledged leader in sustainability, its experience provides an illustration of what such a strategy/practice would be like and where it might be leading. The study, however, is narrowly confined within the structure of a GBR. It limits itself to environmental sustainability issues because our research has been almost exclusively within that area. Reflections on workers’ rights, education and health care in Sweden would be interesting to follow, but are outside the coverage of this study. Nevertheless, the progress from broad concepts to actual developments should be of interest of educators and students who concern themselves with possibilities of the impending future. Put another way, the paper involves some consideration of “how did we get here and where are we going?”

BACKGROUND

Authors' Previous Studies on Sustainability

As background for this paper on Swedish sustainability, it is useful to briefly summarize our previous three papers on the subject. The 2016 *Competitiveness Review* paper associated Zhang and London's (2013) adaptation of Porter's diamond model of international competitiveness with actual Swedish observations. As a foundation, Zhang and London suggested that sustainability would affect all elements in the Porter diamond. There thus should be a plethora of examples in a sustainability-oriented culture. Our paper therefore described how sustainable development was initiated in Sweden and how it has produced observable results, essentially adding some validity to the Zhang and London model. For example, early background in the Swedish process came from the concept of sustainable development itself (1987) and the UN World Summit in Johannesburg (2002). The Swedish Strategy for Sustainable Development (SSSD) was developed and formally presented a year later (2003). In this paper, five developments were detailed dating from the initiation of the policy in 2003 that covered water; jobs and growth; green corridors; environmental and climate; and mineral strategy. In the development of this description of Sweden's approach to State sustainability, it was recognized that there were other sectors in which effort was likely to be initiated. Thus, the diagram in that paper showed empty boxes where those cases could be entered. See Figure 1.

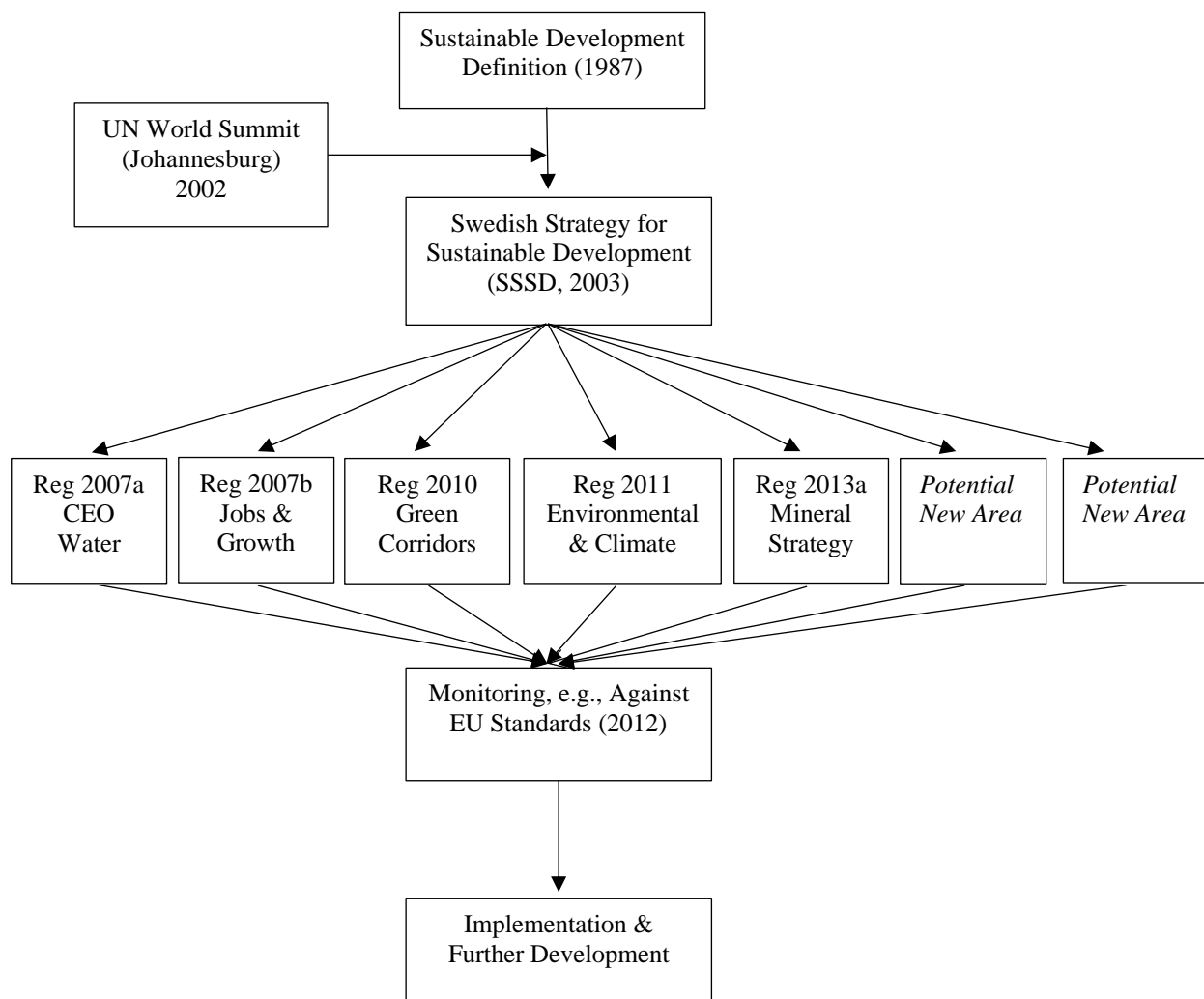


Figure 1. Sequential Nature of Swedish Sustainability Development

The 2018 *Property Management* paper was essentially a case description of public housing refurbishment in the local (Umeå) community and spanned our interest in municipal public housing and sustainability. The major value of the paper might be associated with its timing. It came at a time when the Kyoto agreement had raised concerns about sustainability, but also at a time when many buildings not only in Sweden, but worldwide were facing a need for refurbishment. The study was initiated under the premise that reliable evaluation methods are necessary to ensure investments in energy conservation, and the purpose of this paper was to contribute to that literature. It described some pilot changes and their impact in an actual field study oriented toward upgrading municipal public housing (MPH) units. The overall energy efficiency goal within the project was a 40-50% reduction in the supplied energy for central electricity, domestic hot water and space heating. In order to evaluate if these goals were feasible, a measurement system was installed in a pilot building and in a neighboring building used as a reference. The evaluation was conducted by comparing the post-retrofit performance of the pilot building with the performance of the reference building when it was kept in its initial state (a comparison possible because both buildings had initial similarities). Impacts could be quantified insofar as a reference (control) building in the same environment was sustained for comparison purposes. A 43% improvement was observed in energy utilization in the pilot building compared to its reference companion (99.8 vs 174.5 kWh/m² per year). When the approach was applied to new construction, the present goal of 65 kWh/m² per year was approached as measured by Swedish building code.

The *Journal of Competitive Studies* paper was a continuation of our interest in municipal public housing. This particular paper was concerned with accommodations that have occurred in the Swedish rental sector as a consequence of Municipal Housing Companies (MHCs) complying with the PMHC Act 2011. This act required MHCs to perform in a “more business-like manner”. It was undoubtedly assumed by supporters that the municipal sector of housing would proceed much as before. In other words, the effect would be a tweaking of previous operations. The competitive landscape, however, has changed. Not only have MHCs been affected, but independent rental companies and tenants as well. Observations were associated with classic management concepts, i.e., 1.) unexpected consequences as originally suggested by Merton (1936); 2.) the concept of a business: if MHCs are to become more business-like, this concept is certainly relevant; 3.) the concept of an investment portfolio, particularly that of the property holdings and their returns; 4.) the idea of strategy – intended and emergent; and 5.) cooptation, the simultaneous pursuit of cooperation and competition among firms.

In this paper several important concepts were outlined that help understand Swedish housing and the present concerns with sustainability:

- Apartment rentals are important in Sweden. The sector comprises nearly 30 percent (28.6 percent) of all housing units and is primarily served by three forms of organizations - Public Housing Companies (i.e., MHCs), Independent, Limited Liability Companies, and Individual Ownership of Multi-Units. Among rentals, MHCs comprise over 50 percent (52 percent) of the sector.
- The terms Social Housing and Public Housing are frequently used interchangeably, especially in the U.S. Social housing and public housing are *not* the same; typically, income is used as a criterion for participation in social systems, i.e., the use of a low-income level restricts accessibility. Public housing, instead, is housing built by and managed by public organizations. In the Swedish case, these public organizations are its municipalities. There is *no* social housing in Sweden! (Lind, 2014, p. 91); the term does not exist (Dijol, 2015, p. 26, footnote). The difference between the U.S. (social) and Swedish (public) systems were shown in this paper. Social systems, particularly in the U.S., tend to carry low tenant rent (\$50/mo. v. \$550/mo. in Sweden) and tend to cater to a constituency of seniors, the disabled, single mothers and homeless versus a cross-sectional mix of the population.
- Tenants are unionized in Sweden and rents are negotiated between rental management and these unions. Until a legislation (PMHCA) change in 2011, rents were negotiated between the local Union of Tenants and MHCs, which were also binding upon the private sector and thus further affected the importance of MHCs. Nevertheless, because of PMHCA 2011 private landlords have become equal parties in negotiations and sign their own agreements with unions. That was a game changer in the rental sector – business-like in this context could include price competition.

This paper concluded that the possibility exists that the Swedish rental sector is in a shakeout mode and a paper by Day (1997) not only indicates “why” shakeouts tend to occur but outlined some approaches to survival. The Umeå

situation could be considered to be part and parcel of what Day calls the Seismic-Shift Syndrome. That is, MHCs have enjoyed years of protected prosperity. Now, however, they are effectively deregulated. Just as “coopetition” is used to describe situations in which firms compete in some situations but cooperate in others, “municipalization” may evolve to describe the partial privatization of the housing sector.

New Deal and the Real Deal

At this point in time (summer 2019), a U.S. Green New Deal is substantially a political statement. Nevertheless, it has been characterized as a four-part program for “moving America quickly out of crisis into a secure, sustainable future” (Summary, 2019). Supporters suggest that it is “Inspired by the New Deal programs that helped us out of the Great Depression of the 1930s, the Green New Deal will provide similar relief and create an economy that makes our communities sustainable, healthy and just”. The tenants of this development are outlined below. In comparison, it could be argued that the concept bears a remarkable similarity to the welfare states in Europe, particularly the Scandinavia and in our case Sweden. For instance, statements concern the following:

- Workers’ rights: “including the right to a living wage, a safe workplace, to fair trade and organize a union at work with fear of firing or reprisal”. Recall that in general, Sweden has a heavy union tradition to the extent that even tenants and students are unionized.
- Tuition-free education: “a tuition-free, quality, federally funded, local controlled public education system from pre-school through college”. Private, professional programs face a difficulty insofar as they require student funding, which is difficult to support under Swedish regulation.
- Affordable housing: “the right to decent affordable housing, including an immediate halt to all foreclosures and evictions”. Note that one of the unique characteristics of Swedish public housing is its availability to *anyone* regardless of income.
- Universal health care: “quality health care which will be achieved through a single-payer Medicare-for-all program”.
- Ecologically sustainability: the “investment in sustainable nontoxic materials, closed-loop cycles that eliminate waste and pollution, as well as ... sustainable forestry”.

Umeå and Its Sustainability Focus

Umeå has been featured as an example in some of our research, especially that on municipal housing. It is located about 400 U.S. miles north of Stockholm on the coast of the Baltic Sea. When Umeå University was established in 1965, population growth increased, and the amount of housing has doubled in the last 30 years. It is the thirteenth largest city in Sweden, with about 85,000 permanent inhabitants and another 40,000 students in the University system. It is the capital of Västerbotten County, a center of education, and cutting-edge healthcare. The University and its affiliates are centers of social, technical and medical research in northern Sweden. It is connected domestically with air, bus and rail facilities and by ferry with Vasa, Finland across the Baltic Sea and its two universities there. Internal transportation within the city is facilitated by a functioning residential bus system and a number of taxi companies. One impression of first-time visitors, however, is number of cyclists one sees and the dedicated system of bicycle paths within the city.

Umeå was the European Capital of Culture during 2014, an award that not only recognized its cultural environment, but its approach to providing a sustainable environment for its residents. In that regard, the aforesaid Ålidhem refurbishment project was recognized with the **Energidépriset 2015** (The Energy Idea Award) From the Sustainable Innovation Group (a non-profit organisation owned by the Association for Energy Efficiency (Effekt) where Riksbyggen, Vattenfall, Göteborg Energi, Fagerhult, Toyota, Stockholmshem, ÅF, Intel, White and WSP are members), **National Energy Globe Award Sweden 2014** from the Austrian Embassy in Stockholm, **Sustainable Energy Europe Awards 2013** (Living category) from the European Commission, **Umeå kommuns miljöpris 2013** (Umeå Municipality’s Environment Award), **Green Citizens of Europe 2011** Kommunal tekniska föreningen (The Municipal Technical Association) by the Swedish Municipal-Technical Association (SKT) to reward good efforts in urban planning. In aggregate, this recognition reflects the commitment of residents to sustainability as an operating policy of the City, its administration, industry and residents.

METHODOLOGY

The research reported here was both exploratory and qualitative in nature and utilized an in-depth case study approach to the Swedish international economy. The approach basically followed Siggelkow's (2007) definition of the use of cases as illustrations. That is, the selection of the country was not random, but very special in the "sense of allowing one to gain certain insights that other organizations would not be able to provide". Examples of activity were selected that provided association and thus foundation for analysis provided by Zhang and London's (2013) modified Porter model. The criteria for selection were:

- The illustration had to be clearly Swedish and directly applicable to the ZL description of the sustainability – other factor interaction;
- A secondary source had to be available describing the example, preferably in English; and
- The example had to be directly associated with the ZL sustainability – other factor interaction. For instance, the work in Sweden relating to the natural resource interaction associated with sustainable developments in wood and forestry as related to government, demand and (especially) support industries.

Information was drawn from current secondary sources (Government Offices of Sweden, Regeringen reports for various years and topics, Statistics Sweden, available World Bank data and because of the current nature of the changes, internet information of the development). These sources have been complemented by personal contemporaneous observations and conversations with individuals in Sweden.

OBSERVATIONS

Ongoing Development: Municipal Public Housing

We have been following the progress of Municipal Public Housing for at least the past fifteen years and have routinely reported on our observations at local conferences as well as in peer reviewed journals. It is a topic of particular importance because of the impact this sector has on Swedish GDP and the influence it has on Swedish housing policy and practice. Beginning in 1950 almost all municipalities set up their own independent housing companies. These companies were non-profit organizations in which the municipalities held all the shares. The municipalities had to provide the whole of the capital, normally 1.0% of the production costs of construction. Otherwise, the organizations borrowed all the capital required for housing construction or renovation in the capital markets. Their only source of income was their rents, so they had to reserve funds for capital costs, administration, maintenance, and development. It was in this area that some concerns were addressed. Planning legislation gave the municipality the sole right to land use, and the municipality thus decided when and where housing was to be built. The municipality also granted building permits for housing and other construction under provisions of the legislation. It (the municipality) also could issue financial guarantees for construction as a form of subsidy. The municipality and/or company decided on rules for housing allocation. Need was the common criterion; maximum income was never used. At one time the municipalities were responsible for housing allocation, but now this task is increasingly being taken over by the companies themselves.

Public housing under Swedish policy is universally accessible and allowances are not made by income level, but rather the need for housing. Nevertheless, in July 2002, the European Property Federation lodged a complaint with the European Commission, objecting to the Swedish practice of allocating state aid to the housing of "well-off people". After a State inquiry and significant debate, the Swedish parliament abolished public service compensation for municipal housing companies in order to maintain the principle of universal access. The Municipal Housing Act, which entered into force on 1 January 2011, liberalized the sector and set out the objectives and ground rules for public housing companies. The State's aim was to promote public benefits and the supply of housing for all kinds of people (still) and/but Municipal Public Housing Companies needed to operate under "business-like principles". Under the new legal framework, public companies should charge market rents, including a certain profit margin. Furthermore, municipalities should require a market rate of return on investment, reflecting industry practice and level of risk.

In the promulgation of Municipal Housing Act of 2011, it was not explicitly noted, but undoubtedly assumed, by legislators that the municipal sector of housing would proceed much as before. That is, municipalities would continue to promote public benefits and the supply of housing for all kinds of people. The only difference would be the "business-like" addition to activities. To be sure adjustments were of course anticipated, but Swedish residents would

continue to be largely content with their housing system. The European Property Federation and the European Commission, however, would be off the State's back. As is frequently the case in examples of New Public Management applications; however, there can be unexpected results. In the Swedish example, one change had to do with the relationship between public and private housing provision. Until MHA 2011, rents were negotiated between the local Union of Tenants and MHCs, which were also binding upon the private sector and thus further affected the importance of MHCs. Nevertheless, because of MHA 2011 private landlords have been equal parties in negotiations and sign their own agreements with unions – business-like in this context could include price competition, something rather new to this sector. Further, market rents, profit margins, rates of return on investment and levels of risk had companies analyzing and reassessing their operations. In effect, these companies were pushed into decision making situations that had few, if any, historical precedents and are likely going through a paradigm shift in their operations.

Presently, as the industry goes further, new construction has not kept pace with population growth particularly in the larger cities; in all three major metropolitan areas, the increase in the number of finished residential properties has only been one-fifth of the population increase. According to the latest survey carried out by the National Board of Housing, Building and Planning, 240 out of 290 local municipalities have a shortage of housing. The average wait time for a Stockholm County apartment has grown to 9.1 years. For a contract on a city-center apartment, the wait is 13.5 years. Immigration of course has accentuated the capacity problem. A regulation introduced in 2016 meant that municipalities were required to house more than 20,000 immigrants who have been distributed throughout the country. Whatever the case, the situation is not the same everywhere; individual companies have entered this period facing different local environments and with different resources. All firms in the industry have not adopted the same strategy, nor should they. Nevertheless, those that possess superior resources and make appropriate decisions in their adaption might be expected to do well. Those that have not and/or do not – not so well.

The municipal housing landscape has shifted toward becoming more competitive within the local communities. As the sole stockholders of MHC shares, the municipalities themselves have dual concerns. First are the financial concerns that any stockholder has for their share ownership, i.e., what are the anticipated cash flows likely to be that determine the present value of their holdings? Second are the sociological concerns, i.e., to what degree are the housing needs of our residents being met? The answer to the first question is no longer academic insofar as properties changing hands. The second one is critical because housing availability determines to some degree economic stability and growth; put another way, people need places to live in the area in which they work. Effectively, the unanticipated consequence of MHA 2011 has produced a step toward deregulation of the public housing market. Insofar as the movement has occurred from a rather protective base to one that is now more competitive, this shift may be regarded as a problem for them. We may be seeing a shakeout in progress. Consequences of horizontal alliances, i.e., cooperation among adjoining MHCs can be anticipated as well as the vertical ones of public-private affiliations.

Changes in the housing market and its environment are creating new challenges for the public housing sector in Sweden. In addition to its core activity – building and managing rental dwellings for everyone – Public Housing Sweden (formerly SABO), a trade association of about 300 Municipal Public Housing Companies, has developed a position paper. It suggests that the public housing sector needs to develop its role as a community developer and facilitator. To support this work, Public Housing Sweden, the Swedish association of public housing companies has produced a concept programme in dialogue with its member companies, entitled ***The Public Housing Sector Moving towards 2030***. This effort's overall goals are (1) a fossil free public housing sector by the year 2030; and (2) 30 percent lower energy use by 2030 (Långström et al., 2019).

By regulation, MHCs are required to renovate their apartments every 11 years. The degree of renovation is developed in consultation with the local tenants union and generally includes inspection and reflection of counter tops, flooring and wall covering. Partially as a consequence of PHS's observation as well as the probable inevitability of a sustainability regulation, a local housing company has initiated a renovation project that includes elements of sustainability. In "Reflections on Sustainable Ålidhem: A Case Study in Swedish Municipal Public Housing Refurbishment" (Lindbergh et al., 2018), a 43% improvement was observed in energy utilization in the pilot building compared to its reference companion (99.8 vs 174.5 kWh/m² per year). The pilot project of the local company does not include all the changes made in the Ålidhem case, but it does include some important energy saving features, primarily new windows, doors and energy monitoring devices (Långström et al., 2019). See Table 1.

| Refurbishment item | |
|--|--|
| asbestos sanitation in bathrooms and kitchens | new tap water system |
| replacement of pipes | 2 new laundry rooms |
| relining of wastewater pipes in the foundations | new fibre optics (broad band) |
| new shower rooms, furnishings and goods, new kitchens incl. preparation for dishwasher | relining of existing water pipes |
| new windows | new district heating culvert (added in a separate project) |
| new apartment doors | new cold and hot water culvert (added in separate project) |
| new interior doors | 2 heating stations (added in separate project) |
| new electrical installation including residual-current devices (RCDs) | replace old bicycle sheds |
| new ventilation with new fan rooms | preparation for washing machines in 3 and 4 room apartments (no space available for washing machines in smaller flats) |
| refurbishment of 3 flat roofs to pitched roofs (3 have already been completed) | new mail boxes in stairwells, an additional flat. |
| renovate stairwells with painting and new lighting | |
| new entries to the buildings | |

Table 1. List of items to be refurbished in the upcoming refurbishment project

“New” Development: Rationalization of Domestic Airline Transportation

Swedes frequently will refer to their country as “small”. Realistically, that description can be taken only in terms of population; it is a country of about 10 million people. If nothing else, however, it is a long country; North to South, it measures about 1000 US miles. Consequently, air travel developed early in the country, and residents have become accustomed to flying. Stockholm is the major hub of course, but Gothenburg and Malmo are centers to which businesspeople, as well as tourists, routinely travel. Umeå, our location, is about 400 US miles north of Stockholm and is thus about one hour away by air. On a typical weekday, SAS the dominant carrier and its two smaller competitors each make four flights a day – one hour down starting at about 7:00 AM, turnaround and one hour back – four times.

On the other hand, aviation is responsible for about 3%-8% of the world’s total carbon emissions, according to numbers from the US Government Accounting Office. That’s more than South Korea’s total carbon emission. As early as 2016 the Swedish Social Democrat-Green Party government considered a climate tax on flights as part of its budget - a move that would hike ticket prices. The Swedish government has said that a dramatic uptick in the number of airline passengers is behind their tax. That tax was implemented in April 2019. Under current Swedish rules, airlines pay value-added tax of 6 percent on domestic flights while international flights are exempt from VAT. The new airline tax is meant to compensate for the lack of VAT on international flights and for the low-price airlines pay for greenhouse-gas emissions.

The hope is by levying a fee of roughly \$3-\$49 per passenger, depending on the flight’s destination, Sweden’s government can decrease the country’s number of airline passengers. Implicit in this presumption is that fewer passengers would result in fewer flights, which would mean a decreased carbon output. Swedish officials originally predicted that the tax would mean 450,000–600,000 fewer flyers in the country per year, which would mean roughly a 2% reduction in Sweden’s carbon emissions. In our Umeå example, for instance, instead of four flights a day, perhaps we might have to make do with three, or perhaps the smaller competitors might abandon the service.

A recent report from the World Wildlife Fund (WWF) has revealed that 23% of Swedish people have decided not to fly in the last year because they perceive it to be bad for the environment. International flight growth has been cut in half (4%) compared to (9%) historically. At the same time, 188,000 fewer passengers took domestic flights: a drop of three percent. At least one route has already been nixed due to the fee — Norwegian Air’s flight from Karlstad (KSD) to Alicante (ALC). Norwegian also told the Swedish government that the tax might interfere with the carrier’s goal of making Stockholm one of its major hubs according to a *Business Insider Nordic report*. This phenomenon has gone so far as to even add new words to the Swedish vocabulary. One such word is “flygskam”, meaning flying

shame; another is “smygflyga”, meaning flying in secret. They have also invented a word for those who post on social media whilst taking the train; “tagskryt”, meaning train bragging.

“New” Development: Wood Building

It has become popular in the U.S. to talk about “flyover” country, i.e., that portion of the country between the east and west coasts. A lot of U.S. flyover is farmland. In Sweden, flyover is forests – lots of it; up to 70 (68.9) percent of the country or 108,000 square miles (the equivalent of the state of Nevada) is woodland. Forestry and its auxiliary industries make up an appreciable portion of Sweden’s goods production sectors, e.g., machinery, furniture and paper production – plus exports. There is a long history going back to 1903 of state regulation of privately owned forests that promote afforestation and stand management to sustain yields and maintain supplies for industrial users.

It may seem counter-intuitive to think about sustainability in terms of the use of wood as a material, especially in construction. (Remember when plastic bags became popular because we were saving trees?) Wood is now back in popularity. There are 290 municipalities in Sweden and construction of multifamily dwellings in these municipalities increased by 29% in 2017. **Ahola (2018) indicates** that many of these municipalities currently have a wood building strategy. Consequently, it is inferred that a substantial portion of this new construction is wood based. The sustainability argument notes that industrial wood construction technology has the added advantages that:

- Building hours in the workplace are shortened by 70%;
- The construction site is replaced by a mounting site;
- A dry and quality-assured factory environment is ensured; and
- CO₂ emissions are reduced by 50% over a 50-year life cycle.

Then there is the matter of the involvement of a circular economical approach in the use of wood in construction. This consideration is the non-linear alternative to the usual extract-utilize-discard approach to usage of natural resources. Instead, it involves keeping resources in use as long as possible (thus housing as a key usage), extracting maximum value, including recovery and/or regenerating the resource. The (Swedish) government asserts that:

- Collaboration among participants in wood construction is important for industrial wood construction;
- There is a need for continued dissemination of knowledge to promote increased use of sustainable materials;
- Innovative architecture, innovation, development of new material combinations and technical solutions as well as digitization creates the conditions for continued development of industrial wood construction; and
- There is still potential for increased exports in Swedish industrial wood construction, in terms of products, services and knowledge.

REFLECTIONS

How might a Swedish paper be relevant in the U.S.? In general, concern about the U.S. environment appears genuine. This paper attempts to put present Swedish activities into some perspective, which led us to reflect upon the happenings in housing, the airline industry and the wood products sector. Going back to our purpose, it was suggested that concern would be given to how did Sweden get to its present position and where do they seem to be going? The country got there by starting with a serious concern for sustainability that involved a strategy for development, followed by incremental steps of measureable progress (see Figure 1).

Major developments take time of course; it has taken somewhere between 15 and 30 years for Sweden to get to its present position of “most sustainable” in the world. History actually dates back to 1987 with the accepted definition of sustainable development and a formulated strategy was not developed until 2003 (see Figure 1). As illustrated by the examples in Figure 1, progress has been incremental going from concern for water (2007) to the mineral strategy of 2013. Further, the initial steps were concerned primarily institutional and thus any costs to citizens were indirect.

From this initiation, there now appears to be a shift toward direct effects on the citizenry. In each of the sectors covered here, observations touched upon consumer involvement. There thus is the opportunity to see how practices are accepted in which there are consumer reactions that can be followed. That is, sustainability improvements will involve costs to consumers. In MHC renovation, one can follow the reaction to higher rents. While rents cannot be

raised without a significant reason in Sweden – they are collectively negotiated – it is still possible for landlords to use renovations as a basis for considerable increases. Swedish rents can only be raised if the renovation means increased living conditions; as a consequence, it has been suggested that landlords can use comprehensive renovations as a tactic to increase profits. Approval is needed for comprehensive renovations for sure and disputes are sometimes settled in court. In reality, landlords tend to win in nine cases out of ten. The situation of public and private tenants who cannot afford to pay high rents as a result of renovations is dramatic. During renovation, displacement of residents who no longer can afford to stay can occur. According to a newly published study from Gothenburg, a rent rise of 50 percent after renovations resulted in the displacement of at least 30 percent of tenants (Baeten et al., 2016). Further, calculations by the National Board of Housing, Building and Planning, suggest displaced tenants tend to move to poorer areas, contributing to the deepening of segregation in Sweden (Swedish National Report). The term “renoviction” has been coined to describe the situation whereby tenants cannot afford to stay in apartments after renovation, but instead have to find another place to live.

Likewise, one will be able to monitor flying activities as associated with the tax increase. Naturally, there are some who support the tax and its implications; others, however, are taking a wait and see approach. Nevertheless, initial results are available. International flight growth has been cut in half (4%) compared to (9%) historically. At the same time, 188,000 fewer passengers in Sweden took domestic flights: a drop of three percent. Thus, results appear to be running ahead of the expected two percent reduction predicted by Swedish officials. Only the future will tell what the actual impact will be. In Umeå, there are some who support the tax and its implications; others, however, are taking a wait and see approach. Similarly, the wood impact is not so easy to follow. That effect is longer ranged and its impact on consumer spending is less clear. An early indication, however, will be the progression of municipalities who adopt a wood policy, particularly in multi-family dwellings.

As one reflects on these observations, however, some caution is necessary in using these results, especially in making cross-country projections. For one thing, Swedish interest in sustainability may be changing with respect to the priority that sustainability has in State policy. Perhaps the country is no longer as green as it has been, or perhaps people have more important priorities. The most recent national election was for EC representation in which Sweden has 20 representatives. Compared to the election in 2014, the Green Party dropped from more than 15 percent of the vote down to 11 percent, moving from second largest Swedish party in the EU-parliament, to the fourth biggest today. Previously, it had held four seats; it now has two. The Swedish Democrats, the immigrant concern advocate, had its best showing ever and gained a seat. There is also the concern that despite overall similarities, there are cultural differences between the two countries. For that, we turn to Hofstede (2019). His assessment is that there are major differences in the culture of the two countries – the differences in masculinity and long-term orientation, in particular, suggest that sustainability should have a greater priority in Sweden than the U.S.

CONCLUSION

In conclusion, the premise of this paper is there is, or should be, some natural curiosity of what a green new deal might be like and where it might lead us. The approach basically followed Siggelkow's (2007) definition of the use of cases as illustrations. Sweden is an acknowledged leader in sustainability and thus, provides an illustration of what such a deal would be like and where it might be leading. The study, however, is narrow. We have confined ourselves to sustainability issues because our research has been almost exclusively within that area. Reflections on workers' rights, education and health care in Sweden would be interesting, but are outside the coverage of this study. Further, although details of present Swedish activities are interesting, caution is advised upon the degree to which the observations made here might apply elsewhere.

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CHAOS IN US INDIVIDUAL INTRADAY SECURITY PRICES

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ABSTRACT

We examine intraday security prices using Bloomberg market prices from October to December 2018. Our sample consists of 12,193,335 data points, covering 495 stocks, 63 trading days and 391 minutes per day. It is well known that news arrival impacts market prices. Casual empiricism suggests that news arrival is random and therefore intraday market prices may also be random. However, following Lo and MacKinlay (1988) and Chow and Denning (1993), we reject the linear process of randomness in intraday security prices. Following Webel (2011), we then examine the non-linear chaotic process using the zero-one test adjusted by wavelet denoising prior to testing. Our results are consistent with chaotic intraday security returns and inferentially with chaotic news arrival.

INTRODUCTION AND LITERATURE REVIEW

Fama (1976) was perhaps the first to define an efficient capital market as one where the joint distribution of security prices, given the set of information the market uses to determine security prices is identical to the joint distribution of prices that would exist if all relevant information were used. Any precise formulation of an empirically refutable efficient markets hypothesis is of necessity model-specific. Historically, many examinations of the efficient market hypotheses have focused on the paradigm of the random walk. A random walk is a stronger hypothesis than the efficient market hypothesis because it indicates that there is no difference between the security return distribution given the information structure and the unconditional distribution of returns. Any test of security returns and the responsiveness of returns to information is a joint hypothesis: one that market pricing is efficient and simultaneously one that the model used to identify price dynamics is the correct one. Therefore, a precise formulation of an empirically refutable efficient markets hypothesis must be model-specific. Initially we employ the random walk modeling process. However, rejecting this linear process, we then examine a chaotic stochastic process using the 0-1 test.

Our initial examination focuses on the random walk. A property of a random walk process is that the variance of the increments is linear in the sampling interval. Specifically, for example, the volatility of monthly returns must be four times as large as that of weekly returns. Fama and French (1988), Lo and MacKinlay (1988), Poterba and Summer (1988), and Chow and Denning (1993) use this property to examine the stochastic process of security market returns. Analogous to the variance ratio property, under a joint hypothesis of efficient markets and a random walk in prices (and therefore inferentially in news arrival), the correlation of two processes must be identical a different time horizons.⁹ Daniel and Titman (1997) argue that it is the characteristics rather than the covariance or correlation structure of returns that explain the variation in stock returns.

Consistent with Daniel and Titman, we reject the random walk hypothesis. Rejecting the linear structure of security prices using random walk modeling, we then examine the financial time series using a chaotic time series modeling. Our approach is consistent with that of Webel (2012) which avoids the potential biases in chaotic time series testing by employing the 0-1 test. Modeling returns using a chaotic stochastic process has the benefit of greater accuracy in short term return predictions.¹⁰ The benefit of modeling analysis using a chaotic time model is that it potentially leads to greater accuracy in short term predictions and also indicates that haphazard price fluctuations (such as those resulting from news and the information impact of news on prices) actually represent an orderly system in disguise. Considering the Daniel and Titman (1997) results, we first employ principal components analysis to identify the characteristic factors underlying the distribution of our sample of security returns. Hasbrouck and Seppi (2001) implement principal components analysis for the thirty Dow stocks in 1994 at 15-minute intervals using time-aggregated trade and quote data. They find that common factors exist which and can explain part of the common

⁹ The unity of the correlation ratio (CR) for different holding periods can also be used as a powerful tool to jointly test the random walk hypothesis. See Chow and Denning (2005).

¹⁰ See Williams (1997).

variation in returns and the quotes.¹¹ Aït-Sahalia and Xiu (2018) conduct weekly principal component analysis on intraday returns of S&P 100 stocks which are computed using the latest prices recorded within 1-minute interval over the 2003-2012 period. They find that, consistent with the Fama-French factor model at low frequency, the joint dynamics of the S&P 100 stocks at high frequency can be explained by the first three eigenvalues.¹²

Section 2 presents our methodology. Section 3 presents data. Section 4 presents our empirical results, and Section 5 discusses our conclusions.

METHODOLOGY

The multiple variance ratio test for randomness:

Variance-ratio tests have been widely employed in empirical finance studies to assess the rate of information flow over time and across stocks. Our tests of the randomness of intraday trading price are based on the variance ratio statistics developed by Lo and MacKinlay (1988) (LOMAC, thereafter) and a multiple variance ratio extension developed by Chow and Denning (1993). Let X_t denote a stochastic process satisfying the following recursive relation: $X_t = \mu + X_{t-1} + \varepsilon_t$, $E[\varepsilon_t] = 0$, for all t , (1)

where μ is an arbitrary drift parameter and ε_t is an independent stochastic disturbance with zero mean. Consider a sequence of this time series with a q -period holding time, $(X_0, X_1, \dots, X_{nq})$. Let $\sigma^2(1)$ be the variance of the first difference of the one-period series, $Var(X_t - X_{t-1})$, and $\sigma^2(q)$ be the variance of the first difference of the q -period series, $Var(X_t - X_{t-q})$. Under the LOMAC random walk hypothesis that X increments are uncorrelated, the variance of these increments must be linear in any observation interval, and the variance ratio $\sigma^2(q)/q\sigma^2(1)$ equals one. A variance ratio's deviation from unity can then be considered to be proportional to the amount of inefficiency present in that stock or index.

LOMAC also generates the asymptotic distribution of the estimated variance ratios and defines test statistics under two null hypotheses - H_1 : homoscedastic increments random walk and H_2 : heteroscedastic increments random walk - as follows:

$$\text{Under } H_1: \quad Z_1(q) \equiv \sqrt{nq} \left(\frac{\hat{\sigma}^2(q)}{q\hat{\sigma}^2(1)} \right) [2(2q-1)(q-1)/3q]^{-1/2} \sim N(0,1), \quad (2a)$$

$$\text{Under } H_2: \quad Z_2(q) \equiv \sqrt{nq} \left(\frac{\hat{\sigma}^2(q)}{q\hat{\sigma}^2(1)} \right) [V(q)]^{-1/2} \sim N(0,1), \quad (2b)$$

Where $V(q)$ is the asymptotic variance of $\frac{\hat{\sigma}^2(q)}{q\hat{\sigma}^2(1)}$ under H_2 . The LOMAC approach provides a way to test random walk by comparing the test statistic, $Z_1(q)$ or $Z_2(q)$, with the standard normal critical value.

Chow and Denning (1993) extend the LOMAC approach and provide a more statistically powerful approach to test the random walk by controlling the test size. Compared to LOMAC's individual variance ratio tests for a specific aggregation interval, the Chow-Denning method tests the random walk hypothesis simultaneously over multiple aggregate time intervals.

Consider a set of variance ratio estimates corresponding to a set of pre-specified aggregation intervals, $\{q_i | i = 1, 2, \dots, m\}$. The Chow-Denning method defines that test statistics $|Z_1^*(q)|$ and $|Z_2^*(q)|$ to be the largest absolute value of the all the LOMAC test statistics from (2a) and (2b) over all the holding periods,

$$Z_1^*(q) = \max_{1 \leq i \leq m} |Z_1(q_i)| \quad (3a)$$

$$Z_2^*(q) = \max_{1 \leq i \leq m} |Z_2(q_i)| \quad (3b)$$

¹¹ The first eigenvalue can explain 21% and 11.2% of the total variation in returns and quotes, respectively.

¹² In this research, the first eigenvalue accounts for on average 30-40% and the second and third account for 15-20% of stock variations.

$Z_1^*(q)$ or $Z_2^*(q)$ can then be compared to $SMM(\alpha; m; N)$, which is the upper point of the Studentized Maximum Modulus (SMM) distribution with parameters m and N degrees of freedom, to test the random walk based on Hochberg (1974). If $Z_1^*(q)$ or $Z_2^*(q)$ is greater than the SMM critical value at a predetermined significance level α then the random walk hypothesis is rejected.

The 0-1 test for chaos:

Chaos deals with long term evolution—how something changes over time and it is nonlinear, deterministic and dynamic. A chaotic time series looks irregular or random in time domain, however, chaos has structure seen in a reconstructed phase space. Let us use a logistic map as an example to explain or define chaos. The chaotic data generated by the logistic function are displaced in time domain as shown in Figure 1. It appears random and provides few conclusions. If we transfer the data into a reconstructed phase space where a two dimensional space is built, we can see a parabola in the phase space (as shown in Figure 2). This parabola is hidden in time domain. As such, it is much easier for us to build a model in Figure 1 than in Figure 2 in terms of data interpretation. Analyzing data for chaos can help indicate whether haphazard-looking fluctuations such as in Figure 1 actually represent an orderly system such as in Figure 2 in disguise (see Zhao, Kwiat, Kwiat, Kamhoua, and Njilla (2018)).

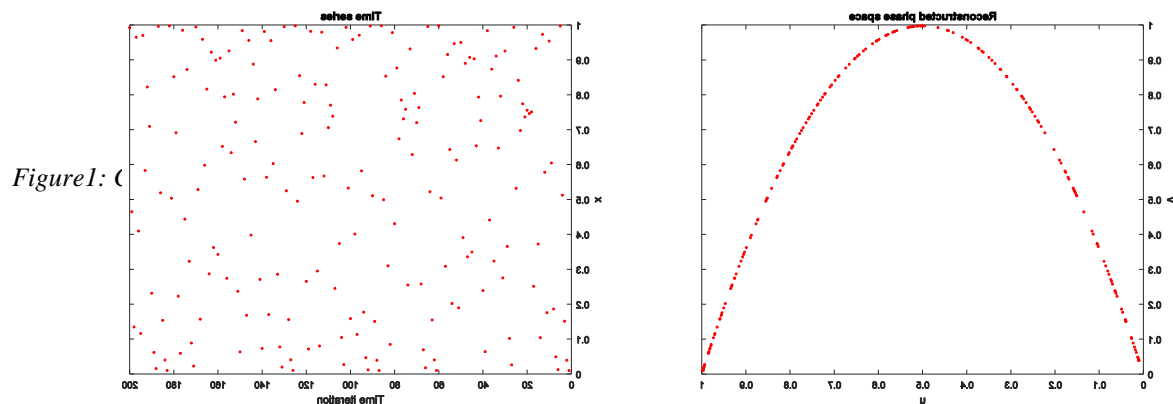


Figure 2: The Chaotic data shown in a reconstructed phase space

Chaos theory has found its applications in many fields such as computer science, engineering, communications, biology and finance based on different aspects of chaotic systems. Chaos theory lets us describe, analyze, and interpret temporal data (whether chaotic or not) in a new, different, and often better way (see Williams (1997)). Being able to differentiate between regular and chaotic dynamics in a financial stock market is important in analyzing a financial time series. Most methods for testing chaos apply largest Lyapunov exponents, and correlation dimensions, which rely on a phase space reconstruction from a finite amount of observations of a noisy time series. This implies accepting certain biases so as to determine the immersion dimension, mean period and time of delay in reconstructing phase space.

The 0-1 test for chaos has recently been developed to solve these inconveniences in order to identify chaos in a financial series. The 0-1 test for chaos is based on a Euclidean extension and does not depend on phase space reconstruction. It works directly with time series. According to Gottwald and Melbourne (2009), the 0-1 test method is described as follows.

Consider a one-dimensional time series $\phi(j)$ for $j = 1, 2, \dots, N$. We use the data $\phi(j)$ to derive the two-dimensional system, in which the translation variables $p_c(n)$ and $q_c(n)$ are calculated as shown in Equation (4).

$$p_c(n) = \sum_{j=1}^n \phi(j) \cos jc ; \quad q_c(n) = \sum_{j=1}^n \phi(j) \sin jc \quad (4)$$

Where fixed frequency $c \in (1, \pi)$ and $n = 1, 2, \dots, N$. The diffusive (or non-diffusive) behavior $p_c(n)$ and $q_c(n)$ can then be investigated by analyzing the mean square displacement $M_c(n)$ as defined in Equation (5).

$$M_c(n) = \lim_{N \rightarrow \infty} \frac{1}{N} \sum_{j=1}^N [p_c(j+n) - p_c(j)]^2 + [q_c(j+n) - q_c(j)]^2 \quad (5)$$

Note that this definition requires $n \ll N$. The 0-1 test for chaos is based on the growth rate of $M_c(n)$ as a function of n . The limit is assured by calculating $M_c(n)$ only for $n \ll n_{cut}$. In practice, $n_{cut} = N/10$ is usually selected for

good results, and $D_c(n)$, a smoothed version of mean square displacement $M_c(n)$ as shown in Equation (6), is used in the 0-1 test for chaos.

$$D_c(n) = M_c(n) - \left(\lim_{N \rightarrow \infty} \frac{1}{N} \sum_{j=1}^N \phi(j) \right)^2 \frac{1 - \cos nc}{1 - \cos c} \quad (6)$$

Then, based on $D_c(n)$, the asymptotic growth rate K_c can be estimated by deploying a regression method or a correlation method. In this paper, we use the correlation method. That is, for vectors $\alpha = [1, 2, \dots, n_{cut}]$ and $\beta = [D_c(1), D_c(2), \dots, D_c(n_{cut})]$, the correlation coefficient K_c is determined in Equation (7) from the mean square displacement $D_c(n)$.

$$K_c = \text{corr}(\alpha, \beta) = \frac{\text{cov}(\alpha, \beta)}{\sqrt{\text{var}(\alpha) \times \text{var}(\beta)}} \in [-1, 1] \quad (7)$$

Where $\text{cov}(\alpha, \beta) = \frac{1}{n_{cut}} \sum_{j=1}^{n_{cut}} (\alpha(j) - \bar{\alpha})(\beta(j) - \bar{\beta})$, $\text{var}(\alpha) = \text{cov}(\alpha, \alpha)$, and $\text{var}(\beta) = \text{cov}(\beta, \beta)$. Under general conditions, the limits $D_c(n)$ and K_c can be shown to exist, and we can use K_c to determine the chaotic pattern of a time series. For regular dynamics, K_c is close to 0; for chaotic dynamics, K_c is close to 1.

DATA

To test for random walk and chaos in stock price, we collect intraday stock trading prices for each of the individual companies listed on Standard & Poor (S&P) 500 index from Bloomberg. We eliminate weekends and observed holidays during which the market is closed. We focus on the stocks with the complete 63 trading days over three-month time span from October 1, 2018 to December 31, 2018. We divide each trading day into successive 1-minute intervals when the market is open at 9:30 a.m. through 4:00 p.m., Eastern Standard Time. We calculate the average trading price across each 1-minute interval for each stock. Therefore, our sample consists of 12,193,335 data points, covering 495 stocks, 63 trading days and 391 minutes per day.

Figure 3 presents the average number of intraday trades per minute from 9:30 am to 4:00 pm over three-month period (Oct 1st – Dec 31st, 2018) for the companies in the S&P 500. We observe a U-shaped pattern in the number of trades by minute of the day. Over the average trading day, there are more trades that occur during the morning and afternoon hours and less during midday periods. The flow of trades shows a decrease beginning at 9:30 am, and continues to drop until 1:30 pm, when new information is presumably light. The flow then starts to rise and peaks at 3:59 pm. The average number of trades during the last ten minutes is over three times greater than that for other times of the trading day.

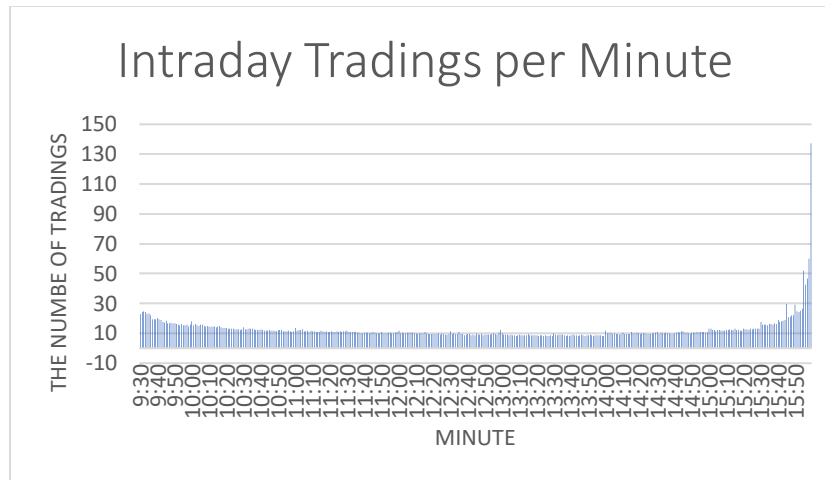


Figure 3 The Frequency of Intraday Tradings

This figure presents the average number of intraday trades per minute from 9:30 am to 4:00 pm over three-month period (Oct 1st – Dec 31st, 2018) for S&P 500 companies.

EMPIRICAL RESULTS

Our first test focuses on multiple variance ratio tests for the randomness of intraday trading price. We start by calculating the variance ratios based on Lo and Mackinlay (1998) for the average trading price per minute of each company in the S&P 500 index at sampling intervals of $q=2, 4, 6, 8, 10, 12, 14$, and 15 minutes. Table 1 reports the

summary statistics of variance ratios for the intraday trading price of S&P 500 companies. For each interval, we report the mean, median, and standard deviation of the variance ratios across S&P 500 companies. We show that the mean and median of the variance ratios are greater than one at all sampling intervals. In addition, as the sampling interval q increases, the mean, median, and standard deviation of the variance ratios increase monotonically.

Table 1: Summary statistics of variance ratios:

This table reports the summary statistics of variance ratios for the intraday trading price of S&P 500 companies. The variance ratios are calculated based on Lo and Mackinlay (1998) for the intraday trading price per minute of each company over three-month period (Oct 1st - Dec 31st, 2018). The mean, median and standard deviation of the variance ratios across S&P 500 companies are reported at $q=2, 4, 6, 8, 10, 12, 14$, and 15 minutes.

| Variance ratio | S&P 500 Sampling interval (q) in minutes | | | | | | | |
|----------------|--|-------|-------|-------|-------|-------|-------|-------|
| | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 15 |
| Mean | 1.222 | 1.354 | 1.403 | 1.429 | 1.440 | 1.451 | 1.462 | 1.468 |
| Median | 1.180 | 1.291 | 1.326 | 1.351 | 1.363 | 1.374 | 1.386 | 1.392 |
| Std Dev | 0.632 | 0.956 | 1.057 | 1.111 | 1.143 | 1.165 | 1.179 | 1.182 |

For each interval, we then estimate the homoscedastic- and heteroscedastic-robust LOMAC test statistics, $Z_1(q)$ and $Z_2(q)$, for the trading price of each company in the S&P 500 index. Using the multiple variance ratio procedure from Chow and Denning (1993), we compare the maximum absolute values of these test statistics to the $SMM(\alpha; m; N)$ critical value, where N is our sample sizes, $m = 4, 5, 6, 7$, and 8, and $\alpha = 1, 5$, and 10 percent level of significance. For each set of test statistics for a stock, if the maximum absolute value exceeds the SMM critical value, we reject the random walk.

Table 2 reports the rejection rates of the random walk with homoscedastic and heteroscedastic disturbances from intraday trading price of S&P 500 companies. The homoscedastic-robust test results show that the percentage of rejections of the random walk from S&P 500 companies is 83.67%, 85.08% and 85.69% for the significance level $\alpha=1, 5$, and 10 percent, respectively. In principle, the rejection of random walk could result from heteroscedasticity in the stock price. From our heteroscedastic-robust test results, the rejection rates are relatively lower, but still significant at 68.75%, 72.58%, and 74.60% for $\alpha=1, 5$, and 10 percent, respectively. Our results provide strong evidence that more than two thirds of our samples listed on S&P 500 reject the random walk of security prices.

Table 2: The multiple variance ratio test for the random walk for intraday trading price:

This table reports the rejection rates of the random walk with homoscedastic and heteroscedastic disturbances from intraday trading price of companies listed on S&P 500 index. The variance ratios and the homoscedastic- and heteroscedastic-robust test statistics, $Z_1(q)$ and $Z_2(q)$, are calculated based on Lo and Mackinlay (1998) for the intraday trading price per minute of each company over three-month period (Oct 1st - Dec 31st, 2018). According to Chow and Denning (1993), we then compare the LOMAC test statistics with the $SMM(\alpha; m; N)$ critical value at the $\alpha=1, 5$, and 10 percent level of significance to test the random walk hypothesis. We report the rejection rates as the percentage of rejections of the random walk for S&P 500 companies at multiple (m) aggregate time intervals (q).

| Multiple (m) aggregate time interval (q) in minutes | Homoskedastic-robust test rejection rate at the significance level α | | | Heteroskedastic-robust test rejection rate at the significance level α | | |
|---|---|----------------|-----------------|---|----------------|-----------------|
| | $\alpha = 1\%$ | $\alpha = 5\%$ | $\alpha = 10\%$ | $\alpha = 1\%$ | $\alpha = 5\%$ | $\alpha = 10\%$ |
| $m=4$ $q=2,4,6,8$ | 88.31% | 89.72% | 90.12% | 76.21% | 79.84% | 81.65% |
| $m=5$ $q=2,4,6,8,10$ | 86.90% | 88.91% | 88.91% | 73.59% | 76.81% | 78.43% |
| $m=6$ $q=2,4,6,8,10,12$ | 85.28% | 87.30% | 87.70% | 70.56% | 74.80% | 77.02% |
| $m=7$ | 84.27% | 85.48% | 86.69% | 69.35% | 73.39% | 75.20% |

| | | | | | | |
|-----------------------|--------|--------|--------|--------|--------|--------|
| q=2,4,6,8,10,12,14 | | | | | | |
| m=8 | | | | | | |
| q=2,4,6,8,10,12,14,15 | 83.67% | 85.08% | 85.69% | 68.75% | 72.58% | 74.60% |

With such a large percentage of rejection rate for the random walk, we next test whether intraday trading price follow a chaotic stochastic process. We start the test by exploring the commonality among the time-series intraday trading price of S&P 500 companies. For this purpose, we use principal components analysis (PCA), a technique in which the time series of a sample of S&P 500 companies are decomposed into orthogonal factors of decreasing explanatory power (see Muirhead (1982) for an exposition of PCA). Specifically, we compute the natural log of stock return as $\text{LN}(P_t/P_{t-15})$ for every 15-minute interval based on the time-series intraday trading price P_t from October 1, 2018 to December 31, 2018. The PCA approach yields a decomposition of the variance-covariance matrix of returns of S&P 500 companies into the eigenvectors of the correlation matrix of returns and the diagonal matrix of eigenvalues. Based on our results of the PCA, the first three eigenvalues explain 52.37% of the variation of the stock returns with the first principal component capturing 41.85%, the second for 7.23% and the third for 3.29%. These three eigenvalues capture a large portion of the total variation when the majority of returns tend to move together at the time of information arrival. Therefore, we focus our attention on only this subset and use the generated three PCA vectors – the principal component factor time series for the following tests.

We then apply the 0-1 test to the three principal component factor time series to characterize the dynamics of intraday trading price. For each PCA vector, we randomly select 100 samples at the sampling frequencies $c \in (\pi/5, 4\pi/5)$ and calculate K_c according to Gottwald and Melbourne (2009). Table 3 reports the median K_c as the chaos factor K for each of the three S&P 500 PCA vectors in 0-1 tests. Our results show that the chaos factor K is 0.9976 for PCA1, 0.9979 for PCA2, and 0.9984 for PCA3, respectively. The close-to-1 chaos factors provide strong evidence that the three principal component factor time series exhibit chaotic dynamic pattern. As the three PCA vectors capture the majority of the variation of the 15-minute stock returns, it is rational to infer that the intraday trading prices of S&P 500 companies follow a chaotic stochastic process.

Table 3: The chaos factors for the three S&P 500 PCA vectors in 0-1 tests:

This table presents the chaos factors of the three S&P 500 PCA vectors in 0-1 tests. We use the PCA approach and 0-1 test to derive the chaos factor, K . Specifically, we compute the natural log of stock returns for every 15-minute interval based on the time-series intraday trading prices of S&P 500 companies from October 1, 2018 to December 31, 2018. We deploy the PCA approach on the log-returns and then apply the 0-1 tests on the generated three PCA vectors. For each PCA vector, we randomly select 100 samples at the sampling frequencies $c \in (\pi/5, 4\pi/5)$ and calculate K_c according to Gottwald and Melbourne (2009). The median K_c are reported as the chaos factor K for each of the three PCA vectors.

| PCA vectors | Chaos Factor K |
|-------------|------------------|
| PCA1 | 0.9976 |
| PCA2 | 0.9979 |
| PCA3 | 0.9984 |

DISCUSSION AND CONCLUSION

An informationally efficient capital market is one where security prices respond quickly and *accurately* to information. However, accurately is a challenging word. It requires a precise specification of the underlying model of the price sequence. Numerous empirical examinations of the efficiency of market pricing have generally failed to support the statistical process of a random walk despite the apparent evidence that unexpected news does impact market prices. Our results which examine the individual securities which comprise the Standard and Poor's 500 index also reject randomness in security pricing. However, following Webel and denoising our data, our results provide support for chaos in security pricing and therefore inferentially in news. It might therefore be argued that chaotic pricing actually represents an orderly system. Future research will have to consider whether these large S&P 500 firm results are robust to differing groups of securities and differing time series,

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ENTREPRENEURSHIP TENDENCY AND ITS RELATIONSHIP WITH KNOWLEDGE AND ADOPTION OF INFORMATION TECHNOLOGY: A CASE OF ETHIOPIAN COLLEGE STUDENTS

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ABSTRACT

This study is the first in its kind to provide empirical evidence to the possibility of information technology's knowledge and intent to adopt as a factor for entrepreneurial intention of individuals in developing economy. It investigates relationships among the personal attributes (creativity, autonomy, risk-taking, locus of control and need for achievement), IT Knowledge, IT adoption, and entrepreneurial intention. A sample of 200 college students from Addis Ababa University, Ethiopia participated in the survey that adopts the General Measure of Entrepreneurial Tendency and IT adoption instruments. The study concludes that the participants showed average entrepreneurial tendency, and the participants' adoption and knowledge of information technology (IT), and entrepreneurship tendency are positively correlated. Implications of these results are also discussed.

INTRODUCTION

In this 21st century, Information Technology (IT) plays a vital role in every aspect of our lives including education, the economy, business, governments, and entrepreneurship. Entrepreneurship is linked to innovation that creates new businesses, products, services, models and processes (Chen, 2013, 2014). Scholars pointed out the existence of relationship between IT and entrepreneurship. Dionco-Adetayo (2006) concluded that (i) entrepreneurial capacity factors such as personality characteristics, learning, experience, social factors, and culture, and (ii) entrepreneurial enhancing factors such as information technology and education have influenced the attitude of youths towards entrepreneurship programs. Del Giudice and Straub (2011) indicated that there are many reasons to believe that the relationship between entrepreneurship and IT is intertwined. Tavakoli (2013) and May (2015) argued that IT has an impact on entrepreneurship as it is one of the most important resources and tools used for entrepreneurial activities.

Recent work attempted to address a gap in the literature to empirically relate individuals' entrepreneurial intention to their knowledge of IT and its application as well as to their intention to adopt IT (Zenebe et al., 2017). This work, in addition to measuring the entrepreneurship tendency, argued and provided empirical evidence using survey data from USA college students, and the results showed positive relationships between entrepreneurial intention and knowledge of information technology (IT) and its application as well as entrepreneurial intention and IT adoption behavior (Zenebe et al., 2017).

There are several studies that investigate the Entrepreneurial Intention of Ethiopian college students (e.g. Tegegn, Paulos and Desalegn, 2016; Kumilachew Aga, 2017). None of these studies consider IT as factor. This proposed research aims at extending these studies and the recent study (Zenebe et al., 2017) by surveying college students from Addis Ababa University in Ethiopia, Africa.

Unemployment Rate in Ethiopia, Africa is high, averaged about 20%. With the recently increase in the number of colleges and universities in Ethiopia, the number of graduating students in various discipline increased exponentially and government organizations and private industries cannot hire all of them. One of the country's main strategies has been promoting the development of entrepreneurship through the establishment and implementation of micro and small enterprises policies. Also, currently in Ethiopia higher education institutions entrepreneurship and small business management course has been incorporated in the curriculum to enhance entrepreneurship practice. Another strategy is the aggressive adoption of information technology both as an industry and as an enabler of socio-economic transformation.

According to the World Bank report of 2016, Ethiopia GNI per capita (formerly GNP per capita) is rising from \$550 in 2014 to \$660 in 2016. It is also true that entrepreneurial tendency to create business ventures in Ethiopia is expected to be increasing as well as the utilization of information technology (IT). According to World Bank's the Enterprise Survey of 2016's results, 8% private enterprises in Ethiopia use technology licensed from foreign companies, 35% of them own their Web site, and 74% of them use e-mail to interact with clients/suppliers.

The objectives of this research are to measure the entrepreneurial intention of college students in Ethiopia, and if IT adoption and knowledge have relationship with the individual's entrepreneurial intention. In this study, entrepreneurial intention is the dependent variable which is related to the following independent variables: i) Personality characteristics of entrepreneurs: willingness of entrepreneurs to assume above-average risk, innovativeness, motivation, locus of control, autonomy, and need for achievement; ii) Information technology adoption tendency; and iii) IT knowledge refers to the level of understanding of IT and its applications.

This research also attempts to answer the following research questions: a) Do students who explore new and emerging IT (that is, IT pre-adoption tendency) have greater entrepreneurial intention? b) Do students who are actual or true adopters of IT have greater entrepreneurial intention? c) Do students who possess greater IT knowledge also have greater entrepreneurial intention? d) Are there relationships among personal IT knowledge, pre-adoption IT, and intent to adopt IT? e) Are there differences in entrepreneurial intention by gender, by age, and by major? f) Are there difference in entrepreneurial intention between USA college students and Ethiopian college students?

The paper consists of several sections. Section 2 presents the methodology of the study. Section 3 shows the results of the study and discussion, while section 4 deals with the conclusion, implications, and limitations.

METHODOLOGY

Data collection

The target population of the study is individuals with assumed potential entrepreneurship tendency. We select a sample of 200 college students from Addis Ababa University, Ethiopia. The study uses survey method for gathering data. The survey instrument is comprised of questions from the following instruments: the General Measure of Enterprising Tendency (GET2) Test of Dr. Sally Caird (1991,2013) to measure entrepreneurial tendency, Personal Innovativeness in IT (PIIT) by Agarwal and Prasad (1988, 1998) to measure IT pre-adoption level, the Unified Theory of Acceptance and Use of Technology Model (UTAUT) by Venkatesh, Morris, and Davis (2003) to measure IT actual adoption level, and IT knowledge measure questions of Zenebe, Alsaaty and Anyiwo (2017) to measure IT knowledge level.

Data analysis

Quantitative approach is used in the study for analysis of the survey data. The study uses descriptive statistics to summarize and explore the data. Cronbach's Alpha is used to assess the internal consistency or reliability of the different measures. The study also examine correlation between the variables using correlation coefficients. Finally, the analysis of variance (ANOVA) is used to explore if there are variations in the relationships between the different variables by academic programs/majors, between male and female students, and among students in different age groups and major.

RESULTS AND DISCUSSION

Profile of the Respondents

Table 1 presents the profile of the respondents. 75% of the participants are undergraduate and 25% of the participants are graduate students. 68% of the participants are female and 32% of are male. 70% of participants are unemployed. 62% of participants are Natural Science and Technology Major. 94% of participants have taken a formal entrepreneurial class. Furthermore, 74% of the participants are 24 years old or younger, and 21% of the participants are between 25 and 30 years old.

Table 2 presents the reliability measures of the different constructs. The reliability is high for the Intent to Adopt IT measure (Cronbach's Alpha = 0.82). The reliability for the Entrepreneurship Tendency measured with Get2 Score (Cronbach's Alpha = 0.63) is acceptable as it is greater 0.5. The reliability for the knowledge of IT scale (Cronbach's Alpha = 0.61) which is greater 0.5 is acceptable too. The reliability is low for the pre-adoption of IT scale (Cronbach's Alpha = 0.44). The reliability coefficients for the five entrepreneurial attributes are low. Hence, Entrepreneurship Tendency, the IT knowledge, and IT adoption measures have greater internal consistency, and IT pre-adoption, and the five entrepreneurial attributes have lower internal consistency.

Level of Entrepreneurial Tendency

Table 3 presents that 88% of the participants have medium enterprising tendency, 12% have low and 0 % have high. Majority of the students show medium enterprising tendency with no high enterprising tendency.

Table 4 presents the average scores for the different characteristics of enterprising tendency. The average scores for Need for Achievement is 7.5 compared to the benchmark score 9. The average scores for Calculated Risk Taking is 7.5 compared to the benchmark score 8. The average scores for Need for Autonomy is 2.8 compared to the benchmark score 4. The average scores for Locus of control is 7.5 compared to the benchmark score 8. The average scores for Creative Tendency is 7 compared to the benchmark score 8. There are wider gaps, low, from the average on the Need for Achievement (1.5) and Need for Autonomy (1.2). Except Creative Tendency characteristic, there is no significant difference in these features by gender as well as by age (Table 7).

Table 5 presents the differences in Entrepreneurial Tendency among the different groups of students. 85% of the undergraduate have medium enterprising tendency, 15% have low and 0 % have high. 96% of the graduate have medium enterprising tendency, 4% have low and 0 % have high. Graduate students show more enterprising tendency than undergraduate students, which is significant at 5% (Table 7). Furthermore, Table VI shows 89% of the female have medium enterprising tendency, 11% have low and 0 % have high. 86% of the female have medium enterprising tendency, 14% have low and 0 % have high. The difference is not significant at 5% (Table 7).

Correlation between Entrepreneurial Tendency and IT

There is significant positive correlation between Entrepreneurial Tendency and Intent to Adopt IT as well as between Entrepreneurial Tendency and IT Knowledge (See Table 1). Intent to Adopt IT is significantly and positively correlated to Calculated Risk Taking and Locus of Control; whereas IT Knowledge is significantly and positively correlated to Calculated Risk Taking and Creative Tendency (See Table 8).

CONCLUSION

This study is the first in its kind to provide theoretical and empirical evidence to the possibility of information technology as a factor for entrepreneurial intention of individuals in developing economy. Positive relationships are found between Entrepreneurial Tendency and Information Technology – both Knowledge and Adoption as was the case with USA students reported in Zenebe and others (2017). The study paves the way for other scholars to explore the topic further. The findings of this study also provide evidences for policy makers, educational institutions and entrepreneurial development centers on the need to incorporate IT in their activities and efforts to train or retrain students and entrepreneurs to improve their knowledge of IT and its applications as well as their tendency to adopt new IT.

Acknowledgements: CIBER-Indiana University, Research assistants at Addis Ababa University, Ethiopia and Bowie State University.

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Table 1

Demographic Data of Participants

| Type of Data | Percentage |
|--|------------|
| Graduate students participants | 25 |
| Undergraduate students participants | 75 |
| Students who have taken formal entrepreneurial class | 94.5 |
| Students who have not taken formal entrepreneurial class | 5.5 |
| Female participants | 68.5 |
| Male participants | 31.5 |
| Natural Sciences students | 62 |
| Non-natural sciences students | 38 |
| Employed – full time | 21.5 |
| Employed – part time | 8.5 |
| Unemployed | 70.0 |
| Age: 25 – 30 | 74.5% |
| Age: 31 – 35 | 21.5% |
| Age: 36 & above | 0.5% |

Table 2

Reliability Statistics

| Construct | Cronbach's Alpha | N of Items |
|--------------------------|------------------|------------|
| IT Pre-adoption behavior | 0.44 | 3 |
| IT Adoption Intent | 0.82 | 3 |
| IT Knowledge | 0.61 | 8 |
| Need for Achievement | 0.33 | 12 |
| Calculated Risk Taking | 0.30 | 12 |
| Need for Autonomy | 0.23 | 6 |
| Locus Of Control | 0.02 | 12 |
| Creative Tendency | 0.34 | 12 |
| Get2 Score | 0.63 | 54 |

Table 3

The General Measure of Enterprising Tendency (GET2) Test - Group Score

| GET2 Range* | Number of Participants | Percentage of Total* |
|-------------|------------------------|----------------------|
| 0-28 | 24 | 12 |
| 27-43 | 176 | 88 |
| 44-54 | 0 | 0 |
| Total | 200 | 100 |

* For assessing the enterprising tendency of individuals, the standard range for GET2 is high (score of 44-54), medium (score of 27-43), and low (score of 0-26).

Table 4

Key Entrepreneurial Attributes of the Participants*

| Statistical Indicators | Need for Achievement | Calculated Risk Taking | Need for Autonomy | Locus of Control | Creative Tendency |
|------------------------|----------------------|------------------------|-------------------|------------------|-------------------|
| Mean | 7.55 | 7.55 | 2.82 | 6.93 | 7.04 |

| | | | | | |
|--------|------|------|------|------|------|
| Median | | | | | |
| Mode | | | | | |
| Std | 1.78 | 1.56 | 0.93 | 1.41 | 1.56 |
| N | 200 | 200 | 200 | 200 | 200 |

* The average GET scores for each of the above attributes are (9) for need for achievement, (8) calculated risk taking, (4) for need for autonomy, (8) for locus of control, and (8) for creative tendency.

Table 5

The General Measure of Enterprising Tendency (GET2) Test: Undergraduate versus Graduate Participants (Percentage)

| GET2 Range | Undergraduate | Graduate |
|------------|---------------|----------|
| 0-26 | 14.67 | 4.00 |
| 27-43 | 85.33 | 96.00 |
| 44-54 | 0 | 0 |
| Total | 100.0 | 100.0 |

Table 6

The General Measure of Enterprising Tendency (GET2) Test: Female versus Male Participants (Percentage)

| GET2 Range | Female | Male |
|------------|--------|-------|
| 0-26 | 10.95 | 14.29 |
| 27-43 | 89.05 | 85.71 |
| 44-54 | 0 | 0 |
| Total | 100.0 | 100.0 |

Table 7

ANOVA

| Variables/ Factors | Pre- Adopti on of IT Total Score | Intent to Adopt IT Total Score | IT Knowl edge Total score | Need for Achieve ment Total score | Calculate d Risk Taking Total score | Need for Autono my Total score | Locus Of Contr ol Total score | Creative Tendency Total score | GET2 Total Score |
|-------------------------------------|--|---|---------------------------------------|---|---|---|--|--|---------------------|
| Gender | 0.001* | 0.068 | 0.122 | 0.96 | 0.601 | 0.168 | 0.466 | 0.032* | 0.34 |
| Program level: UG vs Graduate | 0.023* | 0.23 | 0.00* | 0.002* | 0.108 | 0.716 | 0.052 | 0.059 | 0.003* |
| Age | 0.362 | 0.951 | 0.007* | 0.126 | 0.855 | 0.802 | 0.423 | 0.169 | 0.205 |
| | | | | | | | | | |
| | | | | | | | | | |

* *F-value* is significant at the 0.05 level (2-tailed).

Table 8

Correlations – Spearman's rho for AAU students

| | | | Pre-Adoption of IT Total Score | Intent to Adopt IT Total Score | IT Knowledge | Need for Achievement | Calculated Risk Taking | Need for Autonomy | Locus Of Control | Creative Tendency | GET 2 Score |
|--|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------|----------------------|------------------------|-------------------|------------------|-------------------|-------------|
| | GET2 Score | <i>Correlation Coefficient</i> | -.048 | .28** | .239** | .736 | .692 | .185 | .548 | .623 | |
| | | <i>Sig. (2-tailed)</i> | .504 | .000 | .001 | .000 | .000 | .009 | .000 | .000 | |
| | | <i>N</i> | 200 | 185 | 200 | 200 | 200 | 200 | 200 | 200 | |
| | Pre-Adoption of IT Total Score | <i>Correlation Coefficient</i> | | .185* | .302** | -.127 | -.019 | -.005 | .002 | -.015 | -.048 |
| | | <i>Sig. (2-tailed)</i> | | 0.012 | 0 | .073 | .793 | .943 | .977 | .831 | .504 |
| | | <i>N</i> | | 185 | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| | Intent to Adopt IT Total Score | <i>Correlation Coefficient</i> | | | .296** | .112 | .229** | .003 | .236** | .175* | .283** |
| | | <i>Sig. (2-tailed)</i> | | | .000 | .129 | .002 | .965 | .001 | .017 | .000 |
| | | <i>N</i> | | | 185 | 185 | 185 | 185 | 185 | 185 | 185 |
| | IT Knowledge | <i>Correlation Coefficient</i> | .302* | .296* | | .097 | .181* | .132 | .096 | .219* | .239** |
| | | <i>Sig. (2-tailed)</i> | .000 | .000 | | .172 | .010 | .062 | .175 | .002 | .001 |
| | | <i>N</i> | 200 | 185 | | 200 | 200 | 200 | 200 | 200 | 200 |

THE VARIABILITY OF COST IN OBTAINING AN ACCOUNTING DEGREE IN PENNSYLVANIA

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ABSTRACT

The cost of an Accounting degree obtained in Pennsylvania varies among those whom attain a Bachelor's degree. There are many paths to a Bachelor's of Science in Accountancy. An individual may either begin in a 4-year program or start at a community college – full or part time. Other variable costs included living expenses, housing costs, and transportation costs. What is the least expensive path? Pennsylvania community colleges and state affiliated universities were surveyed to gather information related to the cost of earning a Bachelor's of Science degree in Accounting. These costs included tuition, programming costs, and housing costs. Other sources cited regarding living and transportation costs. These individual costs become the foundation for calculating one year of college education for an individual. The results of analysis is that the cost of an Accounting degree varies greatly among those whom attained a Bachelor's degree in Pennsylvania. There is variability in tuition, housing, living expenses and transportation costs among not only different institutions but also students within the same institution. This may be due to personal choices, preferences, and circumstances. This research is a valuable financial literacy and planning tool for both students and their parents. The study uses economic data derived from Pennsylvania higher education institutes. It invites individuals to consider a comprehensive look about the costs associated with obtaining college degree, how to navigate articulation agreements, and finance it, too.

INTRODUCTION

The goal of this research project is to analyze costs at both Pennsylvania 2-year community colleges and 4-year state public institutions to determine the cost of obtaining an Accounting degree by students in Pennsylvania. The research was conducted by collecting data and formulating projected costs based on actual costs provided by colleges and universities and budgeting for additional expenses such as books, fees, transportation and personal expenses. An analysis of results will be presented.

The project attempts to quantify the cost savings of beginning one's studies as an accounting major in one of the 15 Pennsylvania State Community Colleges for two years, and transferring to a Pennsylvania State 4-year institution to complete one's bachelors versus beginning and completing the degree at that Pennsylvania 4-year college or university. Costs taken into consideration were relevant in nature and included tuition, room and board, charges and fees, transportation, books and supplies, and miscellaneous personal expenses.

Information was gathered other important research data to aid in the college selection process for an incoming freshman and/or a transfer student. Questions that were researched for all of the 14 state, 9 commonwealth, and 14 community colleges included, the minimum SAT, ACT, and GPA required for entrance in each school. The data gathered for that information were more relevant to the 4-year schools rather than the community colleges because the majority of community colleges either require incoming students to take a placement test or wave SAT/ACT scores. To gauge the size of the school and their accounting programs, surveyed each institution concerning their student body head count as well as the number of students who were enrolled as accounting majors. The last set of information gathered were if each school has an Honors Program with honors courses in accounting, what each school's minimum credit hours to graduate were, and if the schools facilitated the students' attainment of their 150 credits required to take the CPA at the undergraduate or graduate level. Lastly, the schools were asked if they had any articulation agreements for accounting majors with other institutions and which specific institutions for the agreements existed. Also researched to the community colleges was whether their programs were accredited.

With a list of research questions, I was able to conduct the research in hopes to find answers to the aforementioned queries and to be reasonably able to calculate the cost for each track: Track 1: 2 years at a community college with completion at a Pennsylvania State University or Track 2: 4 years in residency at a Pennsylvania University. Pennsylvania is unique because it has: 1) a state system of higher education (PSSHE) - state supported institutions and 2) a Commonwealth System of Higher Education –state related private institutions. PSSHE schools receives 25% funding from the state, Commonwealth institutes receive about 10% annually from the state.

THE GOAL TO ACCOMPLISH

With this research project, what was hoped was to provide useful information concerning costs of beginning one's accounting degree at a community college versus beginning and completing the degree at a 4-year school. Seeking to find out if these costs savings were material in nature as well as provide other useful information regarding the individual institutions. It was hoped to quantify these savings so that it's easier for the user to make-a-decision regarding their choice for starting at a community college or starting at a 4-year college or university. This project is beneficial for the personal finance of numerous individuals planning to attain a degree in accounting.

How the project was created

This project originated in 2016 as an undergraduate joint research project at Albright College. Before Albright, I was a professor at Harford Community College in Bel Air, Md. I had an interest of the transferability of credits for accounting majors.

To organize and gather the data, an Excel workbook was created with three separate worksheets: one worksheet consisted of the 14 Pennsylvania state institutions, the second sheet consisted of the 9 commonwealth universities, and the third worksheet had the relevant information pertaining to the 14 Pennsylvania state community colleges. I listed the questions in column one, the institutions at the head of each subsequent column. The data gathered on each institution.

How data was gathered

The data for this project was gathered through intensive research in all schools' websites as well as contacting each school's admissions counselors, chair of the accounting/business department, and registrar's offices to confirm the information on their websites. It became a very difficult and tedious process trying to locate many of these individuals being that they were not in their offices, were simply too busy, or didn't care to participate in answering the questions. The research gathered from each school's website was confirmed with the phone calls made to ensure that the information online was relevant and up to date. Also used were numerous websites that gather higher education information on Pennsylvania colleges and universities.

Information gathered:

Tuition (both in and out of state), room and board, and textbook estimates were used per college. If a school did not provide a charge, an average was calculated and used. For example, community colleges did not have a textbook estimate; an average was calculated from the public institutions.

For commuter students, $\frac{1}{4}$ of the room and board charge was used to calculate living expense. Why? The presumption is the commuter would reside with a relative with an established household. Is that a reliable estimate? For some yes, for others, no. Why? It depends on one's lifestyle and standard of living. Transportation Expenses were calculated as an average from a 6-year old car and a 2019 compact model.

Once the statistics per institution were found they were gathered then entered them into spreadsheets. This was to facilitate calculating averages for those categories previously identified. After averages were obtained, the information was analyzed for highs, lows and unusual trends or items. Scenarios were then created to see what the costs would result from these scenarios. The scenarios were basically what ways would a student access a college or university? As a commuter or a resident? What costs would be incurred during their studies? Was there variability in the cost of an Accounting degree?

One item discovered that an Associate's degree in Accounting from Pennsylvania's community colleges does not transfer very easily. Students risk losing valuable credits when trying to enroll in a four-year program. Why this happens only is a matter of conjecture. What can be done is a community college's Associate's degree in Business Administration can be the basis of being converted to an Accounting degree at both PSSHE and Commonwealth Universities. Business administration and Accounting share a common core of courses. Significant savings results by using a 2-year community college education as a steppingstone and transferring to PSSHE institution or Commonwealth institution to complete one's Bachelor's degree.

Further savings is gained from commuting to the 4-year institution after completing an associate's degree at a community college. The degree of savings varies based on proximity to each school, how much student resources are given (provided) by parents, whether students complete an associate's degree before moving to the bachelor's degree granting school. The greatest cost savings is being able to commute to a two year and 4-year institution, if practicable.

What was also discovered is that some programs may be restrictive, like a degree from the Smeal College of Business at Pennsylvania State University. Smeal accepts students with no more than 29 credits into the program. A savings can result by attending at a satellite campus to complete a degree.

Figure 1: Average Estimated Full-Time Undergraduate Budgets (Enrollment-Weighted) by Sector, 2018-19

| Sector | Tuition and Fees | Room and Board | Books and Supplies | Transportation | Other Expenses | Total |
|---|------------------|----------------|--------------------|----------------|----------------|----------|
| Private Nonprofit Four-Year On-Campus | \$35,830 | \$12,680 | \$1,240 | \$1,050 | \$1,700 | \$52,500 |
| Public Four-Year Out-of-State On-Campus | \$26,290 | \$11,140 | \$1,240 | \$1,160 | \$2,120 | \$41,950 |
| Public Four-Year In-State On-Campus | \$10,230 | \$11,140 | \$1,240 | \$1,160 | \$2,120 | \$25,890 |
| Public Two-Year In-District Commuter | \$3,660 | \$8,660 | \$1,440 | \$1,800 | \$2,370 | \$17,930 |

NOTES: Expense categories are based on institutional budgets for students as reported in the College Board's Annual Survey of Colleges. Figures for tuition and fees and room and board mirror those reported in Table 1. Other expense categories are the average amounts allotted in determining the total cost of attendance and do not necessarily reflect actual student expenditures.

SOURCES: College Board, Annual Survey of Colleges; NCES, IPEDS Fall 2016 Enrollment data.

This table was prepared in October 2018.

RESULTS

From the research, calculated costs in Pennsylvania for tuition, room/board, books and transportation costs per year:

Average Community College Cost **\$12,296**

High Thaddeus Stevens 13,843

Low Lehigh Carbon 10,573

PSSHE Average Costs

Average Cost of Attendance - On campus **\$34,535**

High Millersville 40,305

Low Bloomsburg 34,819

Average Cost of Attendance - Commuter **\$26,465**

| | | |
|------|------------|--------|
| High | Mansfield | 27,780 |
| Low | Bloomsburg | 25,149 |

Commonwealth Average Costs

Average Cost of Attendance - On campus \$39,000

| | | |
|------|----------------------|--------|
| High | U Pitt - Pitt Campus | 43,270 |
| Low | PSU – Other | 29,716 |

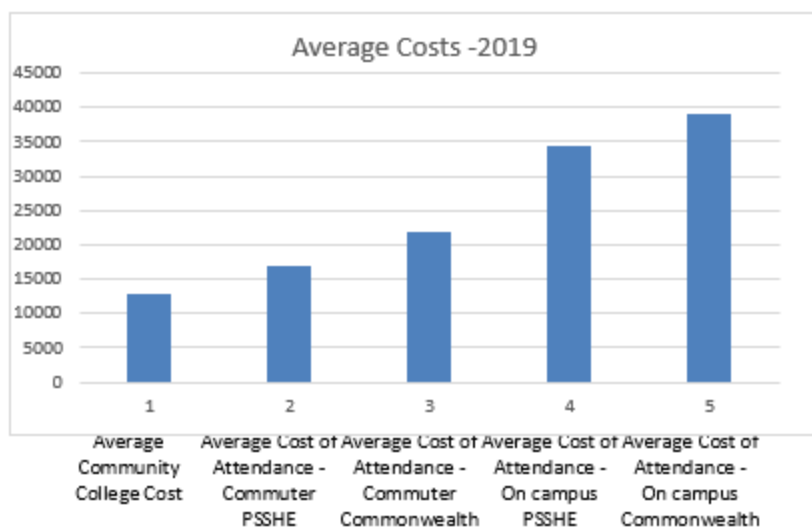
Average Cost of Attendance - Commuter \$29,159

| | | |
|------|--------------------------|--------|
| High | University of Pittsburgh | 33,017 |
| Low | PSU – World Campus | 19,526 |

| Transportation | Retail Cost | 5 year Average | Average Cost/Year |
|--------------------|-------------|----------------|-------------------|
| 2013 Compact | \$9,549 | \$24,629 | \$6,836 |
| 2019 Compact | \$26,859 | \$36,634 | \$12,699 |
| Average Cost Added | | | \$9,767 |

Transportation Costs were based on an average of operating a 2013 and 2019 compact vehicle and averaging their costs.

| Living Expenses | On Campus Residence | Commuter |
|---|------------------------|----------|
| Room/Board Average - PSSHE | \$14,609 | \$3,652 |
| Room/Board Average - Cmnwlth | \$15,197 | \$3,799 |
| Composite Average | \$14,903 | \$3,726 |
| Living Expenses were based on Room and Board Charges for both 4-year institutions and averaged. Commuter charges were based on 25 % of the On-Campus Residence rates. | | |



This chart represents the average annual cost per year to attend college in Pennsylvania at public institutions, based on the research. This includes tuition, room and board - where applicable, books, and transportation. Based on the research, this includes \$ per year for personal and transportation expenses.



This chart represents the 4-year cost of attending college in Pennsylvania at public institutions under various scenarios listed below, based on the research. Various scenarios were composed to estimate the cost of an Accounting degree in Pennsylvania:

| | |
|--|-----------------|
| Scenario 1 – 4 year Commuter, PSSHE | \$74,030 |
| Average Community College cost per year: | \$12,696 |
| Average PSSE cost per year: | \$24,213 |

| | |
|--|----------------------|
| Scenario 2- 4 year Commuter, Commonwealth Institute | \$83,710 |
| Average Community College cost per year: | \$12,696 |
| Average Commonwealth cost per year: | \$29,159 |
| Scenario 3 – 4 year Commuter to PSSHE | \$97,276 |
| Average PSSE cost per year: | \$24,213 |
| Scenario 4 – 2 year Commuter, 2 year Residential - PSSHE | \$94,462 |
| Average Community College cost per year: | \$12,696 |
| Average PSSHE Residential cost per year: | \$34,535 |
| Scenario 5 - 4 year Commuter, Commonwealth Institute | \$116,632 |
| Average Commonwealth cost per year: | \$29,159 |
| Scenario 6 – 2 year Commuter, 2 year Residential – Commonwealth | \$103,392 |
| Average Community College cost per year: | \$12,696 |
| Average Commonwealth Residential cost per year: | \$39,000 |
| Scenario 7 - 4 year PSSHE, Residential | \$138,140 |
| Average PSSE Residential cost per year: | \$34,535 |
| Scenario 8 - 4 year Commonwealth, Residential | \$156,000 |
| Average Commonwealth Residential cost per year: | \$39,000 |

As one can observe, the cost of obtaining an Accounting degree can vary dramatically - from approximately \$74,000 to \$156,000 in 2019. What should be noted is no inflation was factored in for either living costs or for tuition expense. Inflation for higher education expenses generally outpace overall inflation as well. Commonwealth costs exceed PSSH costs and those exceed community college costs.

Through careful planning and research, a student can obtain a highly respected degree and experience significant cost savings from attending 2 years at a community college and completing their Bachelor's degree at a state university.

CONCLUSIONS

What was discovered during the course of research was an Associate's degree in Accounting from Pennsylvania's community colleges does not transfer very easily. Students risk losing valuable credits when enrolling in a four-year program or be denied admission to an Accounting program. What does transfer easily is an Associate's degree in Business Administration from a community college. That degree can be used by a savvy student to turn it into an Accounting degree at both PSSHE and Commonwealth Universities. Significant savings results by education at a 2-year community college then transferring to a PSHHE institution or Commonwealth institution.

Further savings by commuting to the 4-year institution after completing an Associate's degree at a community college. The degree of savings varies based on proximity to each school, how much student resources are given (provided) by parents. The greatest cost savings is being able to commute to a two year and 4-year institution, if practicable. I also discovered that some few programs may be restrictive, like a degree from the Smeal College of Business at Pennsylvania State University. Students cannot easily transfer into the program but can save money and achieve a Penn State degree by attending at a satellite campus.

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Joseph Cunningham is an Associate Professor of Accounting and Director of the Masters in Accounting Program at Wilson College. He is a faculty advisor for the Business club and an active volunteer with the PICPA. He is a member of the Accounting Educator's Committee (since 2012).

Thursday November 7, 2019

Registration – Days Inn Atrium **7:15 am – 3:15 pm**

Breakfast – Center/Arbor Room **7:30 am – 9:00 am**

Welcome – Center/Arbor Room

Norman Sigmond, Kutztown University of Pennsylvania

Chairman, NABET Executive Board

8:00 – 8:15 am

Session 1: Center/Arbor Room

8:30 am – 9:30 am

Welcome

Norman Sigmond, Chairman, NABET Board

Session Chair: *Loreen Powell, Bloomsburg University of Pennsylvania*
President and Conference Director

NABET Conference Proceedings and JBET Information

Norman Sigmond

Kutztown University of Pennsylvania

Jerry Belloit

Clarion University of Pennsylvania

This presentation will focus on the history and the current status the two NABET publications. How conference attendees can submit for possible publication will be discussed, as well as, suggestions that could prove helpful for the attendees. We will also discuss an improved team approach that will be employed to expedite publication of the Conference Proceedings. How interested parties can become reviewers for these publications will also be discussed. A key focus in this presentation will be to encourage those who have never been published. The various steps and procedures and ideas for efficiently completing work that is currently in-process will be discussed. The manner of discussion will be based on the experience of the three presenters. However, input from experienced authors in the audience, as well as, questions will be encouraged.

Session 1: Center/Arbor Room (cont'd.)

8:30 am – 9:30 am

Corporate Social Responsibility and Social Media-An Examination of Facebook, YouTube, and Twitter

Denise Ogden

Penn State-Lehigh Valley

Shruti Gupta

Penn State– Abington

The importance of Corporate Social Responsibility (CSR) has increased in recent years as consumers have become more demanding of accountability and transparency in organizations with which they interact. Inherent in social media is the sharing and exchanging of information. Participants not only consume information, but they can also create and become active participants in disseminating information. There are many organizations using social media platforms to spread the word about their CSR efforts. Alternatively, many organizations and even foreign governments have leveraged the social and unregulated

platforms to spread rumors, lies and influence attitudes and actions. This paper discusses Facebook, YouTube and Twitter through the lens of Corporate Social Responsibility.

Comparative Analysis of the Informed Consent Process

John C. Cameron

Pennsylvania State University

The enforcement of the contractual relationship between the physician and the patient needs to be considered in light of state informed consent statutes. If the informed consent process is incomplete, the patient's right to medical self-determination is jeopardized. So long as the practitioner complies with the informed consent provisions, the statutes provide a limitation on the right of a medical malpractice action by the patient for a claim based on the lack of informed consent. The use of the informed consent process is a customary practice in the medical community and an established standard for health care providers to follow in providing information to a patient. Physicians often rely on intermediaries, such as a nurse practitioner or a physician assistant to shift responsibilities from one party to another party to inform the patient. The interpretation of the statutory provisions by physicians may present uncertainty because of recent court decisions and a multitude of scenarios. According to a Pennsylvania Supreme Court decision, the obligation of a physician to obtain the informed consent of the patient for a medical procedure is a non-delegable responsibility. Prior research to examine the variances in the provisions associated with informed consent legislation within the United States has been limited. To address this gap in the literature, this paper will examine informed consent legislative trends including the duty of disclosure, the requirement of direct communication, the risks inherent in the proposed procedure, the acceptable alternative procedures and a description of the nature and purposes of the proposed procedure.

Session 2: Sylvan Room

9:35 am – 10:35 am

Student Engagement and Outcomes

Session Chair: *Gerard Martorell, Lock Haven University of Pennsylvania*

The Effect of Financial Aid on Student Outcomes

Diane D. Galbraith

Slippery Rock University of Pennsylvania

A primary barrier to college access and college completion rates for students including minority, and low-income students are financial. There are several factors hindering access to higher education for students, including limited financial resources, and higher risk of accumulating debt. Owing to the significance of postsecondary education in addressing possible income inequality and access, financial aid availability and access is of paramount importance. This paper aims to study the effects of financial aid loans and assistance available to students of a mid-sized public university in Pennsylvania, to analyze whether such aid has a positive impact on student performance and access to higher education for this group.

How Student Engagement is Perceived/Promoted/Measured in the US, Europe & China

Gerard Martorell

Lock Haven University of Pennsylvania

US Indiana university proposes a survey instrument, called National Survey of Student Engagement(NSSE), to monitor student engagement. This is represented by the amount of time and effort students devote to their studies and other activities for educational purposes. NSSE provides results on six High-Impact practices (HIPs) that are duly noted for their positive outcomes on student learning and retention. For the last survey in 2018, 511 institutions (489 in the US, 16 in Canada, and 6 in other countries for the first time) participated in this survey. Some accrediting bodies, such as AACSB or ACBSP, have introduced student engagement indicators. Thus, student engagement seems to be attracting more and more

attention to assess university quality. However, these developments are still mainly centered in US and Canada universities. Conceptually the idea of student engagement might not be perceived the same way in other countries/cultures. This research wants to explore what is the understanding of student engagement in three US, Europe, and Chinese universities, what these universities do to promote it, and how they measure the outcomes. To do so, in depth exploratory interviews have been conducted among key players in those three universities. Results show some unexpected results.

Developing Team Decision Making Skills in the Business Capstone Course

Robert S. Fleming
Michelle Kowalsky

Rowan University
Rowan University

This presentation will relate our experience in incorporating a decision-making skill development exercise in *Business Policy*, our capstone business course. This course requires student consulting teams to complete a series of consulting projects related to strategic management. We typically form the consulting teams during the first class meeting. It has at times taken some teams a prolonged time to work through the early stages of group development and become fully functional. Over the past year we have utilized this exercise at the start of the semester and have found it useful in the early ramping up of the cohesiveness and productivity of the various consulting teams.

Session 3: Willow Room

9:35 am – 10:35 am

Pedagogical Concerns

Session Chair: *Jerry Belloit, Clarion University of Pennsylvania*

Obsolete Skills-Do We Still Calculate Square Root Manually? Is It Time to Radically Change Statistics Course Content?

Robert John O'Connell

York College of Pennsylvania

The purpose of this exploratory investigation is to determine if the current content of introductory business undergraduate statistics courses is appropriate given today's technology. Since this researcher began teaching statistics more than 45 years ago, the content of basic undergraduate business statistics courses seems to have changed little, although the technology available to students has changed significantly. Some of the research will be based on personal, and sometimes anecdotal, observations and comparisons to how technology has changed the required memorized facts and procedural knowledge in other disciplines. With the generally accepted argument that initial failure in undergraduate statistics classes is too high, some researchers have proposed modified teaching approaches to reduce failures. However, it appears that little has changed in the core content, but in some cases, introductory or some foundational content was eliminated to accommodate more time on the core skills. Some schools developed parallel undergraduate business degree programs that reduced the number of required statistics courses, and some schools combined the often-separate descriptive and inferential statistics courses into a single course for more credit hours. These approaches to change have met with some success, but has the time come for more revolutionary change that balances a theoretical foundation with the technological capabilities currently available?

Business Students Faced with Ethically Sensitive Decisions: How Will They React?

Joseph Michael Larkin

St. Joseph's University

This study examines the ethical decision-making process of business students when faced with ethically sensitive situations. Participants were presented with eight ethically-sensitive scenarios and asked what

course of action they would take. Data were collected from 288 business students enrolled in a managerial accounting course at an AACSB accredited institution. A survey instrument was administered, similar to one used in a study by Radtke (2000). The results indicate statistically-significant differences across several variables including gender, class level, major and GPA. These findings have implications for the design of effective ethics education in business schools.

Session 3: Willow Room (cont'd.)

9:35 am – 10:35 am

Using Gamification to Develop Student Learning in Introductory Accounting Classes

James Meersman

Juniata College

This paper examines previous studies related to the use of gamification within the classroom to drive student learning. Specifically, this analysis will reflect current practices surrounding games utilized for enhanced learning strategies in introductory accounting courses. These resources will be further tested through the implementation of a newer accounting game that can be implemented both within and outside of the classroom of an introductory accounting course. This game was developed and implemented in various ways throughout the majority of a traditional semester long course that primarily targets business students in their first year of study at the collegiate level. The game went through a variety of changes over time and is still going undergoing additional developments based on student feedback and instructor observation. The game was designed to be played in groups of 3-5 people in minimal periods of time ranging from 10-20 minutes.

Session 4: Logan Room

9:35 am – 10:35 am

Deeper Learning/Active Learning

Session Chair: *Audrey Pereira, Fitchburg State University*

Evolution of “YOU DRIVE”: An Active Learning Approach in Undergraduate Operations and Data Analytics Courses

Matt Patterson Shatzkin

York College of Pennsylvania

This paper describes the implementation of the “YOU DRIVE” approach, designed to increase the active learning of college students in operations management and data analysis courses. After watching the professor perform a concept and approach, students work on a problem during class, under observation from each other and the professor. This approach allows students to immediately gain feedback, make mistakes, learn from each other, and apply concepts after seeing them. This approach also enables the professor to learn individual students more personally, to include understanding individual strengths and weaknesses with the respective course material. This paper describes the ongoing evolution of the “You Drive” approach over three semesters and two different courses. This paper will provide a review of active learning theory and approaches, and will describe feedback and observations gained over three semesters, the latter of which is in progress. This paper will also describe changes and improvements based on the various feedback, and will outline a plan for future research.

Deeper Learning Methods and Modalities in Higher Education: A 20-Year Review

Audrey Pereira

Fitchburg State University

Deep Learning or Deeper Learning (DL) theory has gained traction as a helpful framework for designing higher education curricula in face-to-face (F2F), hybrid, and online settings. Although many research

studies have been published testing DL methods in higher education, it is difficult to apply the results without an overview. This review applies a scientifically-informed search approach to select a sample of 127 peer-reviewed articles (representing 176 experimental groups) published from 1999 through 2019 on the topic of DL in higher education, classifies and extracts data from them, and presents a descriptive analysis of the findings.

Development and Testing of a Role Playing Gamification Module to Enhance Deeper Learning of Case Studies in an Accelerated Online Management Theory Course

Audrey Pereira

Fitchburg State University

Research has established that cognitive rehearsal, or the visualization of application of a skill or behavioral response to a situation can increase self-efficacy through vicarious experience. Yet, it is challenging to incorporate cognitive rehearsal into online teaching, incorporating deeper learning principles (DLPs) in online learning has been proposed. Curricula based on DLPs actively engage the learner in exploring, reflecting upon, and producing knowledge, and an empirically successful approach to including DLPs in online curricula is through game-based learning (GBL), which can facilitate cognitive rehearsal. This project examines the impact of adding a GBL module to two sections of the Management Theory and Process course in the accelerated Master of Business Administration online program at Fitchburg State University in Massachusetts. The module purpose is to encourage cognitive rehearsal associated with case studies to apply management theories. It will be added to the unit on Total Quality Management (TQM), and will be evaluated by comparing grades on the assigned essay questions for that unit between students who used the module and students who did not. Those using the module will be asked to complete a survey providing feedback on positive and negative aspects of the module. The long-term goals of this project include disseminating the findings in a scientific setting, and commercializing similar modules to expand their use in the online education community.

Session 5: Holmes Room

9:35 am – 10:35 am

Risk/Triangular Merger

Session Chair: *Norman Sigmond, Kutztown University of Pennsylvania*

Case Study: When Will a Triangular Merger Qualify as a Reorganization Transaction Under Section 368 of the Internal Revenue Code?

Valeriya Avdeev

William Paterson University

A reverse triangular merger is a type of restructuring transaction used to merge companies. Instead of the regular plan to acquire or create a subsidiary, in a reverse triangular merger a parent company is acquired and used as a subsidiary. Specifically, in such a transaction, the acquisition subsidiary is merged with a target company, but the acquiring company still remains intact.

A reverse triangular merger is quicker, simpler and is more effective than the regular triangular merger mainly because the new subsidiary that merges with the target company has only one controlling shareholder the acquiring company. There are also other benefits of structuring a merger as a reverse triangular restructuring. For example, one major benefit is contract continuity. If the target company has been in existence for many years, the acquiring company might wish to keep the target's proposals. A reverse triangular merger ensures that the acquiring company will be able to enforce those contracts later on. Another benefit of the reverse triangular merger is its faster execution. In a regular forward triangular merger, the acquiring company needs to gain approval of the majority of all of its existing shareholders. In a reverse triangular merger, however, that requirement is automatically satisfied by the fact that the newly

acquired target will have only one shareholder the acquiring company. Moreover, in a reverse triangular merger, there are fewer risks associated with the purchase. Specifically, the target company is not directly merged into the acquiring company. The acquiring company is cushioned against the target's liabilities due to the fact that they remain separate companies. Finally, since the target company remains a separate entity, the acquiring company can freely choose to sell the newly created subsidiary if the merger proves to be less financially favorable. This presentation will examine the reverse triangular mergers which were the most common merger structures among publicly traded corporations in 2008.

Why Business Dynamism has Fallen Over Recent Decades in the US: The Role of Risk Aversion and Rising Returns on Human Capital Investment

Insoo Cho

York College of Pennsylvania

Business dynamism is an important component of the reallocative process and economic efficiency. However, data shows that the pace of business dynamism in the U.S. has fallen over recent decades. According to prior literature, the declining pace of business dynamism can be attributed to declining startup rates. In this paper, we show in theory that individual risk aversion can play a role in explaining the declining business dynamism. The U.S. economy has experienced rising returns and variance of human capital since 1980. The rising returns and variance would tend to increase the gap in the investment in entrepreneurial skills between the most and the least risk averse. Rising variance also reduced the human capital investment for the most risk averse as well. As a result, the supply of entrepreneurs with critical entrepreneurial skills for business success would have been decreasing, which suggests that startup activity has been subdued and entrepreneurial failure has been steadily increased.

Policy Risk and Stock Market Volatility in China

Zhen Ma

Misericordia University

The policy-driven feature of China's stock market induces a debatable argument that political interference should be responsible for the sharp fluctuations of the stock markets because of discretionary changes in government policies. Furthermore, Chinese economy is currently undergoing significant restructuring and transition which need strong support from the capital market, and a stable and healthy stock market is believed to be a key part of the reform process. Therefore, the investigation of the relationship between the risk arisen from government policy and the volatility in the stock markets is of particular importance to both policy makers, investors and academics.

In this study, we first explore the policy-driven feature of China's stock market. Then, we develop policy risk index based on the frequency of news articles published in the 5 selected sample official newspapers to measure the policy risk and/or uncertainty in China's stock markets that are related to policy events such as government intervention, official comments, regulatory activities and market expectations or market rumors. Subsequently, to identify the impact of policy risk on the volatility of the stock markets, multivariate regression models including the PRI as an important explanatory variable are estimated in terms of the different Chinese market conditions. This presentation will focus on exploring the policy-driven feature of China's stock market.

Economic Concerns (1 Paper/1 Panel-30 minutes)

Session Chair: *Lisa M. Walters, State University of New York at Fredonia*

Economic Assessment of Water Framework Directive Implementation Measures in the East Aegean Region

Yuli Radev

Desislava Simeonova

Reneta Barneva

Lisa M. Walters

University of Mining and Geology

University of Mining and Geology

State University of New York at Fredonia

State University of New York at Fredonia

We present a methodology for assessing the economic efficiency of ecological measures in river basins and its application for the East Aegean region. It follows the European Water Framework Directive (European Commission, 2000). Unlike other similar studies, the presented methodology has been developed and tested in terms of the water pollution due to mining activities.

The application of this methodology to the water areas will make it possible to draw conclusions on the effectiveness of the measures taken and identify cases of derogation. Based on them, we will plan additional measures to meet the objectives of the Directive in the period 2022-2027.

In terms of economic theory, the methodology can be described as follows: The cost effectiveness analysis used to select the optimal mix of costs is integrated into the cost-benefit analysis to assess the cost-effectiveness of the proposed measures.

Relationships Between the Industrial Upgrading and Carbon in China: Spatial Econometric Method

Xin Tong

SUNY Buffalo State

This empirical study examines the spatial dependence of carbon emissions and analyzes the industrial restructure spatial functional mechanism in China by using provincial carbon emissions panel data over the period of 2000-2015. It also carefully considered other proxies, such as population, economic growth and technological progress in the country. The fundamental objective of this study is to test the spatial dependence in the context of China. The dynamic estimate of the relationship among carbon emissions, industrial restructure, population, economic growth and technological progress are built through spatial models. The empirical findings indicate that is significantly positive and has a significant promote role. The comparative analysis of 2000-2007 and 2008-2015 indicate that the industrial structure of low carbon economic development has been shown regulate provincial economic growth significantly reduced the effect to the adjacent provincial carbon emissions, and the promotion of the role of provincial industrial structure near the provincial carbon emissions growth have the positive role. On the other hand, expedite technological progress are need promoted on the development of low carbon economy. These results demonstrate that there are some achievements have been made in the transformation of China's industrial structure. The government departments should focus on strengthening cooperation and communication in the neighboring areas, improving the industrial structure optimization and considering the effect mechanism of the spatial effect in the long run.

Management Concerns

Session Chair: *Alex Citurs, Eastern Connecticut State University*

Preparing Students for the Hybrid Career World

Alex Citurs

Eastern Connecticut State University

Employers are increasingly expecting their new hires to have knowledge bases that are both broad across multiple academic-professional career areas as well as deep in one or more discipline-career areas to provide additional flexibility and value to meet rapidly changing data and technology needs. These types of positions are commonly referred to as hybrid careers, which are generally seen as more recession proof, receiving higher pay and growing at paces faster than their component areas. Often liberal arts educated students are perceived as providing the sought-after knowledge breadth. However, this breadth must be matched and integrated with one or more areas of deep discipline/career expertise knowledge. These hybrid positions often require transdisciplinary data analytical and information systems skill sets that are increasingly in demand in more career areas. Educating and advising students for these hybrid career positions is largely an unresearched topic. This study examines aspects to consider in advising, educating and preparing students for hybrid internships and career positions. This includes topics encompassing advisement strategies, early academic starts in multiple areas of deep domain knowledge, as well as integrating both hard and soft skill sets in real world projects and problem domains. Often this involves students acquiring, integrating and applying multiple information systems and business skill sets such as business process design, business data management and analysis as well as the holistic integration of soft people skills. An academic-advising model to integrate experiential learning courses and experiences spanning multiple disciplines is presented for preparing students for hybrid careers.

Insights from Companies that have Employed Individuals with Autism Spectrum Disorder

Monica Law

Marywood University

The purpose of this paper is to bring awareness to hiring practices of companies employing individuals with autism spectrum disorder. Autism affects 1 in 68 people nationwide. This number continues to grow. In fact, Autism is documented as one of the fastest-growing developmental disorders in the United States. Autism, or autism spectrum disorder, refers to a range of conditions characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication, as well as by unique strengths and differences. The term spectrum reflects the wide variation in challenges and strengths possessed by each person with autism. People on the spectrum are often technologically inclined, detail-oriented, have strong analytical skills, have strong mathematical skills, pattern recognition, and information processing, skills businesses most urgently need at this time. Research has shown a diverse workforce to be more productive. In addition, research confirms positive business value to employers that include a workforce comprised of people on the autism spectrum. Specifically, value in reduced turnover, increased performance, focus, attention to detail, honesty, lower absenteeism, and improved morale and workplace safety. The companies showcased in this paper see that with proper hiring practices, hiring individuals with autism spectrum disorder may provide great value to their businesses. With the right job and environment fit, employers may find that the many attributes and strengths of individuals with autism spectrum disorder will help the business gain a competitive advantage.

Effective Management of Information Technology Employees

Gerald Paul Wright

Husson University

Research has shown that effective employee management should result in increased worker happiness, which in turn should lead to increases in productivity and retention; thereby, reducing overall costs. There also exists research which suggests that Information Technology workers need to be managed differently from other employees, and even from other knowledge workers, within the same organization. This research investigates the characteristics of a subset of Information Technology workers, software development professionals. In addition, it examines differences between U.S. software developers and their global counterparts. By identifying any unique characteristics of these employees, employers will be able to more effectively align management techniques resulting in improved outcomes for both the employees and the organization.

Session 8: Logan Room

10:55 am – 11:55 am

Accounting Pedagogy/Student Career Preparation

Session Chair: *Joseph Michael Cunningham, Wilson College*

The Variability of Cost in Obtaining an Accounting Degree in Pennsylvania

John Michael Cunningham

Wilson College

The cost of an Accounting degree obtained in Pennsylvania varies among those whom attain a Bachelor's degree. There are many paths to a Bachelor's of Science in Accountancy. An individual may either begin in a 4-year program or start at a community college – full or part time. Other variable costs included living expenses, housing costs, and transportation costs. What is the least expensive path? Pennsylvania community colleges and state affiliated universities were surveyed to gather information related to the cost of earning a Bachelor's of Science degree in Accounting. These costs included tuition, programming costs, and housing costs. Other sources cited regarding living and transportation costs. These individual costs become the foundation for calculating one year of college education for an individual. The results of analysis is that the cost of an Accounting degree varies greatly among those whom attained a Bachelor's degree in Pennsylvania. There is variability in tuition, housing, living expenses and transportation costs among not only different institutions but also students within the same institution. This may be due to personal choices, preferences, and circumstances. This research is a valuable financial literacy and planning tool for both students and their parents. The study uses economic data derived from Pennsylvania higher education institutes. It invites individuals to consider a comprehensive look about the costs associated with obtaining a college degree, how to navigate articulation agreements and finance it finance it, too.

Session 8: Logan Room (cont'd.)

10:55 am – 11:55 am

Experiential Learning in Extraordinary Times: the Effects of the Tax Cuts and Jobs Act on Student Learning in a Voluntary Income Tax Assistance Program

John Grigsby

Thomas Jefferson University

The Tax Cuts and Jobs Act of 2017 (TCJA) made sweeping changes to the US tax code. These changes created significant challenges for both faculty supervisors and student volunteers who conducted Voluntary Income Tax Assistance (VITA) programs. Participants had to learn the rules under both the TCJA and the laws in effect prior to the enactment of the TCJA. Most provisions of the TCJA became effective on January 1, 2018, and were first used by students in preparing 2018 tax returns. This paper addresses the effects of these challenges on student learning and behavior. First, we describe how a VITA program can provide a

valuable learning experience for students during a period of substantial change. Second, we discuss the challenges faced by student volunteers when dealing with low income and elderly clients during a period of change. Third, we provide a qualitative analysis of student and faculty experiences based on a sample of 15 student volunteers and 15 faculty supervisors. And fourth, we provide a qualitative analysis of the experiences encountered by tax clients from a random sample of one hundred tax clients. Based on our results, we conclude that the student volunteers, faculty supervisors and tax clients all benefited substantially from their involvement in the VITA program during a period of change. We further conclude that communication among the parties is essential to a successful VITA program conducted in extraordinary times.

Industry 4.0: New Challenges for Skills and Competences of Young Students and Graduates

Pragya Singh

Indian Institute of Information Technology

Nripendra Singh

Clarion University of Pennsylvania

Humans, being an entity when accompanied by knowledge, skills and competences, further transform into a resource acting as an asset for the industry, leading to human capital. This research paper determines skills and competence requirements for the era of future industrial revolution 'Industry 4.0'. The Industry 4.0 describes a CPS oriented production system (Riedl, Zipper, Meier &Diedrich, 2014; Henning, 2013; The Industrial Internet Consortium, 2014) that integrates production facilities, warehousing systems, logistics, and even social requirements to establish the global value creation networks (Frazzon, Hartmann, Makuschewitz & Scholz-Reiter, 2013). The core of distributed automation systems is essentially the reliable exchange of information. The new technologies, Ethernet, wireless networks, or web technologies, created new opportunities for making information exchange more comprehensive.

(1) Purpose and Potential Impact: The main objective of this paper is to investigate the changes in requirements for the skills and competences in the context of Industry 4.0 and provide a model for graduates to develop the required skills and competences in a strategically optimized way to retain their jobs in changing working environment. Technology can indeed be a significant enabler for achieving competences in the technology driven world. There is a need to look beyond the phrase, Information and Communication Technology and use the term technology more holistically. For this to happen, substantial investment will need to be made across infrastructure, teaching, education, and content and curriculum. It is necessary for technology to be incorporated into curriculum delivery and teacher capacity building.

(2) Research Methodology: The research draws on literature review of 11 relevant studies and subjective opinion gathering from 281 first year engineering students of an Institution of National importance in the field of engineering in India, and the skills and competences are broadly categorized into Technical, Social, Personal and Practical and their preference orders are decided accordingly for the era of Industry 4.0 using Friedman test and Chi-square tests.

(3) Findings: The study is conclusive about Technical and Practical skills being more preferred as it endorses Continuous Learning, Interdisciplinary Knowledge, Critical Thinking and Decision Making as the most preferred competences for young graduates to prepare themselves for the challenges coming up due to Industry 4.0 but the social and personal skill-set also need to be developed to have a better humane approach for future.

(4) Originality/value: This study is one of the few considering emerging Industry 4.0 in the Indian context. As a result, the research provides useful new insights for researchers, teachers and industrialists to enhance existing and embed new skill-set according to a human work-force in the era of Industry 4.0.

Marketing Concerns

Session Chair: *Ross B. Steinman, Widener University*

Simultaneous Consumer Utilities, Multi-Sided Markets and Consumer Synergies

Jeffrey Yi-Lin Forrest

Slippery Rock University of Pennsylvania

Yaoguo Dang

Nanjing University of Aeronautics and Astronautics

Larry McCarthy

Slippery Rock University of Pennsylvania

Sifeng Liu

Nanjing University of Aeronautics and Astronautics

Yong Liu

Jiangnan University

By employing a systemic approach, which is completely dissimilar to those used in the literature, this work scrutinizes issues related to the following problems: (1) What are the most fundamental decisions a retailer can make in terms of its offers to consumers? (2) When can simultaneous consumer utilities be produced by collocating products and/or services? (3) When can a positively correlated multi-sided market be formed? And (4) without particular talent and luck how can a synergistic innovation be introduced? Due to the specific approach taken, we are able to describe how simultaneous consumer utilities, two-sided markets and consumers' willingness to pay additional react with one another and how the previous problems can be addressed by establishing a series of 6 propositions. To explore the possibility of systemically generating new ideas instead of waiting for the seemingly sudden and random appearance of disruptive technologies, a mechanical procedure is developed for the potential of producing synergistic innovations on either the producer or the demand side. Because of the certainty systems science offers, the general conclusions developed in this paper are expected to provide practically useful recommendations for entrepreneurs, managers and retailers to create and to capture values for consumers and their companies.

Antecedents of Consumer Happiness

Ross B. Steinman

Widener University

The results from laboratory research on the effect of purchase type on consumer happiness are highlighted. Using a decision making paradigm, participants were randomly assigned to fictional scenarios where ordinary/extraordinary material purchases and ordinary/extraordinary experiential purchases were experimentally manipulated. Consumer happiness, consumer choice, and consumer attitude were utilized as outcome variables. There was evidence that participants differed in consumer happiness based on the type, magnitude, and valence of the purchase. This research adds to the literature on consumer happiness in a decision making context. Future directions, including strategic marketing applications as well as methodological strengths and limitations, are discussed.

Trends in Branding Medical and Recreational Cannabis

Denise Ogden

Penn State-Lehigh Valley

James Ogden

Kutztown University of Pennsylvania

It is not often that a once illegal product becomes legal. Such is the case with medical and recreational marijuana. The legal cannabis industry is growing at an amazing pace. With competition in the industry, companies need a way to differentiate their product. Despite the regulatory environments at the state and national level, efforts to brand cannabis products have succeeded. This article examines the trends in branding medical and recreational marijuana. The industry and benefits/drawbacks to branding these products are discussed. In addition, dominant brands are discussed as well as other cannabis products that have successfully built a brand.

Session 10: Sylvan Room

1:05 pm – 2:05 pm

Supply Chain/Monetary Policy/Finance

Session Chair: *David Jordan, Slippery Rock University of Pennsylvania*

How Are Compensation Packages of Executives Determined for Publicly Traded Sports Teams? The Case of European Soccer Teams

Won Yong Kim
Taek-yul Kim

Augsburg University
West Chester University of Pennsylvania

In 1980, Nolan Ryan, a Houston Astros pitcher, became the first million dollar player in the professional baseball league. Since then, players' compensation in professional sports has substantially increased. In 2018, Lionel Messi, an Argentinian soccer player of FC Barcelona, earned \$127 million, where \$92 million came from his salary (Forbes 2019). Although there is debate of whether the high level of compensation for professional sports players is justifiable, it is clear that their salaries are determined based on their previous play record.

Coach compensation is also a popular topic in sports compensation research. A number of studies show that managerial skills affect team performance and revenue (Porter and Scully, 1982; Scully, 1989). Other studies also show that coaches are overpaid and their compensations are not fully aligned with team performance (Thomas and Van Horn, 2015).

When it comes to ownership, professional sports teams are usually privately owned by corporations or wealthy individuals. A small number of teams, however, are publicly owned. As traditional executive compensation literature suggests, compensation packages for executives of publicly traded firms are set so that managerial incentives are aligned with firm value, which may be represented by stock price. Our research question is to show how executive compensation is determined for publicly traded sports teams. We answer the question in this case study by utilizing the data of a group of European Soccer teams (Juventus, AS Roma, Tottenham, etc.) that have equity shares traded in public stock markets.

Session 11: Willow Room

1:05 pm – 2:05 pm

Healthcare Concerns

Session Chair: *Matt Artz, Azimuth Labs*

Medicaid Spending and State Financial Condition

Daniel Hummel

Slippery Rock University of Pennsylvania

Medicaid is a large entitlement program in the United States that represents an element of the welfare state. The states receive a portion of the funding for the program from the Federal government while having discretion over medical services received and eligibility for those services. Medicaid has become the largest category of state spending despite Medicaid expenditures per enrollee remaining relatively flat between 1992 and 2009. The increasing costs associated with the program are related to rising enrollments and increasing costs of pharmaceutical drugs. This study is interested in the effects of this spending on state financial condition as measured comprehensively by the measure developed by Wang, Dennis and Tu (2007), which considers the cash, budget, long-term and service solvency of the government. This has become an increasingly popular measure which was adopted by the Mercatus Center at George Mason

University. Based on the results of the analysis, Medicaid spending per enrollee has a statistically significant and positive effect on state financial condition. However, when Medicaid spending per enrollee is interacted with median income and Census region the effects are significant and negative on state financial condition. Conversely, when Medicaid spending per enrollee is interacted with the unemployment rate, the federal matching rate and population the effects are significant and positive which may explain the positive effects the Medicaid variable has on state financial condition.

Segmenting Chinese Medical and Health Tourists Visiting Croatia: A Travel Intention Based Analysis

Chenchen Huang
Christine A. Lai

SUNY Buffalo State
SUNY Buffalo State

Chinese tourists seeking medical and health benefits from overseas trips represent an important fast-growing market segment in the Chinese outbound tourism market. Despite of its pristine natural environment, welcoming social environment, and successful medical and health sectors, Croatia remains an unfamiliar and thus unusual destination for Chinese Medical and Health Tourists (MHTs).

This study investigated 155 Chinese participants' intention of visiting Croatia for medical and health purposes. Based on nine questions regarding medical and health related tourism products, a cluster analysis classified the whole sample into three groups: Focused MHTs (22% of the sample), Early MHTs, (48%), and Versatile MHTs (30%). Focused MHTs are middle aged, with the highest education attainment among the three groups and a medium budget, and least likely to visit other Croatian cities or attend local cultural activities. Early MHTs are the youngest, attain lowest educational achievement, have the smallest budget, and nevertheless are open to other cities and cultural activities. Versatile MHTs are slightly older than Focused MHTs, well educated, with the highest budget, and eager to explore. Versatile MHTs are the most proficient in the English language and the Focused MHTs are the least proficient. Versatile MHTs are more likely to travel with friends than Focused MHTs.

Findings from this study presents opportunities for Croatian destinations. Versatile MHTs are the most valuable, but Croatian destinations must compete for their business. Focused MHTs can benefit significantly from language assistance and other services provided. Early MHTs represent great potential for Croatian destinations to develop.

Ethical Considerations for Digital Health Innovation

Matt Artz
Carolina Severiche Mena

Azimuth Labs
Azimuth Labs

Digital health involves the application of digital technologies to health products and services in the sectors of mobile health (mHealth), health information technology (HIT), wearables, telehealth, genomics, and personalized medicine.

Advocates of digital health argue that it will empower consumers to make better health decisions while enhancing the diagnosis and treatment capabilities of health professionals. The promises of digital health have resulted in a proliferation of innovations in both the consumer and medical sectors, leading two market research firms to recently estimate that the global market will top \$400 billion by 2024.

Impressive growth, but we ask at what cost and to whom? As critics have warned, despite the potential of digital health to improve health outcomes, there are ethical concerns in both the consumer and medical sectors that must be addressed before consumers' rights are infringed. These concerns involve trust, security, privacy, accountability, and informed consent of individuals, as well as broader societal concerns of access and equitability.

Based on previous research in direct-to-consumer genomics (DTCG), this paper argues that the criticisms of digital health are warranted and that increased ethical considerations are needed to ensure that consumers of digital health products are adequately protected. The paper will offer recommendations that entrepreneurs or established organizations should consider when innovating in digital health.

Session 12: Logan Room

1:05 pm – 2:05 pm

Pedagogical Concerns

Session Chair: *Reneta Barneva, State University of New York at Fredonia*

The US Hospital Industry as a Mechanism for Teaching Organizational Ecology and Niche Formation

Mark Stroud

College of Staten Island

A. Cliff Abdool

College of Staten Island

As a result of government-imposed regulations, the U.S. hospital industry has undergone substantial structural changes. The Emergency Medical Treatment and Active Labor Act (EMTALA) of 1986 requires hospitals with an emergency room to provide services to patients regardless of their insured status or ability to pay. This regulatory act has incentivized a change in hospitals' organizational structures. Specialist hospitals, which lack emergency rooms and are not under the jurisdiction of the EMTALA, have multiplied, while general hospitals, which have emergency rooms and fall under the EMTALA, have suffered. Therefore, the EMTALA has contributed to the formation of a new niche in the hospital industry. An examination of the birth of specialist hospitals and the mortality of general hospitals provides an insightful approach to teaching organizational ecology and niche formation. This investigation provides useful direction to educators at the undergraduate level.

A Comparative Study of Evaluative Coaching for Resumes and Mock Interviews

Celia Lofink

University of Hartford

In today's competitive educational environment we have successfully branded our University of Hartford, Barney School of Business (BSB) Undergraduate program as "Career-Ready", suggesting undergraduates are being prepared to enter the working world with progressive knowledge and skills related to how they think about and engage with their chosen careers. Our Career Ready program was established to give students a competitive advantage in a market flooded with young professionals with newly minted degrees. Our programs span across the four years of college and includes focus on simple resume construction to activities for career building such as club involvement or honors courses. Other events include mock interviewing practice, campus career fairs, corporate visits, job shadowing, internships and more. The research that will be presented is a comparative study of two specific career ready program activities; resume construction and mock interviewing. The study compares a control group that will use traditional methods of coaching resume construction and interview preparation to an experimental group of students using a rule based intelligent technology platform to conduct automated resume review and "smart robot" interviews. Data will be collected on the comparative ROI measures established such as efficiencies of time, volume and accuracy. In addition, data will be collected on student performance effectiveness measures between the two groups and will also be presented. Specifically, is there significant difference in the two group's methods as students both prepare for and enter the working world as measured by number of applications made, number of first round and second round interviews offered, number of job offers and number of secured employment agreements made that will be extrapolated to a projected placement rate by graduation. Some of these data sets will be in process of collection and analysis at time of presentation. Results will be reported on any aspects of the measures established where we have data sets analyzed.

Using Digital Technologies in Music Industry Education

Reneta Barneva
Kamen Kanev
Stuart Shapiro

State University of New York at Fredonia
Shizuoka University
State University of New York at Fredonia

Music Industry is a relatively new bachelor degree offered only by a few institutions. However, it is gaining momentum, attracting an increased number of students. The development of digital technologies significantly changed the way music is produced and listened to, as well as how musical events are organized, artists are promoted, and marketing and ticket sales are performed. Thus, the Music Industry students have to be acquainted with the digital technologies and the opportunities they offer, and be able to use them in their future career. As in every emerging discipline, a challenge in the Music Industry program is the lack of textbooks and other educational materials. In addition, digital technologies develop so rapidly that it is impractical to write a traditional textbook. In this paper, we discuss the digital technologies that are included in the Music Industry program at SUNY Fredonia and what kind of related projects are assigned to our students. We hope that the information will be useful not only to Music Industry educators, but also to educators in other disciplines willing to make their students aware of the latest trends in digital technology applications.

Session 13: Holmes Room

1:05 pm – 2:05 pm

Marketing Concerns

Session Chair: *Uldarico REX Dumdum, Marywood University*

Fostering Integration in Student-Developed Marketing Plans Through the Use of Consumer Interviews

John M. Zych

University of Scranton

A comprehensive marketing plan requires a detailed environmental analysis, as well as an integrated marketing strategy that links the targeted market segments with product design, pricing, promotion and distribution programs. An assignment was developed to utilize consumer interviews as a baseline for accomplishing this integration.

Students were assigned a group project for which each student was responsible for developing a section of a marketing plan and presentation for an assigned automobile. Coaching sessions were conducted throughout the semester to support groups in developing their projects.

Each group member was required to conduct an interview with a family member regarding the member's decision-making process for an automobile purchase. The results of all the interviews were shared with the entire group and provided a database for students to use when developing the project. The family interviews were helpful in engaging students in discussions centered on how the consumer decision-making process is impacted by all components of a marketing plan. The interview process also supported integration across sections of the marketing plan. The conference presentation will illustrate this approach with examples from a marketing strategy class. Student reactions to the assignment also will be discussed.

How Significant are Healthy Food Labels to College Students

David John DiRusso

Millersville University

Food labels such as “local,” “organic,” and “Non-GMO” have been proliferating across various food product packages in the United States. Many food products with these labels carry price premiums. The aim of this study is to determine if college students find value in these labels. Several food categories were analyzed: fresh meat, produce, dairy/eggs, and processed foods. A survey was employed to determine how important students believe these are, how much healthier food is perceived to be if it carries these labels, and how much of a price premium they are willing to pay. Results indicate that these labels do increase perceived value, increase perceived healthiness, and create a willingness to pay a price premium, but do so at different rates based upon the type of food product.

Influence of Cognitive and Emotional Advertisements on Biosphere Reserve Image and Visitation Intention for Youth

Andra Arklina

Agita Livina

Nripendra Singh

Vidzeme University of Applied Science

Vidzeme University of Applied Science

Clarion University of Pennsylvania

This paper reports the results of a study of the role of North Vidzeme biosphere reserve (Latvia) image, pleasure and arousal in building young visitors' intention to visit biosphere reserve (target audience 15-25 years old youth). An online survey was conducted for data collection. A quantitative approach was employed to analyze the data. Findings showed that most of all respondents agreed that visiting biosphere reserves relieves stress, helps to socialize and escape from daily routine as well as they would visit more often protected areas if they would see their friends visiting them. Youth 15-19 were more excited, joyful and astonished about visiting biosphere reserve, but youth 20-25 were more neutral about it. Both groups agreed both groups agreed that there was a lack of advertisements and visibility of area.

Session 14: Sylvan Room

2:10 pm – 3:10 pm

Career Preparation (1 Paper/1 Workshop-30 minutes)

Session Chair: *Linda Hall, State University of New York at Fredonia*

Introducing a Mentoring Program for our Barney School of Business Undergraduates

Celia Lofink

University of Hartford

A pilot of this framework for mentoring (Fall 2015-Spring 2016) and presented at NABET in 2017 and 2018. The two researchers (Lofink and Rogers) had a two-fold interest at the time. First, they explored how effective the mentoring process would be for participants using the Kouzes and Posner (2012) framework. Second, they wanted to explore if undergraduate students (who in the initial pilot happened to be in a leadership council) were open to being mentored and what they perceived as their benefit from the experience. Going beyond pilot, The Barney School of Business (BSB) has moved into a Phase I launch of a BSB mentoring program. The program is fully integrated mentoring in all four years of the undergraduate experience and has focus to better prepare undergraduates to be successful as they journey from Freshman “College Ready” to Seniors poised for “Career Launch” into the working world. The workshop will focus on the key underpinnings of the approach and lessons learned.

Next Generation Business Simulations

Bret Wagner

Western Michigan University

A variety of educational pursuits that prepare students for their professional lives are supported by relevant practice-oriented experiences that enable students to move into their careers with greater ease. The business classroom, while offering knowledge and concepts, attempts to achieve such experiences through case studies, industry projects, cooperative learning opportunities, and simulations. This workshop explores the use of a next generation comprehensive simulation that has been successfully used in varied business disciplines. These disciplines include operations management, quantitative literacy, leadership, information technology, marketing, and analytics.

The workshop presents the short-comings of many business simulations and provides insight into the development and use of this next generation simulation, with regard to its SAP-similar design and its technical development to the final user interface. It explores the differentiating capabilities of this next generation simulation.

Lastly, a review of the available simulations will be presented, as these simulations link to the business disciplines supported. This review includes a look at the supporting materials of the simulation and methods of implementation.

Session 15: Willow Room

2:10 pm – 3:10 pm

Data Analytics Applications

Session Chair: *Loreen Powell, Bloomsburg University of Pennsylvania*

A Business Analytics Tool for Text Analysis

Loreen Powell
Kyle T. Fromert

Bloomsburg University of Pennsylvania
Bloomsburg University of Pennsylvania

Business Analytics is a growing field with many career opportunities within the Business, Information Technology related fields. As a result, many information technology related degree programs are integrating digital data and text examination into their existing course content or simply developing new business analytics courses into their curriculum. However, this are a limited amount of teaching resources available on this topic. This paper adds to the body of knowledge and teaching resources regarding a popular business analytics tool for digital data and text analysis.

Incorporating Data Analytics into the Curriculum

Michael Gallagher

DeSales University

Data Analytics and Artificial Intelligence are two topics that colleges and universities are trying to introduce in their curriculum. This abstract will describe the various initiatives at DeSales University and some of the industry wide programs for these topics at the top of the list for many employers.

DeSales University started Kameron Ashfar Data Analytics Center (KADAC) to provide a center where organizations could design projects to be worked on with Dr. Ashfar and student interns relating to their Big Data needs. The Lehigh Valley Chamber of Commerce has worked with the center on a quarterly economic forecast that is presented at DeSales by the students working on this project. The students also created a poll forecasting project that had local and national attention. Several businesses in the area have also designed projects using the expertise and software at KADAC.

DeSales developed a certificate program and track within the MBA program and is currently developing a five course interdisciplinary program in the undergraduate program that compliments several of the majors at the university. One example is the accounting curriculum consisting of four courses and an elective in accounting that uses data analytics in a student project.

KPMG Master of Accounting with Data and Analytics program was launched in 2016 with Villanova and Ohio State Universities (<https://info.kpmg.us/news-perspectives/advancing-the-profession/first-graduates-from-masters-program-join-kpmg.html>). The Deloitte Foundation Center for Business Analytics is working with the University of Illinois on their eight module approach to data analytics. The University of Illinois is willing to share the curriculum of their program with any other university. PwC has developed classroom resources for data analytics (<https://www.pwc.com/us/en/careers/university-relations.html>). EY and KPMG are partnering with IBM on new data and analytics solutions.

DeSales visited PwC in Chicago and the partner (a DeSales graduate) stated that Data Analytics will be a critical skill expected of each potential hire in the near future. Data analytics will also be introduced to the 2019 CPA exam.

A Text Analysis of NABET Proceedings: Viewing Trends from Past to Present

Loreen Powell
Kyle T. Fromert

Bloomsburg University of Pennsylvania
Bloomsburg University of Pennsylvania

Business, Economics, and Technology fields are dynamic and continuously evolving. As such, there is something to be learned from the past to predict where the future is going within these fields of study. This research reviewed business, economics, and technology academic research topics over the past twelve years to determine the trends of key topics and how they have grown or diminished over this extended period of time. Specifically, this research conducted a text analysis of titles from all conference proceeding published by the Northeastern Association of Business, Economics and Technology from its inception in 2007 to 2018. The text analysis revealed nearly one thousand presentation topics, and shows significant changes and interesting trends in information topics over this twelve-year period. This research is significant in that it serves as a historical review of the changing business, economic, and technology research environments.

Session 16: Logan Room

2:10 pm – 3:10 pm

Sustainability/Social Responsibility/Data Security Concerns

Session Chair: *Jerry Belloit, Clarion University of Pennsylvania*

Reflections on a Green New Deal: Swedish Sustainability

Timothy L. Wilson
Lars Lindbergh

Umea Universitet
Umea Universitet

Presently, there has been a discussion of a “Green Bill of Rights” in the U.S. Two of the elements in this discussion include affordable housing and ecological sustainability, areas in which Sweden is an acknowledged leader. That is, Sweden is perceived as sustaining a high level of competitiveness while producing a pleasant environment in which to live. In effect, the Swedish State is involved in municipal public housing and sustainability is the responsibility of Government Offices as a whole, which produces proactive programs in these sectors. The task of implementing Sweden’s strategy for sustainable development has illustrated a holistic approach and the State has played a major role in its development. Insofar as Sweden might be a model for other countries interested in extending their efforts in sustainable development (perhaps the U.S.), observations here provide some insights into possible

approaches and results. Put another way, the paper involves some consideration of “how did we get here and where are we going?” The framework for this paper associates sustainability with Zhang and London’s modified Porter model and treats elements of municipal public housing, domestic airline travel and forest products in construction.

Social Engineering Susceptibility in Small Business

Amy Washo
Alan Levine

Marywood University
Marywood University

The purpose of this research study is to examine the susceptibility of employees to social engineering attempts in small businesses using their demographic characteristics. Social engineering can be defined as the act of manipulating human beings, most often with the use of psychological persuasion, to obtain unauthorized access to systems and data that the social engineer should not have access to.

Human beings are complex with fluctuating needs and emotions, and the countless interactions employees have with each other every day are all opportunities for a social engineering attack to occur. When a business faces a social engineering threat, the number of people that can be impacted is unlimited. Employees, investors, and clients of the company might have confidential data compromised leading to lack of trust, termination of the business relationship, or loss of assets.

The Humans Aspects of Information Security Questionnaire (HAIS-Q) developed by Parsons, McCormac, Butavicius, Pattinson, & Jerram (2014) will be utilized in this study and given to small business owners and employees in Northeastern Pennsylvania. The HAIS-Q measures information security awareness (ISA) which will be converted to a susceptibility score based on the assumption from the literature: the higher the ISA, the lower the susceptibility to social engineering. Demographic characteristics will be collected to explore the relationship to susceptibility to social engineering, and whether those characteristics can be used to predict it.

Community Empowerment

Traci Dodson
Kelly Sharp

West Virginia Wesleyan College
West Virginia Wesleyan College

For over twenty-five years, we have been talking about, and teaching students about, the importance of the triple bottom line. The idea that people, planet, and profits places emphasis on the importance of social responsibility and environmental sustainability in addition to profits has become mainstream thought and is modeled in the majority of American companies. There seems to be a disconnect between some institutions of higher education, and the curriculum where we are teaching the idea, and a formal application of the concept in business programs. Through the application of empowering processes, students at West Virginia Wesleyan College use a project-based approach to identifying and meeting the needs of the local community.

This presentation will illustrate the WVWC model and will focus on shifting a non-engaged student group to an engaged and empowered team. While some isolated community service may be common, a greater benefit is developing students with the ability to identify and meet needs found within the college and local communities. Specific areas covered will include, identifying the need and appropriate actions to work toward a community solution, using a change-based approach to implement the concepts of community engagement and empowerment, identifying what is currently being done by other community organizations for potential partnerships and scaling, determining methods of expansion for a greater impact, and increasing student and faculty engagement and ownership in the process.

Engaged college students will not only serve as change agents during their time on campus but, upon graduation, will enter new communities with an understanding of how to identify areas of need, involve others, and work to fix social deficiencies.

Session 17: Holmes Room

2:10 pm – 3:10 pm

Pedagogical/Higher Education Administrative Concerns

Session Chair: *Uldarico REX Dumdum, Marywood University*

Comparison of Tenured versus Tenure-Track Perceptions of Chairperson Social Power

Elizabeth Goltz Rogol

Kutztown University of Pennsylvania

The objective of this study was to determine if tenure impacted faculty perceptions of their respective chairperson's social powers. The measurement of social power was based on French and Raven's five bases of social power. Instructional faculty at two universities in the same state system in the northeast United States were sampled using a multi-statement inventory measuring perceptions of their respective chairperson's reward, coercive, legitimate, expert, and referent powers. A comparison between tenured faculty (n=79) perceptions of chairperson power and tenure-track faculty (n=26) perceptions indicated that there is a correlation between tenure and faculty members' perceptions of legitimate power but not for reward, coercive, expert, and referent powers. Implications, limitations, and suggestions for further research are discussed.

From Ordinary to Extra-Ordinary-A Case Study of Student Success through Engagement and Experiential Learning

Christopher Speicher

Sr. Kevin Karimi

Melissa Saddlemire

Marywood University

Marywood University

Marywood University

This case-study explores experiences of undergraduate students navigating their learning in alignment with their Professor's goal to offer all students opportunities to transition from ordinary to extra ordinary students. This case study affirms the findings of other research, that lack of prior experience does not deter learners them from posting unique outcomes. The case study exemplifies the enabling role of a professor for students to lean beyond the classroom bringing them to achieve their highest potential. "At a point, I felt that I was not learning the maximum amount possible by solely attending class. By engaging in entrepreneurial activities I was able to better grasp concepts in class, and think from more of an application lens, rather than an academic lens" (Student A.). Student B said "my colleague and I were treated as professionals and were consulted about every decision made." The two students initiated a shuttle services project which serves the students, faculty and staff, the first of its kind in the history of the University. This case study affirms findings in other studies found that "academic and research for opportunity recognition" augmented with "non-academic ties" contributes immensely to the much needed formation of, strong and collaborative networks for "market credibility" (Billstrom, Novotny & Rasmussen, 2017). Similarly in a study of undergraduate and graduate students aspiring to engage in entrepreneurship, research found that students who had no prior experience had higher motivation and exercised more caution in business plans, than those who had prior experience (Ferreira, Loiola & Gondim (2017).

Session 17: Holmes Room (cont'd.)

2:10 pm – 3:10 pm

Sensemaking in Complex Environments: Implications for Curriculum Development

Uldarico REX Dumdum

Marywood University

Deborah Ancona (2011), Director of the MIT Leadership Center, argues that “today’s leaders need the ability to make sense of complex environments” and that “sensemaking is a particularly important predictor of leadership success.” The top future work skill identified by the Institute for the Future was sensemaking. Sensemaking is also seen as vital in a VUCA world we live in in which business situations we face are one of perpetual white water (Smith, 2014) and can be characterized by volatility, uncertainty, complexity, ambiguity, confusion and feelings of disorientation (Maitlis & Sonenshein, 2010).

As businesses face an increasing and rapid escalation of complexity, the IBM global study of over 1500 CEOs revealed that there is an urgent need to cope with complexity and, more importantly, to capitalize on complexity. Anderson of Intel (2014) concurs with this. He argues that sensemaking is central to understanding customers and the business they are in and that sensemaking “isn’t just for innovation anymore, it informs strategy and long-range planning.”

This paper defines and draws insights on sensemaking from multiple perspectives and reference disciplines. It discusses the 5 principles of sensemaking developed by Madsjberg and Rasmussen (2014) and introduces case studies in which these principles are applied. The paper ends with a discussion of implications for curriculum development along with recommendations on how to incorporate sensemaking principles into the curriculum.

Session 18: Sylvan Room

3:25 pm – 4:25 pm

Investment and Economy Concerns

Session Chair: *Brosh M. Teucher, Western Connecticut State University*

National Culture and the Volatility of Innovation Investment Across Countries

Jung Seek Kim
Seung Hoon Jang

Bloomsburg University of Pennsylvania
Bloomsburg University of Pennsylvania

This study aims to examine the influence of factors like national culture on the volatility of innovation investment. For this purpose, theoretical propositions are provided based the literature and discussions of innovation and national culture. The patterns of innovation investment of each country are expected to be influenced by its level of Hofstede’s cultural dimensions, including uncertainty avoidance, power distance, and collectivism. Scholars and businesspeople are recommended to pay attention to the characteristics of local culture to manage various innovation projects.

Chronicle of a Stagflation Foretold: The Case of the US

Brosh M. Teucher

Western Connecticut State University

This paper applies several perspectives to examine the case of stagflation in the US. Stagflation is identified as condition of persistent high inflation combined with high unemployment and stagnant demand in a country's economy. Various types of information are considered and evaluated in relation to prospects of stagflation in the US. Conflicting streams of thought and evidence are compared. Future research, applied, and educational implications are discussed.

Is Free Cash Flow Value Relevant? The Case of the US Materials Industry Sector

Mostafa M. Maksy

Kutztown University of Pennsylvania

The purpose of this study is to identify the accounting definition of free cash flow (FCF) that is the most relevant to investors in the materials companies. Using correlations and multiple regression analysis on a sample of 12,121 observations covering the 30-year period from 1988 to 2017, the author concludes that the FCF that has the most significant association with stock price changes of materials companies, after controlling for many factors that may affect stock prices, is the one defined as cash flow from operations less cash flow for capital expenditures less cash outflow for preferred stock dividends. The author recommends that investors contemplating investing in materials companies choose companies with high FCF computed using this definition. The author further recommends that materials companies that wish to voluntarily disclose FCF in their annual report should use this definition of FCF.

Session 19: Willow Room

3:25 pm – 4:25 pm

Economics and Finance Concerns

Session Chair: *Pawan Madhogarhia, York College of Pennsylvania*

The Impacts of a Voter Approved Minimum Wage Increase in Arkansas

Mark Ray Reavis

University of Central Arkansas

David Ray Reavis

Texas A & M University

Much has been written concerning minimum wage, but the critical issues on this topic are far from resolved. Supporters argue for fair wages, living wages, and an increase in the United States federal minimum wage. Opponents argue that minimum wage laws lead to higher unemployment, higher inflation, and disincentivize workers from seeking skills that would lead to higher earnings in the workplace. This research focuses on state-level minimum wage law in Arkansas and the impact on prices and employment. A change in Arkansas' minimum wage law in 2014 gradually increased minimum wages over a 3 year period. This research adds to the body of knowledge on the topic of minimum wage by providing evidence that relatively smaller increases in minimum wage may not have the negative impacts argued by opponents. Based on the primary data collected for this research, the increase in minimum wage in Arkansas did not result in an increase in the price of fast food compared to the US nationally and the change in price was not significantly greater than the overall inflation rate in the US nationally. In addition, no negative employment effects were observed.

How Paul Volcker Stopped the Great Inflation 1965 – 82: An Econometric Investigation

William Carlson
Conway Lackman

Duquesne University
Company International Consulting Group

The Volcker plan used control of non-borrowed reserves to reduce the growth of the money stock to lower inflation. Lower money growth led to the 1980 recession that did not do the job and a second recession that did. We show that each of the nine recessions and we know recessions are the only reliable way to reduce inflation. Had Volcker known of a painless way to combat inflation, presumably he would have used it. A "soft landing" solution to inflation is yet to be found. The best solution is to prevent inflation. But if inflation occurs all of the recessions from 1937-8 to that of 1981-2 plus the slowdown of 1967 lowered the rate of inflation. The 1990-1, 2001, and 2008-9 recessions also led to lower inflation.

The Andersen-Jordan St. Louis Fed study, the January 1979 Fed staff study, and Meltzer's real GNP - money graphs indicated that declines in money growth would lead to recession if persistent enough. All of the 1937-1982 recessions were accompanied by lowered money growth. The plan worked. What we have done is provide a statistical background of what happened and why? We could say that the Fed should have used the monetary base rather than non-borrowed reserves to control money. It would be easier to control borrowing from the Fed if the Fed was alert to bank borrowing for risk free profits when the discount rate is lower than the TBill rate. This paper presents significant detail on this complex factual story.

Timing Value Versus Growth

Pawan Madhogarhia

York College of Pennsylvania

Growth has outperformed value over the last several years. Is value dead? This paper explores whether value portfolios are expected to outperform growth portfolios. Value or growth spreads are used to address this research question. Zero investment portfolios yielded positive returns for different growth and value portfolios using returns with different frequencies. At the time of writing this paper in 2019, it appears that value portfolios are predicted to outperform growth portfolios in 2020.

Session 20: Logan Room

3:25 pm – 4:25 pm

Management/Communication/Pedagogical Concerns

Session Chair: *Lynda Kilbourne, Xavier University*

Elaborating Our Understanding of Scope of Change and Communication

Lynda Kilbourne

Xavier University

Textbooks on change management (e.g., Cummings and Worley, 2015) instruct that, in order for organizational change to be effective or successful, the number of members who should be involved in the change process varies directly with the scope of the change. This approach suggests, therefore, that a change occurring in only a small portion of a large organization can be handled quickly and successfully while involving only a small number of members in the change process, and vice versa. A recent change conducted in a large corporation, however, suggests this view of scope may need to be reconsidered. In this presentation, I suggest additional context features that may override scope as a factor in designing and implementing a change process. I use the organizational case to illustrate and support my hypothesis.

Does Exam Format Determine a Student's Success?

Karen Robinson

York College of Pennsylvania

This presentation focuses on whether a student's success in a course is based on the assessment tool used; or how he or she understood, interpreted and applied the information. This researcher has discerned that students have a perception that their success on assignments, namely exams is dependent on the format of the assessment tool (multiple choice, problem, essay, etc.). A discussion with other instructors purported similar conclusions. The purpose of this research is to test that theory to determine its validity by examining current literature to explore the bases for this theory and the recommended resolutions. Furthermore, a review of two classes where the student took the final exam of choice based on preferred exam format; with results compared to interim exams that used a combination format. The use of outcomes from this presentation may provide aid to instructors in improving students' success rates in accounting classes.

Theoretical Models of Buddhism-Based Business Operations

Hideki Takei

Central Washington University

Buddhism-based business operations have been popular among businesspersons. Nevertheless, we have not had a generally accepted model of Buddhism-based business operations. As a result, there are so many studies of Buddhism-based business operations based on the subjective criteria of researchers (Weerasinghe, Thisera, and Kumara, 2014; Ashtankar, 2015; Shakya, 2017).

Without the generally accepted model, most researchers have focused on case studies that analyzed the relationship between managers' Buddhist philosophy and their ways of business (Abe, 2007). Such case-by-case studies will never contribute to developing the generally accepted model.

In this paper, we will suggest a generally accepted model of Buddhism-based business operations by integrating all essences of Buddhism-based business from not only published studies but also teachings of the historical Buddha called pre-sectarian Buddhism.

Session 21: Holmes Room

3:25 pm – 4:25 pm

Pedagogical Concerns

Session Chair: *Douglas C. Friedman, East Stroudsburg University of Pennsylvania*

Effects of Attending a Presentation on Entrepreneurship on Students' Entrepreneurial Inclinations

Douglas C. Friedman

East Stroudsburg University of Pennsylvania

This study examines the effects of attending a presentation by entrepreneurs on students' entrepreneurial inclinations before and after either a lecture by an entrepreneur or a panel presentation on entrepreneurship by several area entrepreneurs. Students attending either of the presentations completed a questionnaire that included the Entrepreneurship Identity Aspiration Scale (Farmer, Yao and Kung-McIntyre, 2011) before attending the presentation and immediately after the presentation concluded. Attendance at either presentation yielded the same results. Attending a presentation increased male students' beliefs that they will become entrepreneurs in the future. Female students also showed an increase in entrepreneurial beliefs, but the change was not statistically significant. Changes in students' entrepreneurial inclinations were not statistically significant.

Entrepreneurship Tendency and its Relationship with Knowledge and Adoption of Information Technology: A Case of Ethiopian College Students

Azene Zenebe

Bowie State University

This study is the first in its kind to provide empirical evidence to the possibility of information technology's knowledge and intent to adopt as a factor for entrepreneurial intention of individuals in developing economy. It investigates relationships among the personal attributes (creativity, autonomy, risk-taking, locus of control and need for achievement), IT Knowledge, IT adoption, and entrepreneurial intention. A sample of 200 college students from Addis Ababa University, Ethiopia participated in the survey that adopts the General Measure of Entrepreneurial Tendency and IT adoption instruments. The study concludes that the participants showed average entrepreneurial tendency, and the participants' adoption and knowledge of information technology (IT), and entrepreneurship tendency are positively correlated. Implications of these results are also discussed.

Attendance Still Matters in a World of Digital Learning: Examining Students in Business Statistics

Timothy Haase

Ramapo College of New Jersey

In this study I re-evaluate the importance of physically attending lectures in a business statistics course when an online digital learning companion is used. A sample of five sections of business statistics that used the exact same text, lecture format, and algorithmic assignments are used. Overall, I find that students who attend all lectures perform significantly better on exams and on assignments when compared to students who have been absent. More specifically, attendance has a significantly larger positive influence on exam scores when there are fewer exams in the semester. Completion of online assignments is more influential in sections with more exams.

Special Session: Sylvan Room

4:30 pm – 5:20 pm

Best Paper Presentation

Session Chair: *Loreen Powell, Bloomsburg University of Pennsylvania*

More Quality, Less Quantity: Diversification and Risk Reduction in Quality Portfolios

Richard Paul Hauser

Gannon University

Richard Makowski

Gannon University Small Business Development Center

The research presented in this paper aims to construct Warren Buffett-style, concentrated portfolios based on two main criteria, size and quality, in order to investigate the diversification and risk reduction in concentrated, quality portfolios. We construct the concentrated index portfolios with companies that are leaders in quality following the method of Asness, Frazzini, & Pedersen (2018). Our research indicates that for any number of stocks in a portfolio, quality portfolios have less risk than portfolios constructed with random stocks. Consistent with the prior literature on the quality factor and the low volatility effect, we find that our low-risk, quality portfolios have higher risk adjusted mean returns than the diversified market portfolio. Finally, we show that the risk of a portfolio constructed based on quality, does not decrease monotonically as the number of quality stocks is increased. Instead, we find that the risk of quality portfolios is minimized at about 10 stocks and that increasing the number of stocks in the quality portfolio actually increases the standard deviation and beta risk. We refer to this increase in risk of the quality portfolios with an increasing number of stocks as the quality dilution effect. While Buffett has long argued that holding a large number of stocks about which he knows nothing seems risky to him, we believe that our research is the first to provide empirical evidence for Buffett's assertion.

Friday, November 8, 2019

Registration – Days Inn Foyer/Atrium **7:15 am - 2:00 pm**

Breakfast - Center/Arbor Room **7:30 am - 9:00 am**

Welcome and Annual Business Meeting **7:45 am - 8:20 am**

Norman Sigmond, Kutztown University of Pennsylvania

Chairman, NABET Executive Board

****All conference participants may attend. ****

Session 22: Center/Arbor Room **8:20 am – 8:50 am**

Special Presentation

Discussion of the NABET Conference Proceedings and the Journal of Business, Economics and Technology (JBET)

Norman Sigmond

Jerry Belloit

Kutztown University of Pennsylvania

Clarion University of Pennsylvania

This session presents information to participants on the logistics and expectations for submission to the NABET conference proceedings and the Journal of Business, Economics, and Technology (JBET). It is intended to assist participants in preparing their manuscripts for the proceedings as well as for review for possible publication in JBET.

Session 23: Sylvan Room **9:00 am – 10:00 am**

Pedagogy

Session Chair: *Matthew T. Kelly, St. Joseph's University*

Assisting Students with Basic Financial Statement Analysis: Simplifying Data Access with FactSet

Matthew T. Kelly

AJ Stagliano

St. Joseph's University

St. Joseph's University

This interactive workshop presents pedagogical techniques that can be applied in connection with student-developed financial statement analysis (FSA). In the hands-on session proposed, we will explore the extraordinary benefit of teaching students how to access the comprehensive and robust dataset that is delivered by FactSet. We do this as a pre-condition to teaching the actual methods involved in quantitative analysis. Our experience has been that once students grasp the need for FSA, and its variety of applications in the firm, authentic knowledge is enabled by enhancing students proficiency at selecting and acquiring

data in advance of learning how to use various analytic tools. Data acquisition should not be an impediment to applying analytics; the FactSet software removes data-collection obstacles.

We document course-tested methods for introducing the immense collection of financial data that is assembled for electronic dissemination without charge to students and faculty by FactSet Research Systems Inc. Learning to use this delivery system facilitates data acquisition, demystifies accounting and finance terminology, and enables students to progress more rapidly toward competent analysis of financial information.

The Evolution of Group Exercises Within an Introductory College Business Course

Matt Patterson Shatzkin

York College of Pennsylvania

This paper describes the ongoing evolution of Group Exercises within an Introductory College Business Course over three semesters. This paper describes the purpose and use of Group Exercises in higher education, along with the evolution of Group Exercises within a current course, based on formal and informal feedback and observations. Additionally, this paper describes the changes made to the Group Exercises within the course, to include the use of fictional narrative, more detailed rubrics for participation and the use of standing groups. Finally, this paper outlines the way ahead for further research and potential contributions to the educational and practical fields.

Session 24: Willow Room

9:00 am – 10:00 am

Pedagogy Styles and Professor Roles

Session Chair: *Christine Marie Lombardo-Zaun, Cedar Crest College*

Does Teaching Style Affect Learning?

Karen Robinson

Richard Butler

York College of Pennsylvania

York College of Pennsylvania

This discussion focuses on whether an instructor's teaching style affect learning. The purpose of this research is to explore this idea and possibly develop a theory. The researchers will exam current literature to explore a theme and the recommended resolutions. The presentation and paper will be based on the current semester's Financial Accounting course where it is intentionally designed to use a common course syllabus, common quizzes and homework assignments via a homework manager and common interim and final exams. A comparison of students' performance will be made between sections. The use of outcomes from this presentation may provide support to instructors in improving students' success rates in accounting classes.

More Than Just a Professor: a/k/a the Parent, the Counselor, the Mentor

Christine Marie Lombardo-Zaun

Cedar Crest College

As educators, we have seen a dramatic shift in the demographic of the current college student. This student can no longer just show up for class and study afterward. They can no longer join clubs and take time to enjoy them. These students now come to class with a host of challenges. There are many new first generation college students, who start college with very little knowledge of what to expect and how succeed in the collegiate world. There are adult learners who crave the knowledge of education, and want their degree, but have to find time to attend classes while balancing a full-time job and possibly while balancing a family. There are the international students who are pursuing a degree in a foreign country, one that is not

always welcoming, and user friendly to them. The student's challenges then become the professor's challenges, making effective teaching difficult at times. This presentation will summarize a survey of questions collected in the spring 2018 regarding student's situations, perceptions, and their challenges. The presenter conducted the survey to see if her college students' experiences matched what was found in literature review. As teachers we must learn how to balance all of these populations in one classroom and this presentation will discuss the challenges that students are facing and will finish with a discussion of suggestions on how to be more than just a professor in the classroom while maintaining a rigorous learning environment.

A Longitudinal Study of Students' Attitudes to a Campus Emergency Notification System

Doncho Petkov

Eastern Connecticut State University

Emergency Notification Systems (ENS) represent a branch of a growing sub-area of Business Information Systems related to decision support for emergencies in organizations. The focus of this paper is on studying user perceptions of ENS for improving the management of their use, a topic that is covered in very few publications. None of them explores this over longer time however. The paper presents findings from a longitudinal study of students' opinions on usage aspects of an Emergency Notification System (ENS) at a Northeast US university in 2011 and 2019. Though the same subjects were not available for the 2019 survey, the responders were drawn from the same demographic pool as the 2011 study since the characteristics of the student population have not changed. Some of the investigated issues include evidence of improvement in the students' attitude towards the university ENS, what types of emergencies are perceived as important by the users of the ENS, the number of students' experiences of training tests of ENS and others. The statistical results show opportunities for improvement in ways to engage students in training and usage of the ENS. The paper discusses also the limitations of the research and directions for future work.

Information Technology/Cryptocurrency

Session Chair: *Cori Myers, Lock Haven University of Pennsylvania*

Consequences of the Excessive Use of Smartphone and Social Media Among College Freshmen in Fear of Missing Out (FOMO) Contribute to their Academic Progress

Kustim Wibowo

Indiana University of Pennsylvania

Azad Ali

Indiana University of Pennsylvania

Almost all freshmen have the latest model of smartphone with Internet connection and full with different kind of apps. Most of them use their smartphone excessively at any place, time, and occasion. They even check on their smartphone during the lecture. It is not unusual several of them are even browsing websites or chatting on their smartphone while they are asking for help during faculty office hours. These behavior in the university environment could indicate that they would spend more time and effort in their daily live in accessing online information in the fear of missing out (FOMO) related interested information that are boiling among their peers.

This study aims to examine how freshman and non-freshman students use and uncover the relationship between smartphone and social media addiction level to their academic progress. A questionnaire on what, how, frequency, and consequences such as feeling anxiety and depress because the excessive use of smartphone and social media will be conducted.

The Technology of Gen Z: Preparing Information Literacy Skills for the Workplace

Cori Myers

Lock Haven University of Pennsylvania

Marcia Kurzynski

Lock Haven University of Pennsylvania

Members of Generation Z (Gen Z), one of the largest and most diverse generations, are now entering the workforce. To help their employers contend with the global landscape, they must possess various skills and technical knowledge. As individuals and companies face the barrage of data and information, they need to discern its usefulness, reliability, and relevancy. Gathering, evaluating, and effectively using data for key decision making has become a more discriminate and technical task. While the typical soft skills like leadership, communication, and collaboration are indispensable, other skills like critical thinking, information literacy, problem solving, and the perpetual ability to learn are needed for gaining and sustaining that competitive edge. This paper explores who Gen Zers are, how they learn, what they need for career success, and the technology (learning strategies) to help them become information literate, honing skills for the ethical use of information, critical thinking, problem solving, and lifelong learning needed in the workplace.

Tax Planning in Uncertain Times: The Cryptocurrency Conundrum

John Grigsby

Thomas Jefferson University

Tax laws have not kept pace with the rapid evolution and exponential growth of cryptocurrency. As a result, taxpayers have had to struggle to determine how to apply the tax rules to cryptocurrency and various transactions involving cryptocurrency. In 2014, the Internal Revenue Service issued some limited guidance concerning the tax treatment of cryptocurrency. The guidance created more questions than answers since it only applied well-established tax principles to cryptocurrency and did not take into consideration the unique characteristics and complexity of this new technology. Since the issuance of the guidance, cryptocurrency has continued to develop, and many questions remain unanswered. This paper discusses the evolution of

the taxation of cryptocurrency, current tax rules of cryptocurrency, areas where additional guidance is needed, and some proposals for the future tax treatment of cryptocurrency.

Session 26: Linden Room

9:00 am - 10:00 am

Human Resource Concerns (1 Paper/1 Workshop-30 minutes)

Session Chair: *Jane Brooker, Pennsylvania State University*

HR by the Numbers

Matt Fuss

Geneva College

The proliferation and advanced capabilities of data analytics has led to the management of human resources by the numbers in many major corporations. Companies such as; Google with their People Analytics department; Motorola with their use of arm-mounted terminals; Zynga with their use of an Intel-created employee tracking device; IBM creating mathematical models of their employee's skill-sets to aid in efficient deployment and Ann Taylor using computer programs to determine which employees should work when and where. I want to explore the efficacy of distilling human behavior down into numbers as a means to obtain a competitive advantage by using metrics to control costs, improve quality and create distinctive capabilities. Employee productivity is the value that a company's "human resource" adds to the company as increased productivity per employee means an increase to the company's overall productivity and therefore profitability. The question of employee value must be addressed. Numbers do little to provide managers with the tools to manage efficiently.

I believe this trend will only grow in the future as technologies continue to advance. The Internet has changed the competitiveness landscape forever and it is even more essential that companies learn to manage by numbers through the use of big data to gain a competitive advantage over rivals and to succeed in today's digital atmosphere.

An Investigation of Interpersonal and Emotional Intelligence Competencies for Early-Career Insurance Professionals Across Mutual Insurance Companies

Jane Brooker

Pennsylvania State University

A problem exists between employers and individuals they seek to hire with non-technical skills, adding value and leadership to their companies. These skills are hard to define and identify when interviewing candidates. The researcher further defined, clarified, and explored interpersonal and emotional intelligence competencies among early-career insurance professionals. Goleman's research on emotional intelligence in the workforce provides a theoretical framework for this study (Goleman, 1998). Goleman's research determined that emotional intelligent employees consistently outperformed their more intelligent coworkers, lacking in emotional intelligence (Goleman, 1998). A review of literature surrounding the early stages and benefits of emotional intelligence followed by emotional intelligence in leaders and the insurance industry will be shared. The research was conducted through semi-structured interviews with 16 insurance executives and two focus groups consisting of five insurance executives in the mutual insurance industry. These executives were selected and volunteered from Pennsylvania mutual insurance companies. Interviews were transcribed and coded to find recurring themes. This research benefits employers in their hiring practices and in identifying insurance professionals for leadership and promotion opportunities.

Education Delivery Concerns

Session Chair: *Scott Bradshaw, Kutztown University of Pennsylvania*

Using Data Envelopment Analysis (DEA) and Data Visualization Tools to Assess the Relative Inefficiency of Course Delivery (Face-to-Face and On-Line)

Elkanah Faux
Augustin Ntembe

Bowie State University
Bowie State University

The technique of Data Envelopment Analysis (DEA) for measuring the relative efficiency of operating decision-making units (ODMU's) that are similar in terms of their Outputs and inputs has been widely used in many applications: in hospitals, higher education sector, the military. In this paper the ODMU's are the delivery methods (face to face and online). This paper proposes an application of the DEA, an efficient frontier technique, to identify an ODMU that is relatively inefficient by comparing it to similar ODMU regarded as efficient, rather than trying to associate an ODMU's performance with some statistical measurement (s) that may not be applicable to that ODMU.

The method does not necessarily identify the ODMU's that are relatively inefficient because the efficiency index of 1 does not lead to the conclusion that the delivery method being analyzed is relatively inefficient. Indeed, any method that has the largest output on any one of the output measures cannot be judged as relatively inefficient. Rather, the purpose of the study is to identify the delivery method with the lowest efficiency scores, as such method will have the weakest return on the allocation of their teaching resources. It is expected that such methods would benefit the most from a revision of their contents or delivery methods (techniques or approach), so as to lead to improved student learning outcomes. The relative performance score of the course is measured based on the performance of the students who completed the course, with respect to how well they were prepared for taking the course and how well they do in subsequent course(s) for which the one used in the study serves as a prerequisite.

Outreach Education and Technical Assistance for Beginning, Small, Socially Disadvantage, and Veteran Farmers

Saima Bashir
Erick Kitenge
Fidelis Ikem
Edith Davidson

Central State University
Central State University
Central State University
Central State University

The Outreach Education and Technical Assistance (OETA) project intends to provide education and technical assistance to beginning, socially disadvantaged, and veteran farmers in the state of Ohio. Despite the increasing number of farmers from the mentioned categories, they seem to lack information on services and network available in the agricultural sector that could help them to increase the production, and then contribute to the mitigation of food insecurity threatening some parts of state of Ohio. Therefore, through face-to-face and online training, this project aims at boosting the willingness and the ability of targeted farmers to own and efficiently manage their farms. This project will also connect agribusiness students to experienced farmers for practical training and potential mentorships. This apprenticeship opportunity for our students is in line with efforts from policymakers to ensure and increase the availability of a well-trained and productive workforce in the US agricultural sector.

Polk and Squires Mathematical Analysis of Effectiveness of Developmental Education

Scott Bradshaw

Kutztown University of Pennsylvania

Drawing foundational ideas from the dissertation of Dr. Anita Polk-Conley and Dr. John Squires, the following mathematical analysis on the effectiveness of the developmental education program at a Mid Atlantic USA Community College was conducted (Table 15). The analysis measured the effectiveness of the developmental program for two different groups of students in order to detect any possible influence of physical education (KINS) program efficacy.

An identical effectiveness analysis was conducted for two groups of students: those students who enrolled in a physical education course (or Kinesiology course) during their time at the Mid Atlantic USA Community College, and those who did not. These two analyses were then compared in an overarching study. Interestingly, the results of the overall study were consistent and robust, lending credence to the notion that physical education improves effectiveness of education. In this specific case, the results suggested that physical education courses positively influenced the outcomes of the developmental education program at the Mid Atlantic USA Community College. The results from this research study could be used to determine the effectiveness of business classes; specifically introductory or developmental paired classes.

Session 28: Willow Room

10:20 am – 11:20 am

Management Concerns

Session Chair: *Shahriar Gias, Slippery Rock University of Pennsylvania*

Smart Home and Solar Technology in New Construction

Jerry Belloit

Clarion University of Pennsylvania

Smart home technology has become an increasingly used in residential properties. This technology has resulted in lower energy consumption, better home security, and more convenience for the property user. This paper is a case study of the integration of smart home and solar energy technologies in new construction. It will discuss the design and implementation of a solar power installation, wi-fi, security, and smart home integration of various building systems. It will present real costs and benefits of the systems used.

Alignment of Core Values for Higher Performing Organizations

Nicholas David Sherwin

Biola University

Renee Scapparone

Fitchburg State University

This article will provide leaders of organizations with a practical understanding of how a strategic and proactive approach to recruiting, hiring and developing human resources whose values are aligned with the core values espoused by the leaders of organization will inspire and motivate employees to higher levels of performance. The literature from the disciplines of leadership, corporate culture, and human resources management reviewed for the study support the position that creating mutually beneficial career opportunities where core values of leaders and their human resources are aligned leads organizations to higher levels of performance. The literature reviewed for this paper supports the correlation between organizational commitment to intellectual capital and high-performing loyal internal customers.

Role of Perceived Job Security on Emotional Exhaustion

Shahriar Gias

Slippery Rock University of Pennsylvania

In the realm of organizational psychology, emotional exhaustion of employees acts as a mediator on the relationship between role conflict and turnover intention. Additionally, perceived job security acts as a moderator on the relationship between emotional exhaustion and turnover intention. However, the direction of the effect was not expected. An increase in perceived job security actually strengthened the association of exhaustion on turnover intention. Those who felt that their jobs were more secure were more sensitive to exhaustion. Possible explanations for unexpected results are discussed.

Session 29: Logan Room

10:20 am – 11:20 am

Accounting Pedagogy

Session Chair: *Renee Castrigano, Gannon University*

Examining the Potential Impact of Upcoming Lease Accounting Changes in an Intermediate Accounting Course

Sean Andre
Joy Embree

West Chester University
West Chester University

Oftentimes, the typical accounting curriculum requires such a large focus on providing technical knowledge that it can become challenging to devote precious time towards developing other important skills, such as examining how various accounting rules actually impact a company's financial statements. Recently, the accounting rules for lease transactions has changed significantly, and this paper provides an overview of an assignment used in an Intermediate Accounting course to engage students in learning about the overall impact. This assignment has the benefit of taking very little time away from lecture.

A Cooperative Learning Assignment to Effectively Review the Accounting Cycle Geared to the Generation Z Student

Renee Castrigano

Gannon University

Many years ago, accounting students were required to complete a practice set, a lengthy problem detailing the full accounting cycle. This has gone by the wayside with advancements in technology. However, the downside is the full accounting cycle is rarely assigned as a project from start to finish. This paper is a means of addressing the issue of the students understanding all of concepts in accounting.

Institutions of higher education are preparing a new generation of students called digital natives or Generation Z. Like previous generations, these students have learning preferences and life experiences unlike their predecessors. They desire "real world" business experiences, engaged classroom activities and visual learning. This paper explains a classroom project that couples the need for reinforcing the full accounting cycle with the students learning style.

The project assigned to each of my accounting classes (Principles and Intermediate) requires students to play the game of Monopoly. Each student owns a real estate investment firm. With each role of the dice, the student must complete a business transaction. After 48 transactions, the equivalent of 12 months, the student must complete to remainder of the accounting cycle from journal entries to producing financial statements to the closing process. With three semesters of data, this project has overwhelmingly helped students gain a deeper understanding of accounting.

Session 29: Logan Room (cont'd.)**10:20 am – 11:20 am****Incorporating a Financial Statement Analysis Exercise into an Introductory Accounting Course**

Sean Andre

West Chester University

Joy Embree

West Chester University

Ki Kyung Song

West Chester University

For many business programs, courses in financial and managerial accounting are requirements for students. Teaching financial accounting to those who have little interest in the topic can be a challenge, which can be further exasperated if the student does not clearly understand why this information is important and how it can be used. The purpose of this paper is to provide an overview of an assignment that can be incorporated into an introductory course. Adapted from the Association of International Certified Professional Accountants (AICPA's) "Taking Care of Business" series, this assignment provides an opportunity to engage in a financial statement analysis exercise and attach real-world meaning to the accounting numbers they learned about during the introductory accounting courses.

Session 30: Holmes Room**10:20 am – 11:20 am****Social Media/Consumer Loyalty Concerns****Session Chair:** *Wei-Xuan Li, Stockton University***Do Social Media Activities Enhance Firm Value?**

Chenyan Xu

Stockton University

Wei-Xuan Li

Stockton University

Jiajin Chen

Stockton University

This research examines the effect of disclosing social media activities on firm valuation. Firms benefit from social media technologies through promoting their products or services, collecting customer feedback to improve product design, and providing better customer support. We develop and test the hypothesis that a firm's disclosures of social media activities in its annual reports should have a positive impact on its market value. We conduct 26 keywords search in the annual reports that public firms filed with the U.S. Securities Exchange Commission (the SEC) to identify disclosing firms from 2008 to 2010. Our sample contains 594 disclosing firm year observations and 9,232 non-disclosing firm year observations from the merged database of Compustat and Center for Research in Security Prices (CRSP) in this sample period. The variables used as a proxy for firm valuation include share price at the end of March in the following year and market-to-book ratio, which is the year-end market value of equity versus the prior year-end book value of equity. We perform a panel regression analysis of firm valuation on a dummy of a firm disclosing social media initiatives, controlling for earnings per share, firm size, and book value of equity. We find that disclosing social media activities have a positive impact on firm value. Our findings indicate that a firm should engage in social media activities to gain competitive advantage and maximize shareholders' wealth.

Predictive Modeling and Visualization of Emotions In Twitter Feeds

Satish Mahadevan Srinivasan

Abhishek Tripathi

Penn State-Great Valley

Penn State-Great Valley

Predictive analytics on twitter feeds is becoming a popular field for research. A tweet holds wealth of information on how an individual express and communicate their feelings and emotions within their social network. Large scale collection, cleaning, and mining of tweets will not only help in capturing an individual's emotion but also the emotions of a larger group. However, capturing a large volume of tweets and identifying the emotions expressed in it is a very challenging task. Different classification algorithms employed in the past for classifying emotions have resulted in low-to-moderate accuracies thus making it difficult to precisely predict the outcomes of an event. In this study an emotion based classification scheme has been proposed. Initially a synthetic dataset is built by randomly picking instances from different training datasets. Using this newly constructed dataset the classifiers are trained (model building). Finally, emotions are predicted on the test datasets using the generated models. By training Naïve Bayes Multinomial and Random Forest classifiers on the synthetic dataset that is constructed from two well-known emotion-classified training dataset, classifications were performed on the test dataset containing tweets corresponding to the 2016 US presidential election. Upon classifying the tweets in the test dataset to one of the four basic emotion types; Anger, Happy, Sadness and Surprise, and by determining the sentiments of the people we have tried to paint the emotional swings across different camps over the period of 6 weeks before the election.

Understanding Online Customer Loyalty

Min Lu

Yanbin Tu

Robert Morris University

Robert Morris University

Customer loyalty is one of the important topics in marketing and entrepreneurship. Many companies are utilizing a variety of tools such as excellent products, and loyalty programs to build true customer loyalty. The existing literature shows solid evidences of customer satisfaction-loyalty-profit chain in business industries (Kumar and Reinartz 2012). Chen (2012) also finds commitment, trust, involvement, and perceived value as mediators to build customer loyalty in the chain.

We have a number of marketing matrices to measure customer loyalty such as retention rate, share of wallet, survival rate and average customer duration. Retention rate is the most commonly used one among these matrices. Retention rate is also called repeated purchase rate. Understanding customer repeated purchase behavior will help business vendors formulate effective marketing strategies, boost customer loyalty and achieve the success of entrepreneurship. Customer loyalty and repeated purchases have been widely investigated in the context of brick-and-mortar stores in the literature. However, to the best knowledge of ours, customer loyalty and repeated purchases at online auction marketplaces have not been well studied. The existing studies in this area in the literature also have certain limitations. For examples, Chen et al. (2016) explore a number of factors affecting buyers purchase and repurchase intentions at online auction marketplaces. They use a simulated market experiment instead of using real online auction data. Tu, Fang and Lin (2012) use a Structure Equation Model to study the methods that online auction sites use to attract buyers to come back. The study is done from the perspectives of website developers instead of from common business sellers. Our study intends to explore the untapped areas about online customer loyalty from sellers and entrepreneurs perspectives by using real business data from eBay.

Accounting/Financial Literacy Concerns

Session Chair: *Linda A. Hall, State University of New York at Fredonia*

Bridging the Financial Literacy Gap: Integrating Financial Literacy in Liberal Arts Education

Gertrude Eguae Obazee

Albright College

Jayanthi Rajan

Albright College

The alarming rise in financial illiteracy hurts both the financial well-being of individuals and the economy. Institutions of higher education should be preparing their students to make financial choices throughout their lives that enable them to effectively participate in our economy, build wealth, and attain their goals. According to Adrianna Kezar and Hannah Yang of the University of Southern California's Center for Higher Education Policy Analysis, financial literacy, "as a life skill, as a requisite to citizenship, and as a critical intellectual competency, is an essential component of a college degree." Financial illiteracy can cause people to become victims of predatory lending, subprime mortgages, fraud and high interest rates, potentially resulting in bad credit, bankruptcy or foreclosure. Critical decisions that students and families make before, during, and after their postsecondary education influence their financial future. Personal finance education provides students with the knowledge and skills they need to manage their financial resources effectively for a lifetime of financial well-being.

The purpose of this study is to contribute to the growing discussion on the importance of financial literacy education in a liberal arts environment and to propose ways in which a liberal arts curriculum can be designed to include financial literacy.

In this study we will:

- Research current financial literacy offerings in small liberal arts colleges in Pennsylvania
- Identify the essential elements of effective student financial literacy education
- Outline an approach to integrating financial literacy education as part of the Liberal Arts experience.

Cost Shifting and UBTI Reporting in Colleges and Universities

Ahmed Ebrahim

Fairfield University

The paper analyzes the reporting practices of Unrelated Business Taxable Income (UBTI) in colleges and universities, and examines evidence of cost shifting between related tax-exempt sources of income and unrelated taxable income to minimize or eliminate tax liability. Increasing commercial-type activities and programs in colleges and universities (among other nonprofit tax-exempt organizations) is generating a growing amount of income unrelated to their core mission and, therefore, is taxable based on the tax code. To minimize tax liability on their growing unrelated income, colleges and universities are motivated to shift expenses from the regular tax-exempt operations and assign them as a tax deductible directly expense related to the unrelated income. Using a sample of colleges and universities during years 2013-2015, I report a significant evidence of cost shifting to minimize tax liability in colleges and universities.

Gross Profit vs. Realization as a Performance Measure in Public Accounting Firms

Mark A. Nickerson

State University of New York at Fredonia

Linda A. Hall

State University of New York at Fredonia

Despite claims to the contrary, the billable hour is still the most common billing method, and realization, a metric used by accounting firms to calculate the profitability of accounting services, the most common internal performance measure utilized by public accounting firms. Even with the emergence of other billing protocols such as value billing and fixed pricing, a majority of firms have not progressed beyond these traditional methods and metrics. We suggest that realization as a performance indicator may actually decrease profitability and create a negative work culture leading to increased voluntary employee turnover. We present the alternative gross profit margin method as a more accurate means of measuring performance, and show how using this method can increase profitability, provide for more accurate fee proposals, and create a more positive workplace culture.

Session 32: Sylvan Room

11:25 am – 12:25 pm

Trade/Securities Concerns

Session Chair: *David Doorn, West Chester University of Pennsylvania*

Chaos in US Individual Intraday Security Prices

Xiaohui Yang
Karen C. Denning
Hong Zhao
Zhaobo Wang

Fairleigh Dickinson University
Fairleigh Dickinson University
Fairleigh Dickinson University
Fairleigh Dickinson University

We examine intraday security prices using Bloomberg market prices from October to December 2018. Our sample consists of 12,193,335 data points, covering 495 stocks, 63 trading days and 391 minutes per day. It is well known that news arrival impacts market prices. Casual empiricism suggests that news arrival is random and therefore intraday market prices may also be random. However, following Lo and Mackinlay (1988) and Chow and Denning (1993), we reject the linear process of randomness in intraday security prices. Following Webel (2011), we then examine the non-linear chaotic process using the zero-one test adjusted by wavelet denoising prior to testing. Our results are consistent with chaotic intraday security returns and inferentially with chaotic news arrival.

Do We Impose Tariffs? How Foreign Imports Are Hurting US Producers: Case of Montmorency Tart Cherry Market

Sunando Sengupta

Bowie State University

This paper explores the current market conditions in the US where many producers and manufacturer are complaining of cheap imports from foreign countries hurting their businesses. The current administration has passed a number of tariff measures recently, including a trade war with China to confront the issue at hand. Trump tariffs has affected 14.9% of all U.S. imports being covered by some sort of special trade protection. The question is- Are tariffs the right strategy to adopt or is there any other alternative that US economy can adapt? Specifically, this paper looks at the case with tart red cherry growing industry based out of Michigan facing competition from Turkish imports. The arguments here in this paper could be used in other trade situations also where similar cheaper imports are affecting US domestic markets.

A Dynamic Shift? Share Analysis of Employment Change in North Dakota

David Doorn

West Chester University of Pennsylvania

With the boom in shale oil and gas extraction that began in the mid-2000s, North Dakota experienced strong economic growth accompanied by substantial increases in employment. This largely continued into the early part of this decade, but came to an abrupt halt when oil and gas prices declined rather dramatically in 2014. Here we conduct a dynamic shift-share analysis of the employment experience of North Dakota and its regions from the 2001 recession on. This allows us to decompose the employment experience of each region of the state into separate components based on relative industry performance across NAICS supersectors.

Session 33: Willow Room

11:25 am – 12:25 pm

Accounting Technology Concerns

Session Chair: *Michalina Hendon, Bloomsburg University of Pennsylvania*

The Effect of Artificial Intelligence and Big Data on Supply and Demand for Accounting Services

Shabnam Hashemiyeh

University of Bridgeport

Alireza Daneshfar

University of New Haven

This paper provides insides on the impact of artificial intelligence and big data on the future of accounting profession and supply and demand for accounting services. The concepts of artificial intelligence and big data have become very popular in today business environment. Organizations are spending significant resources on creating big data files including large financial and non-financial databases about the organization's activities. There is software that can read and analyze the data and present the results for decision-making. In this environment, a critical question is whether artificial intelligence and big data concept will replace the accounting function in organizations or strengthen it, as accounting is a data driven activity. In another word, whether accountants will be replaced by computers and software as computers and software can collect accounting data and prepare accounting reports. Or accountants will have opportunities as a result of artificial intelligence and big data concept. If accountants are going to have new roles in the era of artificial intelligence and big data, what are those roles and how accountants can be prepared for those new roles? This paper discusses these issues and presents major impacts of artificial intelligence and big data on accounting profession, especially how artificial intelligence and big data concept can affect the supply and demand for accounting services. Such discussion could be very helpful for the accounting profession to respond effectively to the new developments and reach an equilibrium for new demands for accounting services.

Automation and the Integrated Audit-Embracing the Emerging Technology and Its Implication

Bea Chiang

The College of New Jersey

Brian Troemel

The College of New Jersey

In a rapidly changing business environment, with technology and Artificial Intelligence commonly disrupting various industries, there is a fear that the demand for auditors will tremendously decrease in the near future. This fear stems from the potential automation implemented in the auditing industry that continues to simplify or eliminate human intervention. On the other hand, the development of emerging technology has a potential to benefit the audit industry to perform audit procedures more efficiently and effectively and thus improve audit quality. The purpose of this paper provides an overview on the potential disrupting impact of emerging technologies using auditing as a context and conclude that disruption seems possible, there is too much human judgement required to eliminate the need for auditors. The emerging

technology can be a complement asset depending on how the accounting professional embrace the impact and take the advantage of the power of technology. Related emerging issues and implication to the accounting profession and education are also discussed.

Session 34: Logan Room

11:25 am – 12:25 pm

Tax/Finance Concerns

Session Chair: *John Grigsby, Thomas Jefferson University*

§72(T) Penalty First Time Home Buyer Exemption: An Analysis of Court Rulings

William H. Lloyd

Lock Haven University of Pennsylvania

Individual Retirement Accounts (IRAs) are an important tool in retirement planning. However, early distributions prior to age 59 ½ can be subject to the §72(t)10% early distribution penalty (IRC §72(t)). There are several exemptions to the penalty. This paper looks at the specific exemptions and focuses primarily on the court findings covering § 72(t)(8). The research shows that there are four primary reasons why taxpayers did not qualify for the exemption. Several taxpayers did not qualify as first-time homebuyers since they already had an ownership interest in a principal residence. In one instance, the taxpayer did not qualify because they had no ownership interest in the property the distribution was used to purchase. A few taxpayers failed to meet the exemption because the distribution came from retirement accounts that were not IRAs. The § 72(t)(8) exemption only applies to distributions from IRAs. Other taxpayers failed to meet the requirements for exemption because they did not use the distribution within the 120-day window. The court findings indicate that strict adherence to the law is required for qualification of the exemptions.

Healthcare: A Taxing Issue

Karl M. Malaszczyk

Janet Malaszczyk

Holy Family University

Carin University

Health care, insurance costs and tax policy are prominent topics in the current election cycle. Health care costs encompass many different factors such as medications, physician visits, medical testing and prosthetics. The United States outspends the world in health care and health insurance; but paying more does not mean a healthier country. Studies show that comparable countries have longer life spans and are healthier. The rising costs of health insurance and health care has given life to the myth that paying more means better care.

Tax policy has a dramatic impact on healthcare. Traditionally, preparers helped taxpayers with medical deductions on their tax returns. Income tax rules for medical deductions are constantly changing. Over the years, the role of the tax professional and financial planner has become more entwined with healthcare. The Affordable Care Act enforces a “shared responsibility payment” on certain taxpayers without healthcare coverage. The Consolidated Omnibus Budget Reconciliation Act (COBRA) provides for continuing health care coverage between jobs. Health care savings accounts and flexible spending accounts impact tax reporting. Individual Retirement Accounts have special exceptions regarding medical expenses, insurance and disability. The landscape of healthcare options is growing more complex and changing every day.

How do we navigate the new health care landscape? Understanding health care, insurance, and tax law and their implications can help America get healthier and live longer.

REIT Dividend Payout: Evidence from Asia Market

Jiajin Chen

Stockton University

Previous studies of real estate investment trust (REIT) on dividend policies have focused primarily on REITs listed in the U.S. These studies find that, REIT in the U.S. usually distribute dividend not bounded by the tax regulation requirement. The dividend distribution by REITs is negatively related to firm performance including return on assets, and growth in earnings. In addition, the managers tend to take advantage of the weak monitoring by paying lower dividends. In this study, I focus on the new emerging REITs market to examine the determinants of REITs dividend payout (selected from five countries or regions in the Asia). My preliminary findings show that dividend payout level for these REITs is negatively associated with returns on assets which support the agency cost theory. My results also show that dividend payout level is negatively correlated with board size, which indicate that REITs pay low dividends with weak internal governance monitoring.

Session 35: Holmes Room

11:25 am – 12:25 pm

Housing/Community Concerns

Session Chair: *Jane Brooker, Shippensburg University of Pennsylvania*

Migration Habits of Single-Female Headed Households: Evidence from the American Housing Survey

Augustin Ntembe

LaTanya Brown-Robertson

Bowie State University

Bowie State University

The study uses data from the American Housing Survey, to determine the effect of gentrification on the displacement of single female headed households across US cities. The factors that are likely to cause the displacement of a single female headed household include age of household head, education level, income, and housing costs. We estimated a logistic regression relating the likelihood that a single female headed household will be affected by gentrification to a set of covariates. The study revealed that the income of the household plays a significant role in the displacement of female headed households. Single female headed households that earned less than 30k were 1.52 times more likely to migrate to a new location than those making 70K per year. Also, the total cost of housing was a significant determinant of displacement. The study suggested measures that can minimize the impact of gentrification on single female headed households in US cities.

Mission Related Investments in Affordable Housing: An Alternative to Governmental Approaches

Eric Malm

Cabrini University

Affordable housing programs are dominated by two large government programs- Section 8 and the Low Income Housing Tax Credit program. While these programs have private, market-based components, ultimately they are funded largely through tax dollars and are not designed specifically to help residents build financial or social capital. This paper describes the Mission Related Investments approach used by charitable foundations and non-profits can be expanded to make an impact in the affordable housing area by smaller local groups. This financing approach is discussed within the context of the Housing Model, a privately-funded, non-profit housing model that allows residents to accumulate savings (or a 'Dividend') over time as they pay rent and participate in the operation of the community. Working together, faith communities, social service non-profits and community banks can play an important role in expanding the availability of affordable housing.

Session 36: Sylvan Room

1:40 pm – 2:40 pm

Pedagogy Concerns (1 Paper/1 Panel-30 minutes)

Session Chair: *Victoria Geyfman, Bloomsburg University of Pennsylvania*

Providing More than Knowledge: Project-Based Learning That Develops Professional Skills & Satisfies Learning Outcomes

Audrey Guskey

Duquesne University

Over a 30-year period, students in the Introduction to Marketing course were assigned a project to “invent” a new product and develop a complete strategic marketing plan within an assigned group, which they delivered in a written report and an oral presentation. Students brainstormed to generate creative, innovative, futuristic products that they could effectively market. In addition to learning core concepts in marketing, students were able to apply this knowledge to a real world situation and develop valuable professional business skills such as communication, critical thinking, creative thinking, team-building, leadership, and project management. For an instructor, the goals of this assignment were to challenge students to utilize their resourcefulness, demonstrate their capabilities, and enhance their skills; thus acquiring more than classroom marketing knowledge and which satisfy employers’ future needs. For universities and business schools, this project worked toward fulfilling the AACSB requirements of Assurance of Learning and Outcomes Assessment.

Session 36: Sylvan Room (cont’d.)

1:40 pm – 2:40 pm

Panel on Teaching with Cases

Victoria Geyfman

Christian Grandzol

Kenneth Hall

Carolyn LaMacchia

Bloomsburg University of Pennsylvania

Bloomsburg University of Pennsylvania

Bloomsburg University of Pennsylvania

Bloomsburg University of Pennsylvania

The significance of case research and prevalence of using case method teaching in business programs have grown in recent years. According to Harvard Business Review, business cases immerse students in practical and realistic business situations. The class discussion inherent in case teaching is known for stimulating the development of students' critical thinking skills. In addition to a myriad of existing cases, as faculty we occasionally find ourselves wishing to change or customize existing cases to our specific courses. *Teaching with Cases* panel will provide a professional development opportunity for faculty to develop or enhance skills in case research, writing, and teaching.

The interdisciplinary discussion will be led by experienced instructors in marketing, finance, management, and information technology who will address the practical aspects of case research and writing (how to develop effective teaching cases and instructor’s manuals) and case method teaching (tips and learning techniques to enhance student engagement and dynamic classroom discussions). This panel will be useful for a novice or an experienced faculty in all business disciplines interested in case research and the case teaching method whether for an entire course or as a component of any business decision course.

Session 37: Willow Room

1:40 pm – 2:40 pm

Technology Concerns (1 Paper/1 Panel-30 minutes)

Session Chair: *Joshua Chicarelli, California University of Pennsylvania*

An Application of AHP for Decision-Making Regarding Mobile Device Management Systems

Satish Mahadevan Srinivasan

Penn State-Great Valley

The IT infrastructure, and the IT operations of an organization, are always in a constant flux and pose several unique challenges. In this paper, we have considered a unique challenge faced by the Remodeling Company that is related to their IT infrastructure and operations. We have particularly looked in to their issues with the JAMF enrollment services effected due to the misconfigurations in the settings of the MDM server. This is a unique and critical issue to the Remodeling Company. In an effort to address this issue we conducted group interviews with the experts within the organization to elicit all the potential solutions and the decision criteria, and have modelled this problem as a MCDM. Finally, we have applied the AHP to evaluate the potentiality of each solution proposed by their experts. Based on our recommendation for creating a separate server for personal (BYOD) devices the organization was eventually able to mitigate this issue. In this paper, we show the synergy and the potentiality of the focus group interview and the AHP analysis to address a unique and critical IT challenge of the Remodeling Company.

Session 37: Willow Room (cont'd.)

1:40 pm – 2:40 pm

Mitigating Data Security Through Employee Policy-Equifax Case Study

Stephanie Adam
Joshua Chicarelli

California University of Pennsylvania
California University of Pennsylvania

This presentation describes the data breaches that occurred at Equifax in 2017. The data breaches involved the personal information of over 145 million Americans. This is the first time in which name, address, birthdate, and social security number were all stolen at the same time (Primoff & Kess, 2017). In the first instance, improper password usage, in conjunction with password policy insubordination led to the vulnerability. Subsequently, employee failure to update a security “patch” led to the further exposure. The data breach exposed the public to the risk of identity theft in the form of account fraud and/or improper account usage. The organization’s leaders failed to take responsibility for the issue, placing blame on a single employee during public Senate hearings. As a result of this incident, the company suffered significant reputational harm, continued regulatory scrutiny, in addition to monetary penalties which are still to be determined. The reader is tasked with addressing this problem from the perspective of employment and data security policy.

Session 38: Logan Room

1:40 pm – 2:40 pm

IT Pedagogy/Student Performance Concerns

Session Chair: *Lisa Walters, State University of New York at Fredonia*

Early Indication of Poor Performance

Robert Liebler

King’s College

Frequent testing is intended to provide an incentive for students to study frequently. Cramming for exams is the opposite of studying frequently. In some course, cramming for exams probably leads to a satisfactory final grade in the course. In other courses, for example, quantitative courses, cramming probably does not lead to a satisfactory final grade in the course. The goal in this paper is to examine whether frequent testing on assigned homework problems provides an early indication that cramming for exams is unlikely to lead to a satisfactory final grade in a quantitative course.

A Note on Teaching Systems Development

Timothy Stanton

Mount St. Mary's University

Students in various business curriculums routinely take an introductory course in information systems, in which they are exposed to the concept of designing and building a working information system. As such, the course seeks to convey the practical approach to developing a new or improved information system. The information systems discipline additionally pursues research to push the boundaries of knowledge, as is common to all academic disciplines. Within these introductory courses, however, the instructor should keep students focused on the former, the practical endeavor, and not the latter, the advancement of the frontiers of the discipline. To that end, this paper suggests a focus on defining the former as method and the latter as methodology.

Evidence on Students Doing Homework

Robert Liebler

King's College

Consider the case in which homework problems are assigned only on material for which a step-by-step solution has been provided at some time in class. In this case, there is always something in the students' notes that shows them how to solve the problem. Thus, performance on the homework problems provides some indication that students are doing their homework. Combining homework problems assigned this way with frequent testing provides a measure of how hard students are working on their homework. The results from using this method are analyzed.

Session 39: Holmes Room

1:40 pm – 2:40 pm

Accounting Pedagogy (1 Paper/1 Workshop-30 minutes)

Session Chair: *Linda A. Hall, State University of New York at Fredonia*

Do Present Value Tables Have a Value in the Future?

John Rude

Bloomsburg University of Pennsylvania

Throughout accounting and finance courses students are taught how to solve time value of money problems so that financing and investing decisions made by companies result in successful operations. Before the advent of readily available personal computers and spreadsheet software, students were taught to solve time value of money problems using factors from present value and future value tables. The process has always seemed cumbersome and limited by the number of periods and number of interest rates shown in the tables. In the current study, we reviewed finance and accounting texts to determine the pedagogy used to teach the solutions to time value of money problems. We believe the emphasis should be placed on the ability of the students to develop timelines of the cash flows and to prove the results of the various applications that determine the present or future value of cash flows.

Demonstration of a Simplified Approach to the Preparation of the Cash Flow Statement to Students

John Rude

Bloomsburg University of Pennsylvania

Students commonly view the preparation of the Cash Flow Statement as a complex and confusing process. This confusion may be caused by the presentation of the conversion of net income to cash flow from operations. Accounting textbooks generally present a table that indicates sometimes increases in accounts are added to and decreases are subtracted from net income to convert to cash flow from operations. Other times increases in accounts are subtracted from and decreases are added to net income to convert to cash flow from operations. In this workshop, I suggest a simplified approach to the preparation of that statement that clears up this confusion. This simplified approach has been class tested over several years. In the workshop, we have examined several of the more popular accounting textbooks used to teach financial accounting, principles of accounting, intermediate accounting and advanced accounting to provide examples of the procedures are currently presented to prepare the cash flow statement. We will then provide examples of how the simplified approach works for both the direct and indirect methods of preparing the cash flow statement.

Session 40: Linden Room

1:40 pm – 2:40 pm

Management Concerns/Healthcare Purchasing

Session Chair: *Jeffrey Yi-Lin Forrest, Slippery Rock University of Pennsylvania*

Dependence of a Firm's Performance on its Ecosystem's Upstream/Downstream Challenges

Jeffrey Yi-Lin Forrest

Slippery Rock University of Pennsylvania

Yong Liu

Jiangnan University

Theresa A. Wajda

Slippery Rock University of Pennsylvania

Erkan Köse

Nuh Naci Yazgan University

Ouzhan A. Arik

Nuh Naci Yazgan University

This paper studies holistically the supply-chain ecosystem of a focal firm, when the firm innovatively deciphers a market invitation. It employs the thinking logic and methodology of systems science to establish a series of generally true conclusions regarding the challenges facing either the suppliers or the complementors. In particular, this paper shows among results that (1) challenges upstream components face help build performance advantage for the focal firm over its competitors; however, if the firm's challenges are mostly on its upstream suppliers, then the performance advantage's lifespan will be greatly shortened. (2) An innovative firm has to consider the availability and development of appropriate complements in its introduction of innovative products. (3) In contracting with upstream suppliers, a focal firm has to deal with technological uncertainty and suppliers' behavioral uncertainty with the former affects the firm's ability to create value and the latter impacts its ability to capture value. And (4) a firm's performance advantage, as a consequence of applying vertical integration within the firm's ecosystem, increases over time within the life cycle of the technology developed to meet the firm's innovative need. At the conclusion of this paper, practical managerial recommendations and open questions for future research are given.

CEO Succession in Family-Owned Businesses: A Comparative Theoretical Study of the US and China

Weichu Xu
Douglas C. Friedman
Douglas L. Nay

East Stroudsburg University of Pennsylvania
East Stroudsburg University of Pennsylvania
East Stroudsburg University of Pennsylvania

The purpose of the paper is to examine one strategic issue: CEO succession in Family-Owned Businesses (FOB) from a theoretical perspective. First this paper reviews several existing conceptual frameworks of CEO succession in family-owned businesses in management literature. After reviewing the different factors considered in existing frameworks, a modified integrative theoretical framework is proposed. Considering the unique characteristics of FOB in the US and China, several propositions are presented about the differences in CEO succession in US and Chinese FOB. This paper also discusses empirical studies on CEO succession in FOB in the two countries to increase the congruence between the theoretical and operational levels, to clarify concepts and variables of in CEO succession process and the relationships among those variables.

Session 41: Sylvan Room

2:45 pm – 3:45 pm

Higher Education/Assessment Concerns (1 Paper/1 Panel-30 minutes)

Session Chair: *Roger Hibbs, Kutztown University of Pennsylvania*

An Insider's Guide to Not Getting Tenure and Promotion

Roger Hibbs
Donna Marie Steslow

Kutztown University of Pennsylvania
Kutztown University of Pennsylvania

Tenure-track faculty often focus on the important and urgent (teaching) at the expense of the important and non-urgent, the tenure and promotion process. In addition, the information they receive about the tenure and promotion process is often fractured, sporadic and anecdotal. This paper reviews articles published on the tenure and promotion process, as well as the experience of two department chairs who have observed how numerous faculty have responded to this process. Our focus is on the “three legs of the stool”: Teaching, service and scholarship. This presentation covers ideas of organizing tenure material, how to prepare for a classroom observation, how to manage student expectations, how to maintain an achievable research agenda, and how to make meaningful service contributions.

Making Assessment Meaningful, by Recovering Assessment Naysayers

David Jordan
Natalie Dick

Slippery Rock University of Pennsylvania
Slippery Rock University of Pennsylvania

During the 2017 - 2019 academic years, faculty of an undergraduate healthcare administration program at a mid-sized state university in the northeast United States researched and developed new program outcomes and assessment plan. The process included program faculty, department and university assessment coordinators, and regional healthcare industry experts. The result was new program outcomes, competencies for each outcome, a curricular map, assessment tools and methods, alignment with certification and accreditation standards, and a strategic plan for continued program optimization.

This workshop will describe the background which prompted the revisions, as well as the process and sources of information incorporated in the new program outcomes and assessment plan. A discussion will be facilitated to discuss the pitfalls and opportunities for this and similar processes to develop optimal results, and the continued work required for such efforts to be meaningful.

Session 42: Willow Room

2:45 pm – 3:45 pm

Advising/Technology Concerns

Session Chair: *Laura M. Gurney, Husson University*

Assessing Sentiment Analysis Scoring

Laura M. Gurney

Husson University

Sentiment analysis scoring is the quantitative evaluation of valence within writing. Assessing the tonal levels of written reviews in ecommerce assists businesses in understanding customer product responses. Positive, negative, or neutral language scores can be determined quickly, numerically, and impartially by digital tools. Traditionally, valence is assessed by human review of written text. Utilizing sentiment analysis algorithm based evaluation allows for quick assessment of customer reviews and consumer feedback attitudes. This paper will present implementation of sentiment analysis scoring, comparing parallel text selections, employing three distinctive free natural language based sentiment analysis scoring algorithms and comparative results. Suggestions for future business implementation and application will be offered.

Segmenting by Benefits Sought: An Exploratory Analysis of Advising Needs

Christine A. Lai

SUNY Buffalo State

Chenchen Huang

SUNY Buffalo State

Academic advisors work with students to ensure the students are on track to fulfill their major requirements to graduate. Academic advisors may also advise students on choosing majors compatible with their interests and skill set and address time-management of students' academic, work and family time commitments. With on-line tools such as Degree Works, Schedule Planner, and program road-maps, is it necessary to meet with students each semester to discuss course requirements for graduation? This analysis uses existing data from a classroom exercise. In a marketing class, students were asked one question: "Should academic advisement be mandatory? Explain." As a result of the open-ended question format, students' responses were detailed and varied. The resulting qualitative data was analyzed for patterns and themes. While students were not asked to provide their names, some students put their name on their responses which enabled identifiable demographic characteristics such as Class, Gender, Minority-status, and GPA. Results show 65.43% students thought academic advisement should not be mandatory, 9.88% students supported mandatory academic advisement for freshmen and sophomores, and 24.69% responded that advisement be mandatory. Logistic regression and other statistical analyses indicated that there were no connections between students' perceptions of mandatory academic advisement and their demographic background as well as their academic performance.

Session 42: Willow Room

2:45 pm – 3:45 pm

Using Data Analytics to Increase Academic Success of Business Students

Lisa M. Walters

State University of New York at Fredonia

Shen Shixiang

Beijing Jiaotong University

Retention of students is one of the significant challenges the universities face. To a large extent, it depends on the ability the students to successfully pass the courses. We had anecdotal evidence that that a combination of some courses increases the chance of failure, while taking the courses in different semesters is successful. To evaluate this evidence, we applied two data analytics methods - FP-Growth and Collaborative Filtering – over an anonymized dataset which provided student aliases with academic difficulties, the semester of academic difficulty, the GPA of the student for that semester of academic

difficulty, as well as the courses the students were taking that same semester, along with the grades of that student in all courses of that semester. The dataset was for the past several years.

As a result of the applied data analytical methods, coupled with a qualitative review of the results by anonymous students, we identified courses that appeared to be problematic with regard to concurrent enrollment; we additionally determined that student interest in course material played a role in doing well in some courses. The results led to a better advising plan. The applied approach could be extended to other programs and disciplines.

Session 43: Logan Room

2:45 pm – 3:45 pm

Marketing/Data Analytics Concerns

Session Chair: *Brad J. Congelio, Kutztown University of Pennsylvania*

Contextualizing Big Data Analytics with Thick Data Ethnography for Enhanced Sensemaking Capabilities

Matt Artz
Uldarico REX Dumdum

Azimuth Labs
Marywood University

Big Data analytics have increasingly gained prominence in business because it has provided beneficial insights regarding emerging trends, behaviors and preferences drawn from millions of touchpoints companies have of customers. It is a powerful and helpful tool companies should continue to invest in. Relying exclusively on big data analytics to address the vast majority of business uncertainties, however, has proven detrimental to our ability to solve problems because more numbers do not necessarily produce more insights (Wang, 2013). Unfortunately, as Maxwell points out, “people are getting caught up on the quantity side of the equation rather than the quality of business insights that analytics can unearth.” Madsbjerg and Rasmussen, in a WSJ article, insightfully captures the essence: “By outsourcing our thinking to Big Data, our ability to make sense of the world by careful observation begins to wither, just as you miss the feel and texture of a new city by navigating it only with the help of a GPS.”

If we are to gain a better understanding of our customers and the business itself, we must not miss nor marginalize “the feel and texture.” We need to see problems and opportunities in terms of human experience and capture and interpret data with a human context. We need to examine and understand “what makes people tick and how they live their lives in their own natural habitats from their own perspective, rather than from traditional business’ perspective (Madsbjerg and Rasmussen, 2014). This applies to markets and products, as much as it applies to corporate culture because humans are complex and difficult to qualify and quantify. By using ethnographic research methods to observe human behavior and its underlying motivations, we can uncover and understand the needs and desires – the whys - the feel and texture - that drive the emotional lives of customers. This type of data is referred to as thick data.

This paper argues for the combined use of big data analytics and thick data ethnography – thick data informing big data and vice versa – a back and forth between what is happening (big data) and why (thick data). For businesses to form a more complete picture, both thick data and big data are needed because each of them generate different types of insights at varying scales and depths (Wang, 2013). As a more complete picture emerges, real and effective solutions and sound decisions to complex business problems may be found. The paper ends with an actual case from extant literature, how, together, big data analytics and thick data ethnography provided insightful advantage.

Session 43: Logan Room (cont'd.)

2:45 pm – 3:45 pm

Finding the Content Gap: Exploring the Use of Content Marketing and Data to Reach Digital Natives

Brad J. Congelio

Kutztown University of Pennsylvania

There exist nominal amounts of proper research into content marketing – or, as defined by the Content Marketing Institute, the “strategic marketing approach focused on creating content” and distributing it to a “clearly defined audience.” The current literature regarding content marketing provides only cursory discussions of the “strategic marketing approach” and largely ignores, whether purposefully or not, the process of systematically locating the “clearly defined audience.” Therefore, the purpose of this paper, is to start filling that gap in content marketing literature. In order to do so, it will use the well-documented increase in competition for high school students between institutions in the higher education admissions process as the framework to make the argument that content marketing is an effective tool for increasing awareness and conversions into the institution’s TOFU (top of the funnel) recruitment process. Moreover, this paper showcases, using data obtained from the SaaS AHREFS, how proper content marketing requires the dismissal of conventional target market audiences and the adoption of a numbers-based strategy regarding search volume, domain ratings, URL ratings, backlinks, and referring domains to coincide with the search intent habits of today’s digital natives.

Brand Authenticity and Customer Engagement on Social Media

Kuan-Pin Chiang

Central Connecticut State University

These days customers are empowered by technology and social media. At the same time, companies are challenged by more customers who factor in honesty, originality and credibility into their purchase decision. Studies have found that these factors are part of brand authenticity. The concept of brand authenticity has gained interest in recent years because it helps build brand trust and establish connections with customers on social media. A 2013 survey by Boston Consulting Group found that brand authenticity was one of the main factors of customer engagement of all demographics. Another survey by Stackla found that 86% of consumers say authenticity is important when deciding which brands to like and support. Therefore, this study seeks to explore the relationship between brand authenticity and customer engagement on social media.

Session 44: Holmes Room

2:45 pm – 3:45 pm

Pedagogy/Technology Concerns

Session Chair: *Doncho Petkov, Eastern Connecticut State University*

On Ways of Using the Work System Method in Various IS Education Courses

Doncho Petkov

Eastern Connecticut State University

Olga Petkov

Eastern Connecticut State University

The purpose of the paper is to describe how the Work System Method (WSM) can be incorporated at several levels in an Information Systems (IS) program. The WSM was developed by Steven Alter to facilitate the understanding between business and technical experts during Information Technology projects. It is one of the very few existing theoretical frameworks to support teaching of information systems published initially in 2002 and continuously evolving. It provides a rigorous but non-technical approach to analyze the functioning of an organization as a socio-technical system before building an information system or just as an analysis methodology in industrial engineering, management or in the design of service oriented systems.

The paper presents an overview of the work system method and related research including a review of publications on how it is used in IS education. Then are presented details on how the WSM ideas were used in the teaching of different types of courses in the IS program and lessons learned. Those are based on 15 years of experience of the authors in using WSM techniques in various forms: as an approach for understanding and analyzing problems in an introductory Information System course, for analysis of business operations and outlining the main characteristics of the client organization in a Systems Analysis and Design course or in a IT project management course and finally as one of the techniques used for initial business analysis before developing an IS strategy project in the capstone IS course.

Using Technology in a Finance Course with an Asset Allocation Game

Rick Hedderick

Penn State-Erie

In an introductory finance course, students are introduced to the concepts of diversification and asset allocation. We are attempting to create an asset allocation game for students to actively participate during the semester. Students will be assigned the task of creating an asset allocation based upon their personal risk tolerance for their mock 401k account. Throughout the semester students will be given a few bits of financial information regarding market conditions during that period. It is hoped each week will be equivalent to a two- or three-year period, so that during a twelve to fifteen-week period students will experience the ups and downs of a 24 to 45-year period. Each student will determine how often they wish to rebalance their portfolio based upon either the current market conditions or their predetermined asset allocation rebalancing plan. The student will not be graded on the performance of their account but on a few short papers the student will write over the semester. At the end of the semester the student will see how their portfolio would have also performed under several different allocations. The student will benefit from this assignment with a realistic view of how asset allocation and rebalancing of their account can affect their actual 401k account.

Session 44: Holmes Room

2:45 pm – 3:45 pm

ERP Blockchain, Importance of Introduction Curriculum for Accounting and Information Technology Students

Michalina Hendon

Bloomsburg University of Pennsylvania

Cassandra Bennett

Bloomsburg University of Pennsylvania

The recent increase in security breaches within technology infrastructure across various organizations has increased the demand for security around financial transactions. The emergence of blockchain technology can provide organizations the added security and financial trail that is demanded by stakeholders. Blockchains' integration with ERP systems is ushering in a new opportunity for organizations to meld old processes with advanced technology to enhance security. As companies begin to integrate blockchain technology with their enterprise resource planning (ERP) systems, such as SAP, it is essential for universities to implement these concepts into the university curriculum. The purpose of an introduction to Blockchain using and ERP system allows for students to understand the process of this new technology used within organizations informational systems. Discussed within this article is the identification of current blockchain uses, benefits, and opportunities as it pertains to Accounting and Information Technology (IT) students. This paper adds to the body of knowledge and provides reasoning for education in Blockchain through ERP for educators teaching Accounting and IT courses.

Session 45: Linden Room

2:45 pm – 3:45 pm

Technology Concerns

Session Chair: *Andrew Mangle, Bowie State University*

Blockchain Technology Reshaping the Business Landscape

Sunita Ahlawat

The College of New Jersey

Blockchain technology is taking the business world by storm. It originated as a protocol for exchanging cryptocurrencies such as Bitcoin. It is now changing the way transactions are carried out by offering reliable and instantaneous verification in a distributed ledger system. Blockchain protocol makes records immutable and supposedly tamper-proof. In a blockchain-driven world, buyers and suppliers will be connected via tokenization, a process where the rights to physical assets are traded using digital tokens. Individuals would be able to create contracts, do business, and pass the rights of goods and services entirely virtually. This paper describes what blockchain technology is, how it works, its potential pitfalls, promises and implications for business, auditors and regulators.

A Preliminary Blockchain Assessment Framework

Andrew Mangle

Bowie State University

With almost 900 public Blockchains and an increasing amount of private Blockchains, selecting a Blockchain architecture seems a daunting task. The research proposal outlines a preliminary assessment framework based on distinguishing characteristics of blockchain implementations with an emphasis on examining scalability, cost, security, and consensus mechanisms. Scalability is determined based on the number of transactions per second that can occur on-chain as well as off-chain or side-chain, supporting infrastructure, and capabilities. Cost is measured by the amount of fiat (USD) to store 1 kilobyte of transactional data from notes, smart contracts, and dApps. The ability to prevent 51% attacks, algorithm quantum and non-quantum resilience, key management options, anonymity, trust, and decentralization assess security. Oversight mechanisms, decision making, and leadership structure are used to evaluate consensus. These assessment metrics are beneficial in comparing and evaluating the myriad of solutions for enterprise integration. Specifically, the research encourages the examination of existing architectural options so firms in financial, supply chain, and other industries can choose a solution that fits their requirements.

Impacts of Distributors and Group Purchasing Organizations on Hospital Performance

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James Langdo

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This research investigates the use of distributors & group purchasing organizations (GPOs) and examine how they affect hospital efficiency and profitability. The data was obtained from the 2015 Annual Hospital Survey (AHA) of which 6,251 hospitals participated. These hospitals were separated by those who purchased supplies through a distributor and those who did not. Likewise, the same was performed for those hospitals which used GPO and those which did not. This study employs the DEA-Solver software to develop four types of bilateral DEA models. The results of the DEA model use a ranking variable (Rank Sum) to rank the variables within the two groups (distributor and no distributor) to determine if there is a significant difference between distributor and non-distributor. The same is performed for GPO and non-GPO. T-test for operating margin was used to determine if hospitals with distributors and GPOs are more profitable than non-distributors and non-GPO hospitals, respectively. Nonparametric Binomial Spearman Correlation is used to determine the relationship between rank sum and each input and output, to determine which input and outputs are correlated with rank. Finally, a Mann-Whitney test to analyze the differences between two groups in terms of the ranks. We examined the several control variables to examine for

statistical significance between these variables and with distributor and without distributor and with group purchasing organizations and without group purchasing organizations. Results indicate that the control variables (teaching and metro hospitals) made a significant difference for hospitals that used a distributor and those that use a GPO.

Conference Ended At:**5:00 pm**

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