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We invite you to read about innovations published and apply in your classroom. We also encourage you to develop your original creative ideas, prepare an article, and submit for review.

This particular issue includes a number of interesting classroom innovations in diverse areas.

Peter J. Billington
Editor

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Data Analytics: Integration into a Graduate Managerial Accounting Course

Laurie J. Corradino, Colorado State University – Pueblo, Colorado, USA

ABSTRACT

Data analytics has become the buzz word in the accounting profession with colleges of business and accounting faculty attempting to address the need for related instruction and student skill building in this area as part of their curriculums. To date, implementation methods have varied spanning simply offering a stand-alone course in data analytics, integrating data analytics into most or all courses in the current accounting curriculum, and even creating new tracks or degrees within undergraduate or graduate accounting programs. In this paper, I describe a multi-stage approach to integrating knowledge and application of data analytics into a Master's in Accounting (MS Accounting) Seminar in Managerial Accounting course including providing a conceptual foundation, identifying real-world applications, building critical thinking and software skills, and tying it all together in a final student-designed data analysis project.

Keywords: Teaching, Accounting, Data Analytics, Big Data, Tableau, SAS, Excel

INTRODUCTION

Integration of data analytics in a Master's in Accounting (MS Accounting) Seminar in Managerial Accounting course occurred at a prior institution in which most students entering the program had been exposed to most managerial and cost accounting topics through an undergraduate introductory Managerial Accounting course as well as a minimum of one-semester of undergraduate Cost Accounting and, in many cases, also an Advanced Cost Accounting course. Given this, I was able to spend a greater portion of the graduate course exposing students to data analytics and expanding their knowledge and skillset in this area alongside a review of traditional managerial accounting topics. I took a multi-stage approach to doing this: (1) Introduce students to the idea of Big Data and data analytics including important data analytics concepts and techniques, (2) Broaden students' awareness of the use of data analytics in real-world familiar organizations by asking them to research such use as it relates to accounting and prepare and deliver a presentation describing their findings, (3) Expose students to individual steps in the data analytics and decision making process through hands-on critical-thinking exercises and practice utilizing applicable software including Tableau, SAS, and Excel, and ask students to (4) Apply the prior knowledge to a comprehensive self-designed final project including identification of a relevant dataset, formulation of accounting-specific questions answerable through analysis of that dataset, analysis of the dataset, and evaluation of findings including the offering of recommendations based on findings.

I discuss each of the stages of implementation including an outline of tasks involved in each stage as a suggestion or baseline for anyone teaching a similar course and wishing to integrate data analytics into it or teaching a stand-alone accounting data analytics course. I also discuss my experience from four iterations of this course (three in a face-to-face format and one in an online environment) including challenges I faced, suggestions for successful implementation, and anecdotal student feedback.

LITERATURE REVIEW

A disconnect or divide is often noted to exist between academia or what students are taught in the classroom and what they will need to know and the skills they will need to possess as members of the profession. This is especially true of technological skills and knowledge as it relates to the Accounting profession (Qasim and Kharbat, 2020). As Clayton and Clopton (2019) note, businesses have been in the process of redesigning procedures to take advantage of the competitive advantages that technology integration can offer. To be successful in this endeavor, those businesses need employees with knowledge and experience in the area. If Accounting students are not prepared for this, the market is likely to choose IT students for coveted positions that were once reserved for Accounting graduates (Qasim and Kharbat, 2000).

Several oversight bodies are also implementing changes to encourage curriculum and skills updates including the Association to Advance Collegiate Schools of Business (AACSB International), the National Association of State Boards of Accountancy (NASBA), the American Institute of Certified Public Accountants (AICPA), the Institute of Management Accountants (IMA), and several large Certified Public Accounting (CPA) firms among others.

Especially for those schools applying for or possessing Accounting AACSB accreditation, related 2018 Standard A5 (Information Technology Skills, Agility and Knowledge for Accounting Graduates and Faculty) those programs are required to incorporate, as appropriate, data analytics into the Accounting curriculum including “statistical techniques, clustering, data management, modeling, analysis, text analysis, predictive analytics, learning systems, or visualization” and to do so in a manner that does not make students dependent on any one software but, rather, able to apply skills learned through the use of one software to any number of programs and related technologies later encountered (AACSB, 2018). Inclusion of such emerging technologies and technological agility are also addressed in AACSB 2013 (updated in 2016) and 2020 Business Standards (AACSB 2016, 2020). Further, content tested on professional certification exams is being updated to address emerging professional needs as it relates to data analytics and technology. With respect to the Certified Public Accountant (CPA) Exam, 2021 changes include a greater focus on data analytics especially within the Audit (AUD) and Business Environment and Concepts (BEC) sections. Within the BEC section, test takers will be asked questions related to data including governance, relationships, extraction, and transformation (AICPA, 2020; Qadir, 2020). The Certified Management Accountant (CMA) Exam has also witnessed changes related to technology with an entire section in Part 1 of the Exam devoted to Technology and Analytics which tests topics such as information systems, data governance, business intelligence, data mining, analytic tools, and data visualization (IMA, 2020). Ernst & Young (EY) and the other Big 4 Accounting firms offer support in this area. Specifically, EY has become a proponent of an “analytics mindset” noting that analytics are critical to every decision in business. EY suggests that Accounting students should be trained to (1) Ask the right questions, (2) Extract, transform, and load relevant data, (3) Apply appropriate data analytic techniques, and (4) Interpret and share results with stakeholders (EY, 2020).

There has been hesitation from some Accounting faculty to make necessary changes to the curriculum (Watty et al., 2016). Resistance has also been witnessed within the profession due to such changes being out of individuals’ comfort zones and the high switching costs involved (Schmidt et al., 2020). Despite such hesitations, a survey conducted by Richardson and Shan (2019) of Accounting department chairs indicated that 90.7 percent of respondents believe that data analytics should be included in the Accounting curriculum citing a need especially within managerial accounting courses. With respect to the format of such incorporation, 59.3 percent indicated a plan to develop a standalone accounting data analytics course within 3-5 years with some of those respondents noting additional incorporation throughout the curriculum while 20.3 percent noted a plan to incorporate data analytics throughout the accounting program but not develop a standalone course given the difficulties in adding an additional course to an already full curriculum. Andiola et al. (2018) also surveyed chairs of accounting departments at schools with separate accounting AACSB accreditation and found that of those schools surveyed, the largest percentage intended to implement data analytics into an accounting information systems course (69.6 percent) while 48.2 percent said they would include analytics in an audit/fraud course followed by managerial accounting at 23.2 percent. Further, 35.7 percent of respondents in that survey indicated that inclusion would be through a standalone accounting data analytics course.

Given the need for accountants to be agile with respect to specific software and technologies, in a study by Dzurainin et al. (2018), the authors address the question of how data analytics should be taught noting that there are benefits to focusing on critical thinking and decision-making skills and placing less emphasis on specific technologies. This reflects the fact that in a professional capacity, accountants may be more involved with interpretation of data and less involved with performing the technical analysis (Earley, 2015). Ultimately, exposing students to both is likely to be most beneficial and is included in the approach described in this paper.

COURSE DESCRIPTION

A catalog description of the Seminar in Managerial Accounting course at the time of its teaching was: “Organizational development of financial and nonfinancial budgets, interaction between performance measurement systems and human behavior, and advanced topics in uses of information for decision making.” The integration of data analytics into the course most specifically addressed “advanced topics in uses of information for decision making.” However, I also prompted students to consider the other primary aspects of the course, budgeting, performance measurement, and human behavior in their responses to data analytics related tasks.

As part of my personal description and goals for the course as stated in the syllabus, I noted that the course involved a “discussion of the concept of Big Data/data analytics and exercises in collecting, cleaning, and analyzing larger datasets to assist in the managerial decision-making process” and upon the course’s completion students should be able to “identify data needed for various decisions and appropriately collect and analyze such data in the decision-

making process.” Additionally, the two learning objectives for the course pertaining to data analytics were the following:

1. Identify sources of data useful in answering organizational questions.
2. Download and analyze large amounts of data, perform analyses using various electronic tools, and interpret results as part of the decision-making process.

The course was taught as an elective for the institution’s MS Accounting program for three of its iterations (Fall 2016, Fall 2017, and Fall 2018), and as a required course for one iteration (Spring 2020) because of a revision of the graduate curriculum. Also due to curriculum and delivery revisions, the Spring 2020 iteration was delivered in a fully online environment while the prior deliveries had been in a fully face-to-face environment. In Fall 2016 and Fall 2017, the course met once a week in a 2 hour and 30-minute block while in Fall 2018, the course met twice a week for 1 hour and 15 minutes each session. Over the four times delivered by me, roughly 50 students completed the course.

COURSE CONTENT

A description of the full content for this course is beyond the scope of this paper. My discussion here focuses only on those aspects of the course related to data analytics.

Stage 1 – Introduce Students to the idea of Big Data and data analytics concepts and techniques

During each of the semesters in which the course was taught, I assigned articles for students to read related to data analytics/Big Data. The articles were obtained from both professional and academic journals as well as mainstream media sources and covered a variety of topics pertaining to the role of Big Data/data analytics in the accounting profession. As a follow up to students’ reading, we spent a portion of the subsequent class periods discussing the content and students’ own involvement with data analytics in either their personal or professional lives. An outline of topics covered in the articles as well as examples of reading materials for this stage follow. This provided a foundation of knowledge for students for subsequent stages.

Topics:

- 3 V’s – volume, variety, velocity
- Various sources of data / data creation including the Internet of Things (IoT)
- Structured vs. unstructured data
- Uses of Big Data / data analytics in various accounting domains including managerial accounting, financial accounting, and tax accounting
- Ethics and risks involved with data collection, analysis, and usage
- Surveys of managers’ perception of the need for data analytic knowledge and skills in the future

Example Articles:

- “Big Data = Big Opportunities” by Arleen Thomas (2015): <https://blog.aicpa.org/2015/02/big-data-big-opportunities.html#sthash.ufsyGKes.dpbs>
- “When Accounting Meets Big Data” by Brian Sommer (2015): <https://diginomica.com/when-accounting-meets-big-data>
- “Business Analytics: Transforming the Role of Management Accountants” by Kristine Brands and Mark Holtzblatt (2015): <https://www.imanet.org/-/media/fba0ebd670414d25a467d4cff8d0c691.ashx>
- “Big Data Accounting – The Predictive Accountant” by Suresh Sood (2017): <https://www.acuitymag.com/finance/big-data-accounting-the-predictive-accountant>
- “Big Data: Its Powers and Perils” by the Association of Chartered Certified Accountants and the Institute of Management Accountants (2013): <https://www.imanet.org/insights-and-trends/technology-enablement/big-data-its-power-and-perils?ssopc=1>
- “How Big Data Will Change Accounting” – citation: Warren Jr, J. D., Moffitt, K. C., & Byrnes, P. (2015). How big data will change accounting. *Accounting Horizons*, 29(2), 397-407.

Stage 2 - Broaden students' awareness of the use of data analytics in real-world familiar organizations by asking them to research such use as it relates to accounting and prepare and deliver a presentation describing their findings

Following the learning of conceptual aspects of Big Data/data analytics and generalized application to the accounting profession, I then asked students to research an organization of their choosing to focus on the specific implementation of data analytics within that organization tying that application back to accounting. Students picked a variety of organizations including Walt Disney, Target, Netflix, Facebook, You Tube, Proctor and Gamble, American Express, and Amazon to name just a few. A synopsis of my directions to students appears below:

Research information (online or in print) describing the use of Big Data within companies. Pick a company for which you can locate information that highlights the company's collection of that Big Data. Make sure to choose a company that not only describes the collection process but also includes a discussion of how that data is being used by the company to increase revenues, reduce costs, or make any internal business decisions that in some way improve or are perceived to improve operations or extract valuable business information.

Prepare a related presentation that includes a discussion of (1) background information about the company (e.g., description, industry, size, year of formation), (2) the type of Big Data captured by the organization, (3) the form of that data and means of collection (e.g., structured vs. unstructured, internally generated vs. externally collected, cleaning involved), (4) storage (e.g., immediate use vs. purge, methods of storage), (5) uses (e.g., means of analysis if stated, ways operations are improved), (6) how the data collected could be used in budgeting or as a management control device addressing behavioral aspects of managerial accounting, (7) any concerns regarding the accuracy, verifiability, and/or privacy of the data, and (8) any additional ways that the data could be used to add value to the organization for which it might not already be doing so.

Stage 3: Expose students to individual steps in the data analytics/decision making process through hands-on critical-thinking exercises and practice utilizing applicable software including Tableau, SAS, and Excel

During subsequent weeks throughout the semester, I exposed students to relevant data analytics steps including (1) formulating questions and properly categorizing those questions as descriptive, diagnostic, predictive, or prescriptive, (2) locating/identifying data that could be used to answer those questions, (3) classifying data/variables as qualitative (nominal, ordinal) vs. quantitative (interval, ratio) and transforming higher-order variables into lower-order variables, (4) identifying types of analysis (including visual analysis) appropriate based upon the form of data/variables and question, (5) analyzing data using software including Tableau, SAS, and Excel by offering tutorials and demonstrations of the use of each. In Fall 2016, Fall 2017, and Fall 2018, I introduced students to both SAS and Tableau and provided guided practice with respect to loading data into the programs, cleaning the data, and utilizing analysis tools within each in addition to discussing use of Excel. With SAS, students learned how to write code to achieve desired objectives. With Excel, I focused on Excel Ideas (an add-in) and Excel Surveys which focused on writing and distributing surveys using the Excel Forms platform on Microsoft One Drive. Given the online format and the greater difficulty in understanding usage of the program, in Spring 2020, I did not incorporate SAS into the course.

During Fall 2018 and Spring 2020, after providing background and instruction in each of these areas, I created assignments for students to practice each of these steps. In Spring 2020, the assignments covered the topics that follow. In Fall 2018, I also had activities related to writing, interpreting, and implementing SAS code.

Assignment #1 asked students to review 3 datasets and related data dictionaries provided to them. For each of those datasets, I formulated various questions that could be answered by the data and asked students to categorize the questions (descriptive, diagnostic, predictive, or prescriptive) and then, for some of those questions, asked them to identify what variables would be used in the analysis. Finally, given a database structure only (no data), I asked students to formulate their own questions in each of the four categories that could be answered using that database and what variables would be needed to do so.

Assignment #2 asked students to categorize various variables from Assignment #1 as either quantitative or qualitative and further as nominal (dichotomous or not), ordinal, discrete, or continuous (interval or ratio). The assignment also asked students to describe how they could transform higher-order variables into lower-order variables (e.g., take a continuous variable and make it ordinal). In the last portion of the assignment, students were asked to identify a visual analysis that would be appropriate for the question and related data (e.g., bar chart, tree map, heat map, box and whisker plot, scatter plot, etc.)

Assignment #3 asked students to load a dataset into Tableau and to follow a set of instructions to create various visual analyses. This provided students practice with simply utilizing the software platform as well as answering questions asked of them related to the visuals created (i.e., practice interpretation).

Assignment #4 asked students to load a different dataset into Tableau and to create a visual analysis to answer related questions. In this assignment students were told what analysis to use but not what variables to use or how to create the visualization within the software to answer the related questions. Students were also required to answer each question based on their visualization (i.e., practice interpretation).

Assignment #5 asked students to load a dataset into Excel and to utilize Ideas to identify several insights from the data identified by the program and to then categorize each of those insights into one of four categories based on prior discussions (trends, rank, majority, outliers). Further, students were asked to create their own short survey using Excel Forms and to share a link to their survey as practice with the process of collecting data.

Stage 4 - Apply the prior knowledge to a comprehensive self-designed final project including identification of a relevant dataset, formulation of accounting-specific questions answerable through analysis of that dataset, analysis of the dataset, and evaluation of findings including the offering of recommendations based on findings. As a final project for the course, I asked students to locate a dataset of interest. I offered various suggestions for publicly available free datasets (see list provided) but welcomed students to locate or use any dataset of their choosing meeting certain criteria (e.g., a minimum level of observations and variables and applicability to accounting issues).

As part of the final project, I asked students in Fall 2016, Fall 2017, and Fall 2018, to use both SAS and Tableau to answer various self-formulated accounting-related questions while also categorizing those questions, categorizing variables, and submitting the related code/files for the analysis and to describe any required cleaning of the original data. In Spring 2020, I asked students to do similar using Tableau and Excel Ideas. As part of the final project, I required that students not only report results but also interpret those results and offer suggestions for operations and/or comment on any business implications. This was conveyed in both a written report and oral presentation.

Examples of Sources of Free Publicly Available Datasets:

Data.Gov: <https://www.data.gov/>

Open Data Network: <http://opendatanetwork.com/>

Inside Airbnb Data: <http://insideairbnb.com/get-the-data.html>

Kaggle: <https://www.kaggle.com/datasets>

DISCUSSION

When I began teaching this course, I was tasked with incorporating content and skills that would appeal and offer value to students many of whom had already completed several prior managerial accounting courses. Given the nature of the course including the course description as well as the growing need for accounting graduates to enter the profession with Big Data/data analytics knowledge and skills, I chose to use the opportunity to incorporate that as part of the course. Much of what I have discussed here and offered as assignment/task descriptions and suggestions were based on the course as delivered in Spring 2020 given prior experience of what worked and did not work in previous iterations of the course. Next, I will further elaborate on suggestions for implementation, challenges, successes, and anecdotal student feedback.

As I previously noted, this course was offered in various formats namely, face-to-face once a week in an extended time block, face-to-face twice a week in a shorter time block, and online. In the face-to-face once a week format, both spending the latter half of a class session or the entire class session (toward the end of the semester) on data analytics material worked well while in the face-to-face shortened time block, it made the most sense to always use an entire period to cover the data analytics material. The online version of the course was like the once-a-week meeting in which the best delivery mode was to include data analytics modules during the same week as covering more traditional managerial accounting material.

I would divide challenges into two main categories. Those categories are software/technology related and lack of student prior knowledge.

All the software used in the course was free to students through various educational programs. That software included SAS University Edition, Tableau (Education), and Excel. While that itself was a success of implementation, ensuring students requested the software (as applicable), downloaded the software on their devices prior to arriving to class (in face-to-face semesters), and made sure that it was properly working was a challenge. The biggest challenge with

respect to this was ensuring system compatibility. Because SAS University Edition operated using Virtual Box and Virtual Box required certain option selections on the devices operating it, sometimes to get the program to run required that those changes be made within the Bios of the computer. While I and some students made such changes to personal computers to allow for operation of the program, some students were hesitant to do so and instead chose to check out a loaner device for the semester. A second challenge was sharing datasets with students and students sharing datasets with me. The datasets used in the course were large so uploading them to the learning management system or emailing them to students even in compressed formats was sometimes impossible. When that occurred, I instead posted them to a folder that I shared with students on One Drive. Even with that workaround, it was crucial to have a good internet connection to upload those files to the platform and for students to have a good internet connection to download them (sometimes with little else operating on their devices at the time). One time during a face-to-face session I also used a portable hard drive as a workaround and shared the file we were using in class with students that way.

Another challenge was students' lack of prior statistical knowledge. Students generally understood and felt comfortable working with analysis methods involving visualization (i.e., Tableau and Excel Ideas). However, this was not the case for other statistical methods particularly regression analysis. This may have been an isolated characteristic of the student population and their prior educational background in my courses. Despite providing some remedial training in this area, students still found it difficult to interpret regression analyses and know when it was appropriate to use different types of regression models. Students' lack of prior coding knowledge and practice in coding also made the use of SAS more of a challenge compared to Tableau which is much more click-based and intuitive. Again, despite offering mini trainings on code writing, students still struggled with it and identified SAS as the part of the data analytics portion of the course that they enjoyed the least. Stata or R could also have been used rather than SAS but I believe that the same student reactions would likely have resulted. I might suggest stronger training in statistics and use of statistical software for students to help address these issues in future data analytics courses or data analytics tasks within courses.

I chose to allow students to pick an organization for their Big Data / data analytics presentation and a dataset for their final analysis project. While I could have instead assigned an organization/dataset, the approach adopted provided students with the freedom to research something of interest to them which I feel increased interest in the assignments and overall learning. In fact, while most students chose to use a dataset that they found on the internet, some obtained their own datasets from employers or local organizations (e.g., one student chose to obtain data from a local parks/wildlife agency related to issued licenses over several years, perform analyses, and offer related recommendations). It was those projects that ended up being some of the more interesting and relevant ones.

With respect to the final data analysis project, for the face-to-face courses I offered students the option to complete the project on their own or as part of a small team (2-3 students). While many students enjoyed working with fellow students and leveraging the knowledge and skills of one another, some preferred to work alone. Allowing for this flexibility rather than mandating a team or individual submission worked well.

Below is some anecdotal feedback from students in various iterations of the course regarding data analytics/Big Data:

- “The individual big data company projects were fun to do and fun to listen to.”
- “It was interesting to learn about the big data software, SAS, and Tableau.”
- “I enjoyed learning how to use SAS and Tableau. I wanted to focus more on data analysis during my undergrad but wasn't able to. The accounting field is slowly moving into the big data realm and knowing how to use these and other statistical programs can greatly benefit us.”
- “[With] the big data analysis project, it was interesting to explore different data sets and develop questions. It seemed like a good flow because I was always asking myself why is the data showing me this? This would lead to more critical thinking.”

CONCLUSION

This paper provides some background on why it is becoming increasingly important to expose Accounting students to data analytics and offers an approach to incorporating such topics into an upper- or graduate-level managerial accounting course. While the approach described here provides some initial ideas, the possibilities of how to integrate data analytics into the Accounting curriculum are varied. What is best for one school or program will be dependent on faculty expertise, current curriculum structure, program size, and several other factors.

After teaching a graduate level managerial accounting course on four separate occasions and incorporating data analytics into the course in a manner previously described, I learned several things. First, students generally realize the importance of acquiring such knowledge. They have been told about the importance by instructors or work/internship supervisors. They have also stayed abreast of professional exam changes which include data analytics content. Second, students seem to welcome a change from traditional accounting content and problem-solving activities suggesting that they enjoy acquiring new skills and exercising their brains in new ways. Finally, while there were challenges faced as mentioned previously, most were easily overcome or could be further overcome with some additional statistical training. Overall, students responded very favorably to the data analytics portion of the course.

If I were to teach this or a similar course again, I would consider partnering with local organizations which had various datasets available for analysis and that were willing to allow students to see, work with, analyze, and interpret such data. As I previously noted, some of the most interesting and relevant final analysis projects were those in which data was acquired from a source other than the internet. In those cases, students seemed to have a greater understanding of and connection to the data and the final interpretations and suggestions made were the most meaningful. I think this approach would provide additional value for students in more of a service-learning type of capacity. It would also allow students to give back and provide help using their newly acquired skills in the local community which is likely to help meet a related objective of many programs and universities.

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An Introduction to the “How To” for AI and Machine Learning

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ABSTRACT

This paper provides an overview of Artificial Intelligence (AI) and Machine Learning (ML) with a focus on discussing the processes used to develop and implement an AI application. We review the key components in building an AI application and then proceed to discuss the “how to.” The review of key components covers six major components including data sources, source code, and algorithms used to train the application (*i.e.*, machine learning) and use of an AI application to fit specific business needs. The paper also provides background on biases with AI-related work as well as samples of different algorithms and models. Finally, we discuss next steps for the reader to consider if s/he wants to pursue AI and ML projects at her/his organization.

Keywords: Amazon Web Services, Artificial intelligence, Google Cloud, Machine Learning, Microsoft Azure, Natural Language Processing, Python.

INTRODUCTION

Just over a decade ago, Marc Andreessen, a successful venture capitalist who founded Netscape, the first company to develop and market a browser, wrote in *The Wall Street Journal* that “...software is eating the world.” His words then were accurate, but today are even more relevant. Per an April, 2021 Report from Grand View Research annual revenues in the software industry now exceed \$400 billion per year and are growing at a very fast rate. Nearly all of us are dependent on software in our lives, whether it’s the applications on our mobile phones, the tools we use at our desks, and the services and products we depend on from local retailers, including restaurants, and merchants like Amazon. The software industry will continue to grow with software products becoming even more integrated into our daily lives.

An important and critical component behind the recent and future growth in software functionality is artificial intelligence and machine learning. Each of us already benefits from software with artificial intelligence and machine learning, and the best is yet to come. Consider, for example, how your mobile phone now automatically corrects your spelling and suggests words when you are texting. Or how Uber uses AI and machine learning to support its services that you may use. Another example of AI and machine learning in use today is Netflix’s recommendations of movies that you would enjoy. Computer vision, language translators, and autonomous vehicles are also examples of AI and machine learning in use.

Many venture capital firms are making significant commitments to AI and machine learning. A recent report from Pitchbook, a well-respected research firm, notes that there were over 2,330 deals involving AI and machine learning, totaling about \$57.5 billion, in the first half of 2021. These investments will yield even more robust AI and machine learning software with the attendant benefits (and risks) to us.

Unfortunately, AI and machine learning are often considered a mysterious and strange technology that only the most technically-advanced people can understand and use to grow corporate value. In fact, this isn’t true. Yes, AI and machine learning are software and, yes, software in general is challenging for many people; a combination of art and science that initially appears to be far too difficult to master, albeit even for understanding how it can be used in our companies and organizations.

Our objective in this article is to provide an introduction to “the how” behind AI and machine learning. Your time spent with this article will give you a critical headstart and perspective for understanding AI and machine learning. Of course, there will be much more to learn, but as you will see, AI and machine learning are well worth your attention and time.

We’ll begin with a review of this mysterious and strange technology with an overview diagram of AI and machine learning in operation. We’ll then move to a discussion about the key components with an AI and machine learning application. We’ll also discuss risks associated with AI and machine learning. The next section then describes how

to create AI models and justification for investments for AI. Finally, we provide some background information on what to consider if you want to build software applications that use AI and machine learning.

AN OVERVIEW OF AI AND MACHINE LEARNING SOFTWARE

We'll begin our detailed discussion with some definitions.

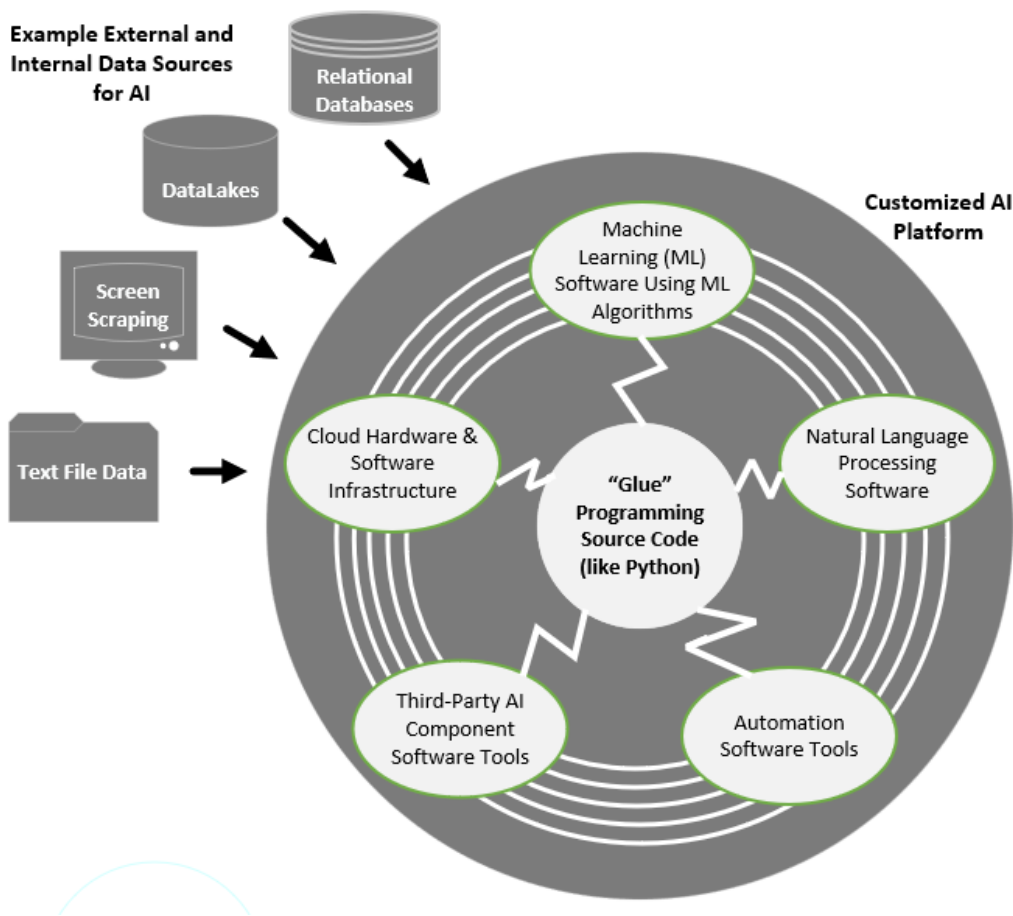
First, Artificial Intelligence. The term AI has been publicly known for decades and, accordingly, has many meanings in use. Reflecting the use and relevance of the term AI in business and science now, our definition is based on work by McKinsey published in 2018: AI is typically defined as the ability of a machine to perform cognitive functions associated with human minds, including perceiving, reasoning, learning, and problem solving.

Next, Machine Learning. Machine Learning is a tool within AI that involves the analysis of large data sets. The machine-learning algorithms detect patterns and make predictions as well as recommendations by processing the data. Additionally, the algorithms self adapt in response to new data and experiences.

Primary Components with AI and Machine Learning Software

There are six major software components with AI and machine learning. The diagram below, Exhibit One, provides a summary look at five key components used as well as referencing a sixth component, the AI programming source code, as shown in the center.

Exhibit 1. Data, Primary AI Components, and Source Code in a Customized AI Platform



The four data sources at the upper left of this exhibit emphasize the preeminence of data for AI, since AI absolutely requires ongoing and quality input data. Data sources range from structured data (*e.g.*, text and numbers organized in

rows and columns) and unstructured data. Unstructured AI data can be images, recordings, videos, graphics, emails, or web pages – showing that AI input data is not confined to text and numbers. Unstructured data can be stored in what is called a data lake, which is a data repository like the much-used software program Hadoop, part of the Apache Hadoop software library. (Hadoop is named after a child’s stuffed elephant toy.)

The first (of the six components) is the central “glue” programming source code. Source code ties the components together, emphasizing the fact that AI is not out-of-the box software that we can license online and, thus, requires AI-experienced personnel and programming knowledge. Programmers often use the Python programming language (discussed below) for AI due to its relative simplicity, readability, widespread use, and flexibility. A key Python AI advantage stems from the multiple “add-on” Python libraries to handle AI and machine learning tasks that can be called from the lines of Python source code. Here we also have the algorithms used for machine learning.

There are many programming languages and even non-technical people may have been exposed and did programming work in the past, even if it was just macros in Microsoft Excel. Among the many programming languages available, Python has become the “defacto platform for new technologies,” including AI and Machine Learning. *IEEE Spectrum*, a well-known and recognized publication from the IEEE (Institute for Electrical and Electronics Engineers) Computer Society, in an article published in August 2021 discussed how Python is the top-ranked programming language.

As noted above one of the reasons why Python is so popular is the depth and breadth of Python tools; examples of well-known and readily available, Python-friendly machine learning (ML) software tools are H₂O AutoML, TensorFlow, and Scikit-learn. Another Python library is NumPy, providing multiple ways to manipulate data. Pandas is yet another tool good for reshaping matrix data from sources like Excel and plotting output graphs. More information on these software tools is readily available via a Google search.

Second, and going clockwise from the exhibit’s top, the machine learning (ML) software uses algorithms and statistics to learn and to adapt from its exposure to input data over time. Simply put, ML software gradually learns from multiple passes through the ever-growing input data, with an AI professional or the ML software automatically tweaking an AI model’s parameter values with the data passes.

Unlike a computer program written by a human, machine learning creates its program (called a model) based on the desired result guiding the ML software to learn from the input data. The constant passes through input data are a critical aspect of how AI and machine learning software “learn and adjust” with more information. Large data sets are critical, as we discuss below in more detail.

A critical part of the ML software is the algorithms used for learning from the analysis of the data. We’ll discuss in more detail below, but a quick example can be helpful. Those of us who have taken statistics or research methods are likely familiar with regression models. Essentially, regression enables us to model relationships between independent variables, say one’s blood pressure, with dependent variables, in this example, weight, BMI, age, and type of diet. While not showing causation, we know that the dependent variables can help to explain variance in weights among people. Linear regression is a simple and popular algorithm for machine learning. So, if you are familiar with linear regression, you are already on the way of learning how to do AI and machine learning.

Third, working closely with machine learning, natural language processing (NLP) software is another essential since it enables computers to understand written and spoken words. NLP software is so critical that earlier in 2021 Microsoft acquired Nuance Communications, a company known for conversational AI, particularly in medical applications. Microsoft spent \$16 billion and justified the purchase publicly by stating that the acquisition will enable it to expand its addressable market in healthcare alone by \$250 billion. NLP is used in various ways with AI and Machine Learning projects. Bain & Company noted in a Bain Insights article published in March, 2021 that it used NLP and machine learning in a survey study for a global retailer to yield richer and more robust findings, particularly in regards to the analysis of responses to open-ended questions.

Fourth, due to the massive amount of data required and the steps needed to create an ML model, automation software is essential to manage many mundane AI tasks, since you want your skilled AI personnel focused on high-level work. Automated tasks include searching/collecting data from near and far, performing data cleansing tasks, and starting/monitoring machine learning tasks.

Fifth, the proliferation of third-party AI component software tools offers a wide choice of AI customization functionalities to suit your AI business needs. An example is PyTorch, a third-party add-on component for the Python programming language, which is “an open-source machine learning library framework that accelerates the path from research prototyping to production deployment.” (<https://pytorch.org>.) The software toolset market also has components that work with other programming languages, but Python is highlighted due to its current dominance in AI. It’s common to have scores of such open-source products used to create and maintain a customized AI platform, ranging from programming language extensions like PyTorch to non-AI tools like security scanners.

Sixth, AI platforms are usually located in the cloud, due to AI’s need for massive data storage and processing power for developing and hosting production AI platforms. The primary cloud vendors including Google Cloud, Microsoft Azure, AWS, and others have created specialized AI tools to develop and host AI platforms. These toolsets will continue to grow in options, speed, and functionality.

AI’S DATA SOURCES AND ETL (EXTRACT, TRANSFORM, LOAD)

We noted above the importance of having data, lots and lots of data, to create and use an AI application. Much like we learned in our lives from experiences, AI and machine learning need “experiences” to analyze, hence, the tremendous demand for data. Consider, for example, an application like Netflix uses for recommending movies. Similarly, one company now offers driverless lawn mowers for golf courses with AI functionality that gets more efficient and better based on its experiences mowing.

Data: Critical to Your AI Application

An initial creation of an AI platform may be limited to an initial set of data sources, with more data sources planned in later releases. The depth and breadth of available data is expanding rapidly worldwide, so responsible organizations should do ongoing data searches to discover new valuable data “grist” to add to their AI platforms.

If the AI input data is incomplete, unrepresentative of the real world, or just wrong – the AI output information will also not represent the real world. Like humans, ML software learns through experience through data, but the software can make sense of massive input data sets that humans can’t comprehend. Sometimes what the ML software “learns” is incorrect. Nevertheless, when the software learns correctly it is astonishingly powerful and useful. Consider AI’s use in medicine. A more prosaic use is software offered by companies that through the use of AI and machine learning enable recognition of a vehicle often without the complete image of the license plate, a task that humans can’t do.

Once AI data has been acquired via various means, it must be cleaned and enhanced to be made usable for AI using ETL (Extract, Transform, and Load) software. Unstructured raw data is often stored in a data lake repository, where it can (if needed) later undergo the ETL process to make it usable for AI. In fact, even structured data can require the ETL treatment, with the resulting cleansed data stored in a structured database.

Getting (Extracting) and storing (Loading) are easier tasks compared to “Transforming,” since the transformation process can require substantial logic to make the needed data changes. ETL software conceptually might seem easy, but data is frequently “dirty” or poorly formed. For example, incoming city names may be misspelled, correctable by ETL software through zip code lookups or through referencing information for common misspellings of cities. (Think, for example, of “De Moines” rather than the correct spelling of “Des Moines,” the capital city of the State of Iowa.)

Consequently, much software has ETL built in, such as the Excel data import feature, but sophisticated AI data cleansing and enhancing requires a high-powered ETL tool. Two examples of non-trivial transformations are: a) transforming a time to a 24-hour format to remove the AM and PM time formats, and b) cleaning data to remove typos and bad zip codes.

ETL software has been around for many years and ETL is now available via the cloud. Examples of cloud ETL tools are AWS Data Pipeline, Azure Data Factory, Google Cloud Data Fusion, and Informatica Intelligent Data Management Cloud. The AWS ETL tool is a web service API (application programming interface that enables two applications to share information, for example, the weather app on your phone) that gets transformed “...according to a predefined chain of data dependencies, operations, and a given schedule.” Similarly, the Azure, Google, and Informatica cloud-based services provide ETL tools to move, transform, and store data.

The Risks of Bias

Accurate data is critical for AI, so it's important to realize a number of biases could well exist in data sources, consisting of four primary bias areas. We'll list multiple detailed biases within each area to emphasize the myriad ways data can be biased: The first bias area is Data Creation Biases which includes Sampling Bias, Measurement Bias, Label Bias, and Negative Set Bias. A common Sampling Bias is over-representation of one type of AI learning data to the detriment of another data type, such as face recognition AI data concentrating on light-skinned faces with darker-skinned faces under-represented, causing poorer AI recognition of darker-skinned faces.

Second, a Problem Formulation Bias is caused by a Framing Effect Bias, which is the original AI business intent unduly framed to favor a certain outcome. For instance, AI predictions of credit-worthiness might be framed to maximize a company's profit margin or to maximum loan repayments, which benefits a company and not the applicant.

Third, Data Analysis Biases includes Sample Selection Bias, Confounding Bias, and Design-Related Bias. An example of a Design-Related Bias comes from AI algorithms relying on randomness to accurately distribute results. However, insufficient computing power or the algorithm itself skews data selections towards the beginning or the end of lists, making results non-randomly distributed which causes inaccurate results.

Fourth, Validation and Testing Biases can consist of Sample Treatment Bias, Human Evaluation Bias, and Test Dataset Bias. A Sample Treatment Bias can be caused in AI input data preparation testing when certain people speaking a different language don't see ads shown to everyone else during the testing, skewing the results since certain testers saw a subset of the data.

AI Biases can throw off machine learning results, so forewarned is forearmed to minimize the errors possibly inherent in the data and the processes used by AI to learn. As such, data biases are important to ensure an organization's data is accurate at the beginning. Ask questions about data biases at your company when the AI effort is getting underway.

A CUSTOMIZED AI PLATFORM – COLLABORATION AMONGST THE COMPONENTS

Machine Learning Software

An AI platform is built from many components, but the most elemental component of all is the machine learning software, which learns from input data using automated statistical methods. In effect, the computer gains experience over time so it can make decisions on its own, make predictions, and improve outcomes. As an example, often when you use Amazon, the company's software looks at recent purchases and recommends products that you may be interested in purchasing.

Going in, it's clear to understand the degree of flexibility needed with machine learning software, since some ML software might lack the flexibility to address your AI needs. Machine learning software (services) from the Big Three cloud vendors are as follows: Google has Cloud AutoML and BigQueryML; Azure has Azure ML; and AWS has SageMaker. However, there are multiple third-party ML software open-source vendors such as H₂O AI and Scikit-Learn. The Scikit-Learn ML software offers "Simple and efficient tools for predictive [ML] data analysis." Overseen by data scientists, these ML software tools ingest large amounts of AI input data to gradually learn over time (like humans,) leading to more accurate predictive results.

Good software design applies to all kinds of software, but the following characteristics are particularly notable for AI software. The user interface should be easy and intuitive to create/manage the data inputs required for AI jobs and for viewing/analyzing AI outputs. As with all software, documentation should amply describe the sophisticated algorithms, required ML inputs, and available ML outputs.

Given the massive data required and extreme processing time, ML software should be fast and, thus, may require specialized software to scale with speed. Cloud vendors offer readily-available abilities to scale out or scale up. Scaling up focuses on the server by making it more efficient as well as adding more robust hardware capacity. For instance, an application-specific integrated circuit (ASIC) name "Tensor Processing Unit" (TPU) has been developed by Google to work with its neural network ML TensorFlow software, resulting in less energy use and speed increases. Better-known GPU (Graphical Processing Unit) ASICs can also improve a computer's energy use and speed for AI.

Thus, scaling up increases the computational work one server can do. Scaling out, also called scaling horizontally, distributes the computational workload among multiple ML servers via load balancing. Load balancing software acts like a traffic cop by monitoring incoming requests and distributing the work to multiple servers so no one server is overloaded.

ML software should be readily customized or configured to suit an organization's business needs. Of course, 100 percent customization through the ML software isn't possible for AI platforms, since programming languages are often needed to tie together AI platform components and to address AI data science needs. For instance, the Python programming language can customize an AI platform by calling third-party Python libraries to access sophisticated ML algorithms, extracting data, loading data, and providing sophisticated statistical graphs.

ML software should handle the needs of all levels of data science personnel, complete with specialized security roles to expose "need to know" information to the appropriate user roles that align with the various personnel skill sets in an organization. Microsoft's Azure Machine Learning has three default roles: Reader (allows read-only rights); Contributor (allows create/read/update/delete rights for many functionalities); and Owner (allows create/read/update/delete rights for all functionalities.) Azure also allows customized user roles to be created, improving an organization's security by ensuring sensitive data is only seen by personnel who need to know the information.

ML Model and Data Governance

ML model governance is important to keep machine language outcomes accurate and well maintained. Top organization executives should delegate ML governance so a mix of organization AI stakeholders can manage the overall functioning of ML. Regular meetings allow oversight of new model development, monitoring the AI inputs and outputs to ensure optimal training (learning) done by an ML model.

Overall, governance lets an organization align their business goals with the business outputs produced by AI. In our experience, some organizations combine AI data governance and ML model governance into one unit, since both data and models are the main drivers of AI effectiveness. Governance provides a process to analyze continuously input data against set standards, compare AI model outputs against set standards, and to apply governance contingency plans for use when standards are not met. Through governance, an organization's efficiency and bottom-line are benefited when ML prediction outputs are originally developed accurately and kept accurate thenceforth.

Natural Language Processing

As an adjunct to ML, Natural Language Processing (NLP) is a less invisible AI component, but it's critical. NLP goes hand-in-hand with machine learning, since a computer can't learn from written or spoken text unless NLP understands the content and context, such as performing co-reference resolution, which is a synonym-like ability to identify various words referring to one object. NLP can also translate text from one language to another, increasing the amount of data available to AI, using a tool like Google Translate. Or, NLP lets Google find references similar to your requests when doing a search. Many of us are familiar (and often, likely frustrated) by voice recognition software in use at many companies. Some of this software uses NLP.

Perhaps most importantly for AI, NLP can do "deep learning," which is a subset of machine learning. Deep learning uses neural networks, which is software mimicking the human brain, to understand language spoken or in text that can reveal important data nuggets amidst massive data sets. Many NLP products are on the market, such as Google Translate, Amazon Comprehend IBM Watson, OpenNLP, and MonkeyLearn.

Some NLP products are best suited for large organizations and other products, like InBenta that specializes in a customer experience data niche. Keep NLP's functionality in mind when thinking about an ML product to understand the extent of NLP functionality beforehand.

The Importance of Automation for AI

AI platforms require massive inputs of data and are invariably composed of many discrete processes before useful AI results emerge. Due to the magnitude of the work and the steps needed, automation is absolutely critical to make AI accurate and cost-effective by reducing labor hours and reducing the time required spent by skilled personnel to do menial tasks.

One automation tool example is Azure Automation to automate cloud-based tasks, provided you have an Azure cloud account, though the tool can access other cloud vendors and on-premises data centers. Another automation tool is Run:AI, featuring intelligence for neural network deep learning that requires massive computing power to manage GPUs efficiently to increase speed and save energy.

Third Party AI Component Software Tools

A robust third-party market exists to help users construct an efficient AI platform. The tools range from major components like ML software to discrete software services such as tools to detect “data drift,” which detects changes in AI input data over time (that can negatively impact AI results). For example, demand for some consumer and enterprise products changes over time due to various factors like the weather and fashion trends; accordingly, the AI software needs to be updated with fresh and more current information.

Many of the available third-party components are open-source software constructed to be included within an AI platform. Multiple external open-source AI products need to collaborate well. Responsible software developers, including those creating AI functionalities, must ensure external open-source functionality comes with source code and meets certain standard criteria such as trustworthiness, good maintenance practices, legally-sound, popular, and likely to be supported over time. Be sure to ask questions in regards to open-source functionality if and when you get involved with an AI project at your organization.

Once external dependencies are placed into an organization’s source code, they’re often difficult to remove. To guard against inclusion of open-source vulnerabilities in an AI platform, third-party dependency scanning security tools can be used to detect and remedy vulnerable open – source components. An example is Dependabot, a bot to scan the GitHub source code repository widely used to store an organization’s source code. Dependabot “creates pull requests to keep your dependencies secure and up-to-date.” GitHub’s free repository hosts source code, provides version control and access control. GitHub also provides collaboration tools to track bugs / enhancement requests and to do task management.

Another third-party product is NumPy, short for Numerical Python, which offers mathematical functionality to deal with sound waves and images. The NumPy library is open-source software written in the C programming language and compiled to increase AI computational speed when accessed.

Cloud Hardware and Software Infrastructure

The growth in cloud services has been nothing short of astounding. Notably, AWS’s debut in 2006 featured just eight services, whereas Amazon had 262 in 2019. Among other new cloud services, AI has been added by cloud vendors to meet burgeoning demands. The following list of features emphasizes the broad range of AI functionalities available in the cloud: machine learning, natural language processing to understand written and spoken text, business intelligence to make sense of AI data, purchase predictions via AI-powered forecasts, incident automation to sense problems and automatically handle them, and multi-lingual support for language translation.

Naturally, more traditional ancillary services are important for AI, such as unstructured data lake repositories to store raw data, structured relational databases to store data in an AI-usable organized fashion, scaling up or out to increase speed and handle loads, disaster recovery to ensure AI system restoration in case of floods or hurricanes, backup & archiving to prevent data loss in case of hardware or network failures, and heightened security to prevent hacks.

HOW MACHINE LEARNING AI MODELS WORK

AI Model Creation

To get insight into the skill sets required to create models, it’s useful to get a sense of the model creation process, the gradual learning done by ML software, and the challenges faced to produce a model that meets predefined success criteria.

ML software uses data to train a model, with the model constituting an AI “product” that can be reused over time via regular AI input data updates. ML software has four basic learning types: Supervised, Unsupervised, Semi-Supervised, and Reinforced. These four basic learning types are defined as:

- Supervised... involves making the algorithm learn the data while providing the correct answers using labels placed on the data. This essentially means that the classes or the values to be predicted are known and well defined for the algorithm from the very beginning.

- Unsupervised... Unlike supervised methods the algorithm doesn't have correct answers or any answers at all, it is up to the algorithms discretion to bring together similar data and understand it.
- Semi-Supervised... A hybrid with a mix of Supervised and Unsupervised learning.
- Reinforcement... in Reinforcement Learning, there are rewards given to the algorithm upon every correct prediction, thus driving the accuracy higher up.

Data science expertise is needed to determine the best statistical algorithms for use in the ML software to fit your particular data set. For instance, a long and accurate data history would suggest use of a certain statistical algorithm. Volatile data with a short history could require another algorithm. Product data with a high seasonality, such as big sales before Christmas, could require yet another algorithm.

The following algorithms are often used in AI: Naive Bayes used for sentiment analysis, spam detection, and recommendations; Decision Tree used for outcome predictions; Random Forest merges multiple decision trees to improve predictions; Logistic Regression used for binary classifications (A or B); Linear Regression used for categorizing a large data set; AdaBoost, Gaussian mixture, Recommender, and K-Means Clustering to organize data into groups like market segmentation or finding crime-prone areas.

Many of us may be familiar with the general concepts in these algorithms based on prior work in statistics, finance, research methods, epidemiology, physics, econometrics, and other fields. Consider Bayesian statistics, which you may recall from an earlier statistics course. Data set features are rarely independent of one another, but the Bayes algorithm “naively” assumes that they are independent. The naïve assumption combined with the Bayes statistical probability algorithm produces a good way to classify data, such as determining if an email is spam or not.

Plunging into model creation, there are three distinct learning stages for machine learning: Training Stage A; Validation Stage B; and Testing Stage C. Before starting the entire process, it's necessary to ensure the data is as well-organized and immaculate as feasible. Though the concept is simple, getting data wrangled into orderliness is a time-consuming and detail-oriented process to make the data free from duplicates and disconnected data. After cleansing, the data is divided up randomly into three sets to be used for each of the three training stages. The random data division is meant to discourage selection data biases.

Three relevant definitions in model creation are:

- Parameter. Model parameters are values learned automatically by the ML software from the AI input data as training progresses, although a user can manually change a parameter value during the training process. Examples are the maximum number of passes to be made during a session and the training data maximum model size in bytes.
- Hyperparameter. Values external to ML that are input beforehand by a data scientist user, so hyperparameter values are not derived from AI data and can be changed during the training process. Examples of hyperparameters are the number of clusters to be returned when using a clustering algorithm and the number of layers in a neural network.
- Variable. The particular AI data input fields chosen for consideration by the ML software, which can be modified as training progresses. Variables can be age, height, and weight.

Before starting Stage A (Training), it's important have labels added to the data to the ML software that provides clues to help it learn (unsupervised learning does not need labels). For example, the below exhibit for supervised learning shows two rows of data containing product sales data in text, potentially including a product brand name label and a product type label attached to each row of product data, per the below exhibit.

Exhibit 2. Example AI Input Data Labels for Supervised ML Training

Blog text to be analyzed by ML	Data “Helper” Labels
I chose the Craftsman 18” chain saw due to its ability to cut medium-diameter trees	Craftsman, chain saw
While I was at the store, I bought both a chain saw for \$32.50 and loppers	chain saw, lopper

For Stage A, you can use the ML software default parameter values or you can change the parameters yourself. After Stage A Pass #1 finishes, parameters are automatically changed by the ML software through its learning – or a user

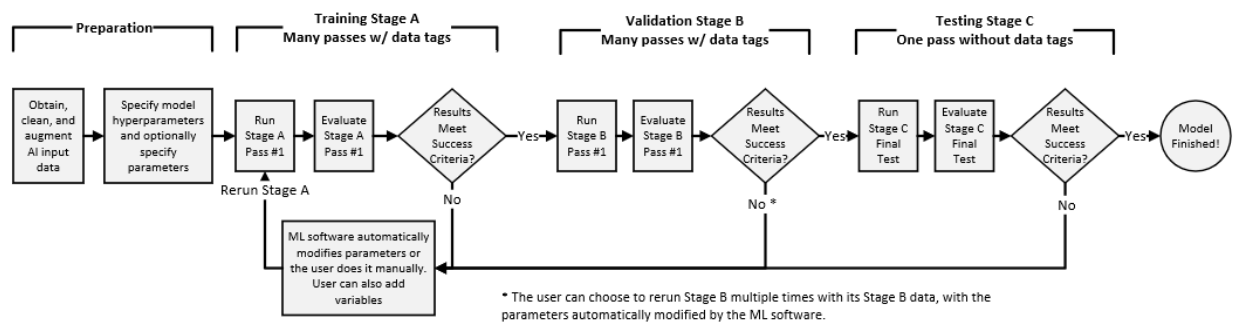
can modify them before running Stage A Pass #2. You can proceed to Stage B once the Stage A results meet the success criteria. But most likely, it won't be successful after Pass #1, so Pass #2 and additional passes will likely be needed to proceed until the ML software reaches its preset maximum pass count or no new patterns are found by the ML software. It's very possible Stage A will show the input data needing more cleansing and augmentation.

Validation Stage B Pass #1 uses a new set of data. If the Stage B Pass #1 result exceeds the success criteria, you may proceed directly to Testing Stage C. Stage B passes can continue until the ML software shows no new patterns or it reaches the maximum number of passes. Negative results require a return to Training Stage A, where additional input data variables may need to be added. The parameters are automatically modified by the ML software or by you as training progresses. Stages A and B can alternatively be run in tandem, with the results of Stage A compared to the results of Stage B until agreement is achieved.

Testing Stage C is the "final exam" against a new set of data - but this time lacking the "helper" data labels (for supervised learning only). If it passes the test, you now have a working model. If not, it's back to Stage A for the user to potentially add new variables suggested by training done thus far. As before, you can manually modify parameters or let the ML software automatically modify parameters as training progresses.

The following exhibit lays out the AI training process flow.

Exhibit 3. Process Flow of ML Model Training Stages A, B, and C



In short, machine learning is a repetitious replay of the ML software's exposure to data, with parameters automatically changed iteratively by the ML software (and/or by humans) to make the model smarter after each pass of the data. ML software does multiple passes of the data until it realizes no new patterns are being detected, causing it to stop.

AI Model Ongoing Maintenance

Constant vigilance (monitoring) is the price of AI freedom. To determine how well an AI model is doing, an obvious tack is to monitor how closely the actual performance matches the AI prediction. If the AI predictions worsen, it's time to reenter the model training process to correct the model using up-to-date data.

As mentioned earlier, input data can easily change over time - called data drift in the trade. Data drift can cause the AI model's accuracy to deteriorate, so early data drift warnings are important to stay ahead of problems. AI tools are available to track data drift and find outlier data, such as Fiddler, Neptune, and Azure ML, which can supply early warnings so data problems can be addressed by ML updates sooner rather than later.

Justifying and Explaining AI

It's one thing to have AI provide accurate predictions, but how does one assign numbers to an AI model to determine ROI? All organizations will want to know how much business value has been created over time by AI models. Many AI vendors have in-house tools to figure if AI models have provided returns that exceed the time and expense spent on AI development and implementation. These vendors have use cases to monitor the business value derived from AI models.

We suggest that investments in AI at this time should not be analyzed as compared to investments in technologies and other assets that have historical data on financial returns. Instead, AI investments should be considered in the context of the necessity to gain experience with a technology that will have a major role in the operations of many companies.

Try It!

To get started, there are many sources of free or payment-based AI training via on-line videos ranging from minutes to 12 hours using a web search of “artificial intelligence courses.” Online articles, magazines and books also offer various levels of instruction from beginners to experts. You can start your AI quest by registering for accounts with cloud vendors AWS, Azure, Google Cloud, and many others, with some vendors even offering a free AI try before you buy. Providers of courses include Udacity, edX, MonkeyLearn, OpenAI, and many universities.

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IT Certification Courseware for Experiential Learning and AOL

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ABSTRACT

Assurance of Learning (AOL) for continuous improvement is a vital part of AACSB business school programs. New standards are meant to help business schools provide students with a learning experience needed for success in today's organizations. However, learning is difficult to assess and report especially for technology intensive courses requiring constant updates before reporting cycles conclude and reflection can occur. This study introduces professional certification courseware as a means of promoting and assuring experiential learning and technology related requirements of AACSB's new 2020 curriculum standards while simultaneously keeping courses on the cutting edge. Professional certification courseware was integrated in computer Networking and Security courses at both a private and public university. Objective measurements obtained from the courseware were combined with a survey of student perceptions on experiential learning confirming that professional certification helps achieve AACSB's goals.

Keywords: Certification, courseware, learning outcomes, AOL, experiential learning

INTRODUCTION

A 2020 survey of aspiring adult learners by the social impact organization Strada Education Network found that the number of people who believed education was worth the cost had dropped 18 percent in the last year alone, while the number who believed a degree would get them a good job decreased 25 percent. Furthermore, it was found that interest in non-degree pathways had increased 18 percent, and only 1 in 3 adult learners had a positive experience last time they attended high school or college.

Employers had already been increasingly questioning graduates' job readiness and whether they learned what they needed to learn for the job (Chamorro-Premuzic and Frankiewicz, 2019). Higher education's increasing disconnect with the needs of students and employers has not gone unnoticed by academia. Experiential learning has been touted as a means of improving the quality and relevancy of education, specifically preparing students for success in careers.

The concept of experiential learning has been around since the 1970's and includes activities like cases, games, and computer simulations where hands-on activities require the learner to be active in the learning process. Experiential learning is popular with students and employers, but still underutilized by faculty due to issues with class structure, class sizes, faculty resistance, and the complexity of implementation (Wurdinger and Allison, 2017).

The demand for experiential learning can be seen in all areas of education, but is of particular concern in business education, especially where business education intersects with technology. The sudden and abrupt shift to online learning due to COVID-19 presented an unexpected challenge to business technology faculty and required "outside-the-box" thinking. Interestingly, the 2020 Strada study found that although their findings were part of an ongoing trend, part of the dramatic uptick in dissatisfaction with learning had to do with the mass push to remote learning due to COVID-19. A study by Allan and Seaman (2016) estimated that 5.8 million students had been enrolled in at least one online class. In 2020, that number changed to almost all students and classes moving online during the COVID-19 pandemic.

The problem with this move to online education is that experiential learning is more difficult to implement online and more reliant on a slew of new and emerging technologies that are constantly evolving. For technology intensive courses like Management Information Systems as well as an increasing number of business courses in other disciplines, courses must change more often to stay relevant. So, related to the problem of implementing experiential learning online is the problem of demonstrating that the curriculum was improved as exemplified by AACSB's assurance of learning (AOL) process. How can one identify the effect of a specific curriculum change during a cycle consisting of many other significant changes that were required to keep up with technology and industry?

This paper proposes IT professional certification courseware as an effective way to assure experiential learning as required by AOL. TestOut certification courseware was implemented in our classes to enhance students' learning about IT networking and gain hands on experience using the "true-to-life" simulations to reinforce learning goals of the course. Student learning was measured by examining a combination of course and courseware measures to assist in assurance of learning activities. A survey of student perceptions about active learning with the courseware was given at the end of the term in several classes over several semesters at a small private and small public 4-year university.

The rest of the paper is organized as follows. We begin the next section of this paper by reviewing the literature on experiential learning and assurance of learning, paying attention to the needs of both traditional and online course formats. Active learning, an approach to teaching experiential learning that aligns with the IT certification courseware offered by TestOut, is discussed next. Professional IT certifications are discussed and TestOut's professional certification courseware is detailed. We then describe the survey and results we obtained. This is followed by a discussion of results and recommendations based on our experiences to guide other programs interested in implementing IT certification to achieve successful AOL.

EXPERIENTIAL LEARNING

Traditional thinking about learning irrevocably combines teaching and learning and implies that teaching must happen for learning to occur (Ruben, 1999). This relies on a belief that knowledge is delivered by the professor and transferred to the student through learning activities that are passive in nature (Beckem and Watkins, 2012). Examples include reading assigned portions of a book and listening to lectures in class.

Wurdinger and Carlson (2011) defined experiential learning as education using real-world problems that allow students to apply knowledge in order to learn. In broad terms, experiential learning is learning by doing or learning from experience. In *Experiential Learning Theory (ELT)*, Kolb and Kolb (2005) define experiential learning as "the process whereby knowledge is created through the transformation of experience" (p. 194). The common thread in these definitions is that experiential learning is learning by doing.

In contrast to passive learning, experiential learning yields higher levels of comprehension, allowing the learner to translate knowledge to skill (Rosso et al., 2009). These skills are what employers seek, but employers are reluctant to provide experiential training to newly hired employees. In candid conversations the researchers had with hiring officials from organizations hiring IT graduates, hiring officials expressed an unwillingness to offer additional training because too often the newly trained employees will leave for a higher paying job with the competition after they are trained. In addition to the obvious cost of training there is the cost of mistakes made while learning, the cost in time for trainer and trainee, and the cost associated with work the trainers could have been doing had they not been training. A common question from employers has been, "Why do I want to train my competitor's workers to outperform my company?". Employers want college graduates trained and ready to be productive immediately (Mahmoud Al-Rawi et al., 2005). For this reason, employers scrutinize with a more intense interview process to ensure experiential knowledge and rely more on work experience and professional certifications to assess required skills (Knapp et al., 2017). This has shifted the burden of providing experiential training to institutes of higher learning. As a result, business faculty have increased efforts to engage in a wide range of hands-on activities including simulations, class activities, and case studies in an attempt to foster experiential learning (Carlston et. al, 2018; Reising and Dale, 2017).

ACTIVE LEARNING

Wurdinger and Carlson (2011) identified active learning as one approach to teaching experiential learning. Active learning is student-centered learning that places greater responsibility on the student to learn. One important distinction of active learning is that the approach focuses on skills acquired by the student in the classroom through the practical application of self-directed learning (Pilkington, 2018). This self-directed approach to learning is central to active learning but can be challenging for students as they are often unprepared for the autonomy required (Aslan and Reigeluth, 2015). Additional complications for the student identified by Aslan and Reigeluth (2015) include overreliance on the instructor for unnecessary guidance and being ill-prepared to assume responsibility for learning that is required by active learning. It is imperative to provide adequate structure and set student expectations to facilitate active learning and TestOut's IT Certification courseware is well-suited to this task. A critical component of

learning by doing is learning from mistakes made while undergoing multiple trial and error attempts (Wurdinger and Allison, 2017). This learning iteration of trial and error, reflection, and learning from mistakes describes AACSB's Assurance of Learning (AOL) process.

AOL

The growing acceptance of the importance of experiential learning is demonstrated by AACSB's new 2020 Curriculum standard 4.3 which requires that the "school provides a portfolio of experiential learning opportunities". AACSB is the premier accrediting body for Schools and Colleges of Business around the world. AACSB accreditation ensures that programs have the highest standards including high-quality faculty, pertinent and thought-provoking curriculum, and a commitment to constant enhancement. In order to achieve this success, AACSB requires Schools and Colleges of Business to practice a process of continuous improvement called Assurance of Learning. In this process, program-level goals for each program are stated, monitored, and evaluated to ensure students are successful in meeting learning goals. Student learning is measured to determine student success and the measures are used to plan improvement efforts. This constant manner of reflecting on student learning measures to plan improvements to the program is called "closing the loop".

Technology used in education and business is constantly changing and requires constant attention to maintain relevant, timely curricula that provides benefit not only to students but also to future employers. In programs where learning goals and student outcomes are continuously measured to determine future changes to curriculum and program goals, the never-ending changes in technology have a confounding effect on Assurance of Learning efforts.

From this situation, a need emerges for technology instruction that can be evaluated dynamically based on student learning that allows for continuous improvement and the ability to "close the loop". Professional certification courseware is an excellent solution that simultaneously provides experiential learning in both traditional and remote learning environments. It also allows for effective student learning measurement and supports Assurance of Learning for schools that currently have or are seeking AACSB accreditation.

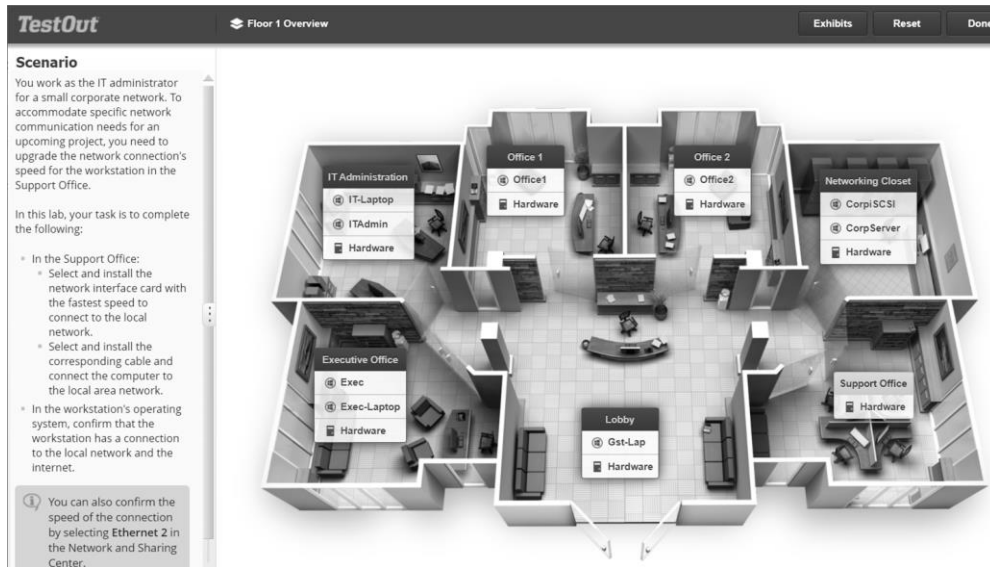
Since the new AACSB standards were created, COVID-19 forced the adoption of new technologies by many universities so they could instantly move all courses online. Distance learning combines many new and emerging technologies and was already rapidly growing in importance and acceptance before COVID-19. Also, in AACSB's 2020 Curriculum is standard 4.1 which requires that, "The curriculum content cultivates agility with current and emerging technologies". Most of the emerging technologies causing change in curriculum delivery and employment involve Internet technologies and Artificial Intelligence (AI). These include technologies incorporating aspects of 5G, Internet of Things (IoT), virtualization, simulation, gamification, and machine learning. Online learning for students and remote access for employees both incorporate and influence innovation with these technologies. Currently, professors are exploring different methods of delivering experiential learning in the online environment (Bursuc, 2020). Earlier research with the millennial generation indicated that students prefer face-to-face instruction (Fish and Snodgrass, 2015; Weldy, 2018). However, online learning tools and methods have advanced, and Generation Z's preferred learning style includes technology-driven instruction in an online environment with the instructor seen as a facilitator (Magano et al., 2020). The learning iteration of trial and error, reflection, and learning from mistakes that describe AACSB's AOL process discussed above also describes the tools used in TestOut's courseware, which makes it a good fit for AOL. In the next section we explore the use of TestOut's certification courseware as a current technology for delivering and assuring experiential learning.

TESTOUT'S IT CERTIFICATION COURSEWARE

As previously discussed, AOL involves stating, monitoring, and evaluating program-level goals. More than ever, these learning goals are experiential learning goals, making use of current and emerging technologies, and aligned with the needs of employers. Professional IT certification courseware incorporates experiential learning through a process of becoming proficient with industry-standard material specific to either a manufacturer product (i.e., programming language or hardware/software/operating system) or a professional organization like the Project Management Institute's Book of Knowledge (PMBOK). Proficiency is demonstrated by passing a certification exam. Professional certification gives students a way to prove mastery of a specific domain or body of knowledge and instructors a way to demonstrate that students have mastered material for assessment purposes.

TestOut has been providing online courseware and professional certification for students and IT professionals since 1991. Their LabSim simulation labs provide students with an opportunity to practice real-world, hands-on skills in a virtual environment. For programs that do not have the budget and resources to provide an actual lab for teaching IT skills, the experience provided by LabSim is an attractive alternative. Figure 1 and 2 show the simulated lab environment where students can choose rooms and navigate using their computer keyboard and mouse. In the same way they can choose, for example, a server, turn the server around, access the shelf where supplies are kept to select the correct component, install it, and configure it.

Figure 1: Simulated Lab Environment in TestOut

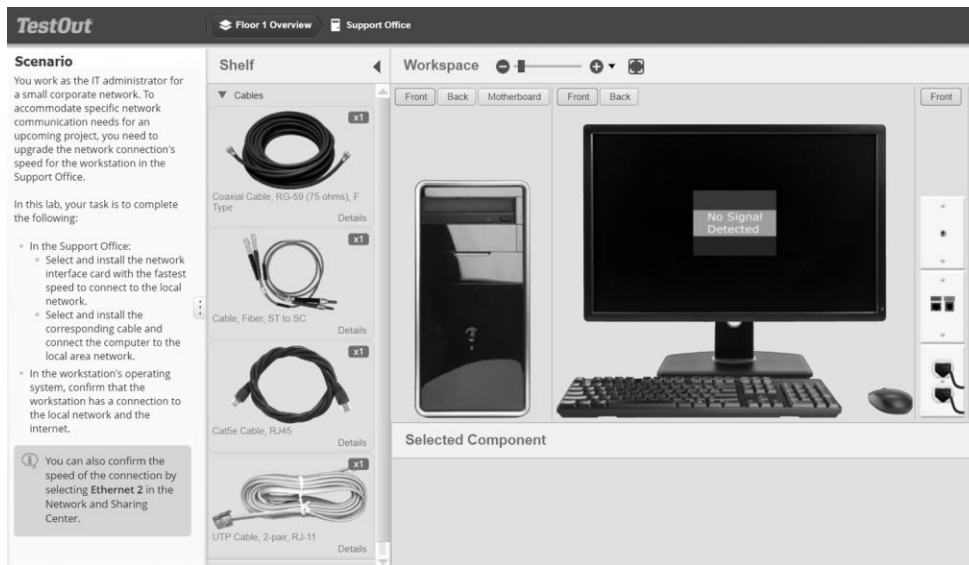


TestOut has many advantages over traditional lecture courses that use a textbook as the main educational resource to disseminate knowledge. TestOut presents information using multiple instructional methods to engage students. This accommodates multiple learning styles and ensures that content is presented in a variety of formats, something that is not possible with a traditional textbook. Such content benefits all students and provides an advantage to students who may struggle in traditional classrooms. Instruction is presented by interactive video, text lessons, simulation labs, and section quizzes. Interactive videos include explanations, demonstrations, and animations that can be viewed along with a transcript and can be sped up or down to best match the speed at which the students prefer to learn. Text lessons include fact sheets that provide summaries of facts that are important to understand and can be found at the beginning of sections and interspersed with other types of activities. Simulation labs provide students with an opportunity to interact with a virtual lab setup to practice hands-on skills with a variety of hardware, software, and operating systems and networking components. A summary of learning activities provided by TestOut Network Pro is shown in Table 1.

Table 1 – TestOut Network Pro Learning Activities

Course Component	Total
Video lessons	130
Demonstrations	78
Text Lessons	136
Simulation Labs	88
Section Quizzes	99
Exam Questions	949
Practice Certification Exam	2

Figure 2: A Screenshot From a Lab in TestOut



Additionally, TestOut provides resources for instructors that facilitate assessment including a gradebook that calculates average grades on individual activities attempted multiple times, total time spent for each student broken down by the four categories of activities (video, labs, fact sheets, quizzes) as well as time spent on each individual activity, and percentage of courseware complete. Information can also be restricted to specific date ranges as specified by the instructor. Courseware can be integrated with multiple LMS and course pacing guides are available to help with planning the semester schedule.

TestOut's Network Pro certification courseware was used in our classes as a means of providing experiential learning. The need to measure and report experiential learning as required by AOL raises the following question: Can experiential learning levels be measured by success in the course? A basic tenet of experiential learning theory is that experiential learning results in more practical, applied knowledge. Professional certification is an objective measurement of such discipline specific knowledge. It is expected that higher levels of experiential learning, as measured by active learning, would result in a higher likelihood of passing the certification exam.

H_a: Active learning is positively correlated with passing the certification exam.

SURVEY RESULTS

At the end of the course, students were asked to reflect on their perceptions about active learning using the certification courseware. An online survey for measuring these perceptions was administered to students who had completed a networking course at a small private university and a networking course at a small public university. Both courses used TestOut's Network Pro courseware as the primary learning tool.

As previously mentioned, active learning is an approach to teaching experiential learning that involves practical applications and classroom acquired skills. Three questions measuring active learning were adapted from an online survey developed and validated by three educational researchers at MIT's Teaching and Learning Laboratory (Barak et al., 2006). The three close-ended questions were all on a five-point Likert-type scale and all measured student perceptions about active learning. The internal consistency of the scale, Cronbach's Alpha, was found to be 0.91 as shown in Table 2. This compares with a Cronbach's Alpha score of 0.84 reported in the original study.

Table 2: Test of Cronbach’s alpha

reliability statistics		
<i>Cronbach’s Alpha</i>	<i>Cronbach’s Alpha based on standardized items</i>	<i>Number of items</i>
.914	.919	3

A Mann-Whitney U test was run to determine if there were differences in perceived active learning between students from the private university (n=57) and those from the public university (n=32). Distributions of the perceived active learning scores for private and public university students were not similar, as assessed by visual inspection. Perceived active learning scores for private university students (mean rank = 43.27) and public university students (mean rank = 48.08) were not statistically significantly different, $U = 1010.500$, $z = 0.847$, $p = .397$.

A Mann-Whitney U test was then run to determine if there were differences in perceived active learning between students who passed the certification exam (n=54) and those who failed (n=34). Distributions of perceived active learning scores between the two groups were not similar, as assessed by visual inspection. Perceived active learning scores for students who passed the exam (mean rank = 52.75) were significantly higher than for those who failed (mean rank=32.47), $U=509$, $z= -3.617$, $p < 0.001$. Frequencies of the responses to the five-point Likert scale consisting of all three questions by grade (pass/fail) are shown in Figure 3.

Figure 3: Frequency of Response Values by Grade (Pass/Fail)



The median of students’ responses to the survey questions grouped by certification test outcome are presented in Table 3. However, findings indicated that students who passed the certification exam were very enthusiastic about being active in class (Active Learning Q1, Median response=4, “a lot”), and agreed that active learning helped them understand networking (Active Learning Q2, Median response=4, “usually”). Students also felt that active learning via the courseware stimulated their interest (Active Learning Q3, Median response=4, “a lot”).

Findings indicated that students who did not pass the certification exam were only somewhat enthusiastic about being active in class (Active Learning Q1, Median response=3, “a moderate amount”), and somewhat agreed that active learning helped them understand networking (Active Learning Q2, Median response=3, “sometimes”). However,

students who did not pass did not feel that active learning via the courseware stimulated their interest (Active Learning Q3, Median response=2.5, where 2 = “a little” and 3 = “a moderate amount”).

Table 3: Median Response Values of 5-point Likert Questions on Active Learning

Topic: Active Learning	Questions	Median (on a 1-5 scale)	
		Fail	Pass
Q1	How effective were active learning sessions with Network certification courseware in helping you understand networking?	3.0	4.0
Q2	After active learning sessions, how often did you finish the assignment with a greater understanding of the material?	3.0	4.0
Q3	How much did the active learning sessions with Network certification courseware stimulate your interest in the material?	2.5	4.0

DISCUSSION

This paper highlights opportunities for implementing experiential learning and innovative technology as required by AACSB’s new curriculum standards through the integration of certification courseware in IT/information systems classes. Central to the effective use of certification courseware for experiential learning is the importance of having students actively engaged in experiential learning. Measuring and reporting student engagement in experiential learning via innovative courseware technologies (e.g., simulating a \$100,000 lab environment virtually online) addresses two problems.

First, it allows instructors to encourage hands-on experiential learning, especially in online and hybrid courses where implementing experiential learning has been problematic and not well researched. Furthermore, certification courseware and the technologies they use are continuously improving and therefore periodically require new scrutiny. Secondly, certification courseware helps business schools meet AACSB reporting requirements for quality instruction, experiential learning opportunities, use of innovative technologies, and continuous enhancement. Meeting, measuring, and reporting these requirements is one reason we recommend that instructors make taking the certification exam at the end of the term a course requirement. Another reason is that it helps students demonstrate skills desired by employers.

The online survey found that students who passed the certification exam absorbed more knowledge through active learning than those who did not pass. One possible explanation for this is that students who are more familiar with traditional teaching are not comfortable being active learners in class. Furthermore, prior research has demonstrated that curriculum changes are often associated with inconvenience, difficulty, and faculty and student resistance to change (Pahl, 2003). The challenge for the instructor is to encourage more active learning, which we have shown is correlated with student success. We found regular progress checks and regular feedback beneficial for student success.

CONCLUSION

The main contribution of this study was that we demonstrated the ability of modern certification courseware to deliver meaningful, experiential learning in online and hybrid IT/Management Information Systems courses. This is especially valuable for AACSB business schools where a move to online instruction may have disrupted the delivery, measurement, and reporting of traditional experiential learning.

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When IT Met IB: The Importance of Infusing Culture into IT Courses

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ABSTRACT

Toward the end of the twentieth century, technological innovations fueled globalization, reshaped business practices, and focused pedagogical and empirical attention on information (IT) and the emergent topic of global supply chain management (GSCM). While at first limited to one firm in one country, IT facilitated international expansion. IT systems soon spanned borders and not long thereafter, through incorporation in GSCM systems, spanned different firms from different host countries. However, the cultural contexts of IT systems increased in complexity. IT systems could be developed in one country by a firm for use by other firms operating across a network of different countries. In addition, IT is used differently in different countries and cultures. Therefore, IT professionals must understand international business (IB) concepts, such as cultural differences, when developing IT systems. That way, IT systems can be used to the fullest extent. The purpose of this paper is to present the argument for infusing IB concepts into IT courses and providing samples of teaching tools and assignments intended to improve cultural literacy.

Keywords: information technology, international business, global supply chain management, culture, teaching

INTRODUCTION

Information technology (IT) and global supply chain management (GSCM) are among the topics that received attention in the past few decades as they both reshaped how businesses operate. IT enables GSCM as it helps firms expand outside their home countries. IT systems facilitate communication, coordination, and information sharing among all firms in the supply chain (Sanders & Premus, 2005). To ensure the quality of information, all firms must understand how to use IT systems to their full extent. However, the cultural context has added a level of complexity. IT systems could be developed in one country for use by one or more firms operating across a network of different countries. As academic work caught up to international firms' IT use, studies revealed that culture influenced various IT concerns – from development to outcome. Notwithstanding a growing literature highlighting the significance of culture and cultural differences for understanding IT issues, a review of IT curricula evidences a lack of attention to culture, cultural literacy, and related social issues.

The pedagogical focus of this paper is on the need for the expansion of international business (IB) course materials into the business domain of IT. *“IT professionals focus on meeting the needs of users. It is therefore important that they develop the skill to determine user needs”* (Ekstrom, 2006: 355). Furthermore, increasingly users come from different cultures than systems designers and IT specialists. Therefore, it is important to introduce cultural knowledge in IT courses to learn how to design successful IT systems.

LITERATURE REVIEW

IT is defined as any technology used by organizations to acquire, process, and transmit information for more effective decision-making (Grover & Malhotra, 1997). While IT became a critical component of the success of many firms decades ago, it did not emerge as a distinct area of research and field of study until the 1990s (Chen & Watanabe, 2006). Businesses needed college graduates who could combine knowledge from computer science with more traditional business acumen. As a result, universities soon developed programs to produce graduates having a *“better understanding of organizations and the way in which IT applications can support them”* (Ekstrom, Gorka, Kamali, Lawson, Lunt, Miller & Reichgelt, 2006: 344).

Contemporaneously with the creation of the study's IT programs was the growth in academic research focusing on IT. In 1997, Kendall explained that research focusing on IT was necessary and could contribute to business. Kendall specified three reasons for evaluating IT, given its importance to firm productivity and success. Specifically, Kendall (1997) explained that IT faced challenges associated with acceptance at the firm and individual level (Venkatesh, Morris, Davis, & Davis, 2003), effective use and alignment with organization objectives (Kearns & Lederer, 2003), and implementation difficulties (Stratopoulus & Dehning, 2000).

As research efforts continued, a body of work focused on the implications of culture for IT. The research considered both national and organizational culture and IT (Leidner & Kayworth, 2006). Extensive research in IT literature shows

that such cultural differences lead to varying behaviors in adopting, developing, using, and managing IT (Leidner & Kayworth, 2006). Leidner and Kayworth (2006) identified six major themes within the IT-culture research streams. First, culture impacts IT development. For example, Dagwell, Weber, and Kling's (1983) research shows different development approaches taken by U.S. and U.K. systems designers versus their Australian and Swedish counterparts. The second research stream explores the implications of culture on IT adoption and diffusion (Leidner & Kayworth, 2006). For example, adoption of IT is less likely in cultures with higher levels of uncertainty avoidance (Png, Tan, & Wee, 2001; Thatcher, Srite, Stepina, & Liu, 2003). Similar findings of cultural differences and IT adoption have resulted from analysis using other Hofstede dimensions (Hasan & Ditsa, 1998; Hill, Loch, Straub, & El-Sheshai, 1998; Kitchell, 1995).

The third research stream considers the relationship between culture and desired outcomes. For example, Chau et al. (2002) found that people in Hong Kong use the internet primarily for social communication while people in the U.S. utilize it to seek information. The fourth research stream addresses how culture influences IT management and strategy. This stream of research links culture to topics such as IT personnel, corporate governance, ethics, and investment (Grover, Teng, & Fiedler, 1998; Leidner & Kayworth, 2006; Luftman & McLean, 2004). Examples are given in the studies about how different cultures perceive software privacy (Husted, 2000), privacy regulation (Milberg, Burke, Smith, & Kallman, 1995), and intellectual property rights (Shore, Venkatachalam, Solorzano, Burn, Hassan, & Janczewski, 2001). The last two research streams concern IT's impact on culture and the values and norms of IT groups (Leidner & Kayworth, 2006).

GSCM scholarly research lagged behind IT work in both volume and attention to culture. In GSCM, a firm integrates activities along the value chain -- with upstream suppliers and downstream distributors and customers (Mentzer et al., 2001). IT is a critical factor in a GSCM with globally dispersed value chain activities (Ueltschy, Ueltschy, & Fachinelli, 2007). IT is a key enabler for successful GSCM (Bowersox, Closs, & Drayer, 2005; Sanders, 2005). Information sharing with appropriate IT systems can alleviate problems associated with such matters as demand certainty or uncertainty (see Lee, Padmanabhan & Whang, 1997; Stalk & Hout, 1990; Suri, 1998; Thun, 2010). Similarly, the effective use of IT in GSCM can reduce supply chain costs (Swaminathan, Sadeh & Smith, 1997; Tan, 1999), reduce transaction risks (Malone, Yates, & Benjamin, 1987; Clemons & Row, 1992) and achieve competitive advantage (Li & Lin, 2006; Shin, Ishman, & Sanders, 2007). In addition, IT can eliminate duplicate activities and resourcing waste (Andraski, 1998; Stank, Keller, & Daugherty, 2001). Other potential benefits of information sharing with IT in GSCM include increased supply chain visibility, improved production planning, inventory management and distribution (Sanders & Premus, 2005), faster information flow (Cheng, 2011), and seamless integration of entities in a supply chain (Sanders & Premus, 2005) (see also Bowersox, Closs, & Stank, 1995; Edwards, Peters, & Sharman, 2001).

Ultimately, IT strategy and business strategy alignment has emerged as a critical issue in the GSCM (Thun, 2010). *"An important task of many IT professionals is to design, select, apply, and deploy computing systems and integrate them into the organization"* (Ekstrom et al., 2006: 354). Organizations increasingly span different markets. With the rapid globalization of markets, GSCMs and their IT systems traverse borders and create a myriad of cultural challenges. The implications of cultural differences in the supply chain will present increasing difficulties (Smagalla, 2004). However, cultural complexity has often been left out of GSCM discussions (Gunasekaran & Ngai, 2004).

The foregoing discussion evidences the importance of culture in IT and GSCM. Cultural differences and cultural literacy impact all aspects of IT, including those within GSCM systems. It is not surprising that businesses have noticed. Huff and Martin (1995) report that the IT industry requires graduates with social and cultural knowledge as well as technical skills. Students need to hone their cultural literacy as it pertains to IT to successfully face the global economy and global markets (Hasan & Ditsa, 1998). In June 2011, however, Hall lamented that IT curricula gave little or no effort to prepare IT students for immersion in a wide variety of business and social networks embedded in different cultural environments. Hall (2011: 63) explained: *"This means educational institutions with various IS/IT and modern business programs should develop and instill courses into their core requirements focused on cultural literacy and social adeptness in technical business environments."*

PROPOSED ASSIGNMENTS

Objective. This paper intends to address the need for further expansion of IB teaching activities to, for example, IT curricula. Secondly, the paper contains sample tools for promoting increased cultural literacy that may be incorporated in IT courses.

Method. Students today, especially IT students, are more comfortable with “lonely” internet searches. Proserpio and Gioia (2007) explained that these students are accustomed to getting most of their information from the internet. They find that search style valuable and desirable and will use it to seek answers to anything from trivial to important questions. The involvement of the internet in teaching culture will engage these students and enhance other in-class activities (see Arbaugh, 2005).

Instructions. The following are some suggested instructions for students on internet assignments concerning different cultures and cultural perspectives.

1. Go to YouTube and search using “information technology” and the name of a country other than the United States (or your home country) as the keywords. Watch the video and write a one-page paper that summarizes the contents of the video and includes your thoughts about the way the material was presented. Consider: In what ways was the video different than you expected? Was the IT information consistent with your understanding of the material? Why do you think there were differences or things you did not expect in the video? Copy and paste a link (web address) to the video into the paper.
2. Go to Google scholar (www.scholar.google.com), click on Advanced Google Scholar. Search for items that have the exact phrase “information technology” and the words “culture” and “odd” or “funny.” Then, add other words to the search to narrow and look for the most amusing story you can find that discusses difficulties or funny situations related to cultural differences and confusion, and IT. Finally, write up a one-page advertisement to share with the class to explain why your article has the funniest or most interesting story about or information regarding how culture affected information technology – possibly involving development problems, inappropriate adoption decisions, or implementation challenges.
3. Go to Google News (www.news.google.com). Conduct a search to find a news story related to cultural differences between countries or cultural issues faced by IT businesses or workers in IT fields. Find a good article on either topic and read it. Copy and paste the link for the article. Then, write up a paragraph description of the article and a paragraph giving your thoughts about the cultural issues.
4. Conduct a Google search or other internet search and find information about an IT job that might interest you in a different country. Analyze the country and its culture. Write a 3 to 5-pages paper concerning the challenges you would expect if you took this job in another country. Consider issues regarding the contract with the firm, adjustment to the country, working with people from the other countries. Explain how being in a different country would make the job different.

Pedagogical Benefits. There are multiple benefits of the assignments. First, IT students can learn the cultural difference. People across the globe view and use IT differently, and as future IT systems designers, IT students can select and apply the cultural knowledge accordingly. Second, the method fit in the students’ background. IT students are technologically savvy and are expected to have adequate internet background. Therefore, they should not find difficulties completing the assignments. Third, students can learn the multiple ways of researching on the internet. Google or other search engine websites are not the only outlet to research on a topic. Finally, this is a teaching innovation to infuse IB materials into IT courses that can increase students’ engagement.

Learning Assessment. The assignments were tested in two classes. There were a total of 50 (24 and 26 students) students in those classes. In addition, a survey was conducted at the end of the class using adapted items from a previous study (Harnowo, Calhoun& Monteiro, 2016). The results can be seen in Table 1 below. To summarize, students enjoyed the assignment, and engagement was high (4.36). In addition, the assignment demonstrated how to perform internet searches using a variety of google websites (4.08). Finally, the assignment introduced the cultural difference concepts (4.26) and how cultural differences impacted work (4.12), businesses (4.12), and the use of information technology (4.19).

Table 1: Learning Assessment

Survey Questions	Mean
(1= Strongly Disagree, 5= Strongly Agree)	
1. The cultural activity was a fun, hands-on learning experience.	4.36
2. Through participation in the cultural activity, I am able to understand different cultural perspectives.	4.26
3. I am able to identify cultural differences after participating in the cultural activity.	4.18
4. The cultural activity helped me to understand businesses and jobs in different cultures better.	4.12
5. The cultural activity showed me multiple ways of researching on the internet.	4.08
6. The cultural activity reinforced my understanding of difficulties faced by businesses due to cultural issues.	4.12
7. The cultural activity helped me understand how IT is used in different countries	4.19

CONCLUSION

This paper focuses on the need to infuse IB concepts into IT courses. IT systems are used to enable global supply chain management. To ensure the full extent of use of IT systems, IT professionals must develop the skill and knowledge to determine users' needs, and one of them is cultural knowledge. People across the world perceive and use IT differently. This paper proposes simple assignments that introduce students to cultural differences. There are multiple benefits to students as well as to the instructor.

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Adapting to New Technology in the Accounting Industry

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ABSTRACT

The accounting industry has recently seen changes related to common practices resulting from new technology entering the market. While many firms are eager to enhance their services through these new advancements, many are hesitant to adapt, anticipating challenges they will face such as increases in financial costs, the cost of retraining employees, and the potential need to hire new employees. As a result, accounting graduates will need to be knowledgeable of and practice with various accounting technologies, have a technology-based skill set, and have traditional accounting knowledge, in order to be valuable employees within firms. In preparation, educators must significantly revise their curricula to engage students with accounting technology, and thus produce proactive, skilled firm recruits. While presenting obstacles, the adaptation process results in improved efficiency, a better client experience, and the elimination of trivial accounting tasks, once relegated to the “new hires.”

Keywords: Accounting education, accounting technology, accounting firms, clients

INTRODUCTION

The accounting industry is flexible and adaptive to change. Technology advancements have replaced traditional operational methods of accounting firms. However, new technology cannot benefit accounting firms not actively working to implement these innovations (Leaders Forecast, 2018). Though many firms are eager to implement new technologies from the marketplace, some remain hesitant for a variety of reasons. Adaptation concerns can lead to lethargy. Unaddressed stagnation can hinder a firm’s growth and opportunities. Firms that overcome technical inertia will realize many benefits adaptation will produce including efficient accounting services and higher client satisfaction. The research question proposed is, “What are the benefits of overcoming challenges related to adapting new technology in the accounting industry?” In order to address the question, the researchers identified common and repeated themes linked among practitioners when adapting to new technology. The purpose of the study is to gain insight into the challenges and benefits of overcoming barriers faced by professional accounting firms. Adapting to new accounting technology is a relevant topic for both practitioners and the academy. Further field research in accounting technology adaption is needed as firms grapple with benefits and costs of advancements. In turn, educators must enhance curricula to equip students to be value-adding members of their firms.

LITERATURE REVIEW

Retiring the processes that accounting firms have used for many years in order to adapt to new technology is imperative. An industry wide attitude of urgency for adaption of new technology will bring opportunity to firms’ clients and allow for more efficient provision of services as technology facilitates more effective interactions between firms and their clients (Padar, 2014; Christauskas & Miseviciene, 2012). At the same time, education is rising to the challenge of curriculum adjustments to meet new standards for data analytics, and while this shift is in its infancy, there will be opportunity for research into the value-added impacts of new methods, new software, and experiential relationships between universities and firms. Christensen, Harrison, Hollindale, and Wood (2019) advance the study of team-based learning in accounting courses as a pedagogical approach for students early in their professional learning, with the goal of teaching principles of accounting and team skills, cultural awareness, negotiation, and problem-solving, all key attributes for accounting graduates.

Tang, Norman, and Vendirzyk (2017) introduce data analytics in the internal audit function with concern that accounting has lagged other professions in its adoption of technologies. In their survey of perceptions of big data, Tang et al. (2017) examined both for-profit and not-for-profit firms using a case approach. Their findings indicated big data analytics was a high priority for most firms and they anticipated needing employees skilled in analytics to assess and analyze risk. While accounting programs prepare students toward careers in the profession, it is widely known the practice of the profession is learned in the firm, therefore, experiential learning (internships particularly) is highly sought after by accounting students. Ali, Nazif, Nori, and Baharudin (2019) found these experiential settings not only increased students’ interest in the profession, but also enhanced the soft skills of communication, team spirit,

and time management. Maginnis and Wagaman (2019), referencing the NASBA-AICPA CPA Evolution Working Group, said, "...accounting educators may have to adopt changes more swiftly and comprehensively." The profession and education have arrived at the crossroads with the new standards, which will require educators and accounting firms create greater synergy utilizing advisory boards, communication, and quick response to assure graduating students are prepared.

For firms to overcome challenges of new technology, leadership must identify and support the change. CPAs must acquire in-depth understanding of IT skills to utilize new technology correctly to provide the greatest potential benefit for the firm (English, 2019). The adaptation of new technology in firms may result in distractions and interruptions, as the process will be slow-moving (Huttunen et. al, 2019). Another challenge is identifying the scope and breadth of technology capabilities entering the market and matching these with firms' needs. Firms should explore advances in technology to discern which technology is appropriate and useful to the specific needs of the firm. Prior to adapting to new technology, firms should be prudent in discerning which technology is appropriate and useful to the specific needs of the firm. Among the capabilities of the technology solutions are accessibility to data at any time with cloud computing and decision-making tools. With more efficient services in place, as a result of these new technologies, firms should be able to lower their expenses (DSJCPA Accounting, Tax & Advisory Services, n.d.). Blockchain is an example of a tool that can produce benefits for various accounting sectors such as auditing (Drew, 2017). Kepczyk (2018) suggests that new tools such as blockchain, artificial intelligence (AI), and drones (among other technologies) will change the current processes of accounting firms. If firms do not conduct proper research and have knowledge on the various technologies available, firms may invest heavily in ill-suited products without having the ability of reaping any benefits as the technology may not accommodate the needs of the firm. (English, 2019). Additionally, firms fostering the acquisition of new skill sets of CPAs and practitioners elevate the capabilities of the collective firm (Pitter, 2018).

Hiring employees already quipped with appropriate technical skill sets may be challenging. Recent graduates having a variety of both accounting and sough-after IT skills will have an advantage in the job market and may command higher entry salaries. Educators must work to implement changes into curricula to prepare graduates with needed skills. For those already in the workforce, firms will benefit by training the current employees to be equipped with advanced technology (McDonald, 2019). Another benefit is the elimination of traditional accounting tasks leaving CPAs with more time to focus on tasks requiring professional understanding and knowledge (Cieslak, Mason, & Vetter, 2019). Although some firms may find it unnecessary to adapt to new technology at this time, delaying could yield harmful long-term effects as competition arises, leading to a loss of relevance in the industry (Leaders Forecast, 2018).

Despite the challenges firms face, the benefits of adapting to new technology in the accounting industry outweigh the challenges. The benefits of adapting to new technology include the elimination of traditional accounting tasks, more efficient accounting services, and a better client experience. Once firms adapt to the new technology, their businesses will strengthen (Leaders Forecast, 2018).

METHODOLOGY

The research question proposed is, "What are the benefits of overcoming challenges related to adapting new technology in the accounting industry?" The rationale for exploring this research was to gain a thorough understanding of the viewpoints of professionals in the industry regarding the adaptation of new technology in accounting. Both the challenges faced in the process of adaptation along with the benefits of overcoming the challenges were examined to gain a better understanding of the adaptation and implementation process of new technology in accounting firms.

The methodology employed in this research is an archival exploration of academic and professional literature, exploring common and repeated themes related to adapting new technology within the accounting industry. The literature explored was a coalescence of relevant articles based on first-hand interviews with professional and other academic and practical information regarding technology in the accounting industry. Understanding practitioners' perspectives through professional literature provides an opportunity to examine current professionals' views, analyze themes, and based on the data, provide recommendations for adapting to new technology, and reveal skills needed by new graduates based on the data. As the focus of this research is the adaptation of technology in the accounting industry, the literature review examined recent advances, ranging from the years 2012 to 2020, and targeting the years 2017 to 2020 where more relevant, timely data to support the research topic.

This process of data collection was appropriate for the research topic, as this approach allowed for a deeper understanding of the various aspects of the process of adapting to new technology in the accounting industry from

professionals in the industry. Accounting and technology professionals' views on current adaptation and their predictions of challenges and benefits in implementing technological tools in firms were analyzed. The analysis of the data produces insights addressing the research question.

RESULTS AND FINDINGS

There are numerous challenges firms will face as they acquire and adapt to new technology. Many of these challenges will affect individual employees of the firm as well as the firm as whole (Bhimani, 2018). From the data analyzed, two common barriers that emerged, regarding the process of adapting to new technology in the accounting industry, were high financial costs and employees. With these challenges can come benefits once the barriers have been overcome. Once the barriers are overcome, the benefits may include an elimination of traditional accounting tasks, higher levels of efficiency within the firm, and a better client experience (Drew & Tysica, 2020; Tucker, 2020; Padar, 2014).

Challenges

Financial costs

One of the most considerable challenges for many accounting firms in implementation of new technology is cost. Accounting firms may consider putting off new technology as they may think the investment in new tools will be too costly. Although few firms are responding to new technology entering the market, many firms are still behind and have not been able to jump on the trend as a result of cost constraints (Cieslak & Vetter, 2019). However, in some instances, rapid-adapting firms not deterred by cost also face problems as they have not researched tools before investing in them. As a result, they must now use more financial resources to reinvest in tools that will provide a greater benefit based on the specific needs of their firm. Many firms have already purchased new tools without having a thorough understanding of the correct use and potential of the technology and are now having to deal with the negative effects of their purchase (English, 2019). Lack of knowledge can result in long term challenges for firms as they have invested deeply into technology and are not reaping full benefits from yet. Firms that have overspent on new technology without planning for capabilities and application are befuddled with higher expenses and lower profits. Companies, having purchased new tools without a thorough understanding of their capabilities, are faced with negative outcomes of their investments (English, 2019).

Firms must understand the value in new technology to appropriately select products and adapt to the new technology entering the market. If firms do not begin to shift expeditiously, or even in the next few years, they will begin to lose their relevance in the industry. Over the next few years, most firms will have started to shift if not fully shifted from traditional services to more advanced and efficient services in order to provide higher value to their clients. A core competency of many accounting firms is strategic decision-making based on their clients' needs, yielding high quality and service value. For example, many firms have begun using data analytics and actively seek recent graduates who have technical skills sets beyond those traditionally held by CPAs. As all accounting firms are in the service business, firms should take initiative to produce the most value services possible to provide superior performance for their clients. The changes brought about with the new technological tools could allow new competitors to leapfrog the more staid, traditional, and non-adapting firms (Leaders Forecast, 2018). Although the challenges may seem difficult to most firms to overcome, research indicates that there are several benefits to overcoming the challenges related to adapting new technology in the accounting industry.

Employees

Another main challenge facing firms, as a result of the adaption of new technology, is the employees themselves. This challenge is in relation to employee training, retraining, and the idea of continuous learning as a result of new technology entering the firms. In many cases, firms experience difficulty in hiring professionals who are technologically equipped with the appropriate skill set; therefore, firms may need to train such employees to effectively use the technology. Training may be done internally (within the firm) or through external training programs (McDonald, 2019). The challenge of retraining employees in order for them to have a sufficient understanding of the use of the tools is a key barrier that must be overcome for the adaption of new technology to be effective (Padar, 2014). As a result of this challenge, changes are forthcoming to the CPA exam to ensure an appropriate level of preparedness among CPAs entering the profession. The accounting profession is revising training requirements through programs such as the CPA Evolution initiative started by the AICPA and NASBA, with a goal to bring changes to the CPA exam to better fit the evolving technological advancements and other changes within the industry. The purpose for this initiative is based on the belief that it is imperative that students have a high level of competency in the technology sector as that is what will likely be required from the firms in the coming years. Although one of the main reasons for starting the CPA Evolution initiative was due to the increasing need for IT skills within CPAs, it has

been noted that it is crucial for traditional accounting skills to not be overshadowed as there have been several additions to accounting and auditing standards that recent graduates will need to be familiar with as well (Yeaton, 2020). Many firms have seen an increase in the number of non-financial professionals that have been hired, which is more than the number of CPAs that have been hired since 2011, illustrating the need for technology-based professionals in the industry (Henry, 2020). This reiterates the need for colleges and universities to be certain that their graduates are equipped with the needed knowledge in both traditional accounting topics as well as IT topics to be successful in their fields of work as technology is becoming more prevalent in the accounting industry.

Organizational change

Although change can be difficult, having a well-rounded approach to the implementation of new technology in the accounting industry can benefit firms during their adaptation process. According to Kurt Lewin's *Organizational Change Model*, people are the agents of planned change. People's driving forces motivate them to bring about change. However, others' restraining forces keep them from yielding to the change. By using Kurt Lewin's model, firms may find ease in the adaption process (Calder, 2013).

Lewin's *Organizational Change Model* involves three steps—unfreezing, changing, and refreezing (Kinicki, 2008). During phase one, unfreezing, as people's motivating forces and drive become stronger than their restraining forces, preparations for change must occur. In this step, firms must begin by making plans related to their goals for change. Although firms may find traditional partners, and other employees, hesitant and resistant to the change, they must find a way to overcome this in order to continue along with the adaptation process (Calder, 2013). In order to help firms combat resistance from employees, tactics such as communication, training, employee involvement, and negotiation are recommended by Lewin. Firms' communication about the status of the change and about the effects of the change to their employees and clients should be continuous and clear. During the unfreezing phase of organizational change, a lack of transparency about the change is often more bothersome to people than the change itself. Employees will require training on how to effectively facilitate and implement the change. Allowing employees to share their ideas makes them feel included in the change. Negotiation is a tactic to reduce resistance. Partners and other employees of the firm will want to know their concerns are heard; compromising by giving those resistant to the change something they want in order to persuade them to support the change is often helpful. In phase two of the model, the change process, employees will be exposed to new norms, specifically with new technology and the procedures and policies regarding the new tools within the firm. During the change process, monitoring and rewarding performance, reinforcing goals, highlighting and celebrating accomplishments, and mitigating challenges or failures quickly, will help to encourage persistence. Once the change has been made, phase three, refreezing, must occur in order to keep new norms in place. The most beneficial way to keep change reinforced in the firm is through feedback and organizational rewards for implementing and demonstrating the change. In terms of feedback, there should be open communication with all members of the firm on their use of the new tools and what they believe has made their duties easier, more complicated, or harder (now that the changes have been made) in order for leadership to accurately assess and evaluate the implemented changes and stay updated on the effectiveness of the tools within the firm (Calder, 2013).

Benefits

Elimination of traditional accounting tasks

One key benefit to the adaptation of new technology is the ability for firms to focus more on high level tasks as technology allows for more automation of services. As processes become more automated in the firms, CPAs will be able to focus on higher level tasks from advising to building better relationships with clients (Najjar, n.d.). For example, with the addition of tools such as artificial intelligence, traditional tasks that would typically take hours to complete can be done within minutes, leaving time for CPAs to focus on deciphering problems (Cieslak, Mason, & Vetter, 2019). This advancement also allows CPAs to focus intently on decision-making using data entered and processed by the machines (Deakin University, n.d.). Trivial, traditional accounting tasks, while important, take up resources that could be used on higher level tasks, such as decision-making and advising, illustrating one of the key benefits of adapting new technology in the accounting industry (Tucker, 2020). When these tasks are fulfilled by machines, there can be value created within the firm as CPAs will be able to put their knowledge towards more meaningful tasks (Drew & Tysica, 2020).

Efficiency is key

Along with increasing opportunities for CPAs to focus on higher level and value-producing tasks, implementing new tools can also create more efficient services within the firm. The use of more efficient services allows for tasks to be done faster and with more accuracy. Without technology, human error is inevitable. When entering data, simple

mistakes such as transposing numbers can take up time and resources, making the switch to new technology important in error reduction. If errors can be reduced, more efficient services can be conducted. As a result, CPAs will instead be able to focus on analyzing accurate outputs instead of focusing on mistakes related to erroneous inputs (Tucker, 2020). Technologies such as blockchain and artificial intelligence will encourage more efficient tax and audit services in the firm. For example, blockchain can help audits run more effectively by helping with all aspects of the audit such as counting of inventory, confirmation of values, and analyzing data from the audit (Smith, 2018). The new technological tools can help with tasks such as compliance controls as well (McDonald, 2019).

A better client experience

Another key benefit of adapting to new technology is a better client experience. Communication has historically been difficult, but implementing new tools allows firms to increase their communication with local clients, as well as new and potential clients around the world, as communication has formally been a difficult task for firms. Incorporating new technology will not only create more efficient processes within the firm but will also allow firms to create a better experience for their clients (Padar, 2014). One of the main reasons why technology is constantly being developed and then redesigned is to find new ways to bring opportunities and benefits to consumers. Adapting to new technological tools will allow firms to grow their client base and create more connections, eventually causing an increase in demand (Bhimani, 2018). Technology can produce effective interactions between the firm and its clients as the client base of the firm can be accessed by more individuals in the firm, on a larger scale (Christauskas & Miseviciene, 2012). This shift will allow firms to become more interconnected with not only clients but also with CPAs around the world (Deakin University, n.d.). This shift will create a better experience for clients and provide them with more value (Najjar, n.d.). Another way firms will be able to create a better experience for their clients is through the ability of having access to up-to-date information anywhere at any time. Communication with clients can now be more refined, with advanced tools such as cloud computing. (Padar, 2014). Having the ability to have real time data anywhere can also benefit the firm internally, as having real time information can aid CPAs in decision-making processes (Tucker, 2020).

CONCLUSION

Although some firms may be eager to implement new technology, many firms are hesitant to do so. These barriers are illustrated by the two common themes found within the research by analyzing and gaining an understanding of the viewpoints of professionals through an archival exploration of academic and professional literature which are financial costs and employees. These challenges, resolved, can lead to many benefits, including an increase in efficiency within the firm, a better client experience, and the elimination of trivial accounting tasks. If firms are willing to accept the shift from traditional accounting to a new technology-based system, efficiency can be created within the firms. Although challenges such as high financial costs and retraining employees can cause firms to resist adaptation, adaptation is imperative (Bhimani, 2018). There are numerous benefits that can result from this shift from more efficient services, to better experiences for clients, to adding more value to firms, allowing them to grow in many advantageous ways (Smith, 2018). A key point that is vital for firms to understand is the importance of the evolution of change. If firms do not begin the shift in a timely manner, they will begin to become irrelevant and fall behind in the industry. Most firms will have shifted (at least partially) from traditional services to more advanced and efficient services within the next few years. Although the challenges may seem daunting from a short-term perspective, there are a many long-term benefits for firms if they embrace new technology in the accounting industry (Leaders Forecast, 2018).

The research discussed is relevant to the accounting industry as many of the traditional accounting methods currently used by firms are becoming outdated. Firms should be providing the best service to their clients and should be working at the highest level of efficiency. Although the research points to the various concerns and challenges firms may face during the implementation process, the importance of looking past the challenges and realizing the long-term benefits cannot be overstated. By adapting to the new technology entering the accounting industry, firms will be able to provide efficient services to their clients (Leaders Forecast, 2018). With this in mind, it is essential for educators to realize the need to modify curricula to include information technology topics. Recent graduates need to be well rounded by having knowledge in both accounting and IT as they will be expected to have some degree of understanding on these topics as they enter the industry. It is essential for accounting students to learn new technologies during their preparation to enter the field. Therefore, accounting programs must adapt quickly to the needs of firms. This will require more symbiotic relationships among all stakeholders, from students to the firms' customers.

Future research

For future research, a behavioral methodology could be employed to corroborate the research findings. The approach would be to conduct first-hand interviews to gain insight into the challenges of adapting to new technology in the accounting industry from a first-hand perspective. This additional research would allow for a more in-depth exploration of the concerns of professionals as they begin the process of implementing new technology into their firms and the benefits of this undertaking. Additionally, analyzing student perceptions of data analytics in the classroom versus in the firm will help both firms and educational institutions assure learning of new technologies. Although most firms are hesitant to make drastic changes regarding the adaptation of new technology entering the market, having a detailed plan in place can aid firms in implementing the new technology with ease. For instance, the first step firms can take is to set aside time to attend conferences discussing new technology that is being introduced into the accounting industry. This learning opportunity will allow firms to gain more insight into the various tools available, which tools will be most effective, and how implementing this technology can benefit firms. In addition, each time a firm gets a technology upgrade, all team members, from partners to interns, should be trained on the correct use of the tool in order familiarize everyone with the new technology. Having a detailed plan in place may allow firms to more easily adapt to new technology entering the accounting industry.

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Growing Agriculture without a Tractor: Developing an Agribusiness and Food Innovation Program in a College of Business

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ABSTRACT

This article examines the process of establishing an agribusiness and food innovation program within an AACSB college of business at a comprehensive, midwestern state university. Both curriculum development and student engagement activities are presented. The impetus for starting the program was the decline in rural population coupled with the need for food of the growing world population. The limited availability of traditional agriculture and food majors has created challenges for human resource recruiters needing to hire more people for the agriculture and food supply chain. Instead of only looking towards agriculture majors, recruiters should look towards the large number of business majors since agriculture and food companies require similar principles and practices taught in business schools. Thus, this article describes an example of starting an agribusiness program in a traditional college of business without a large investment in faculty or resources.

Keywords: agribusiness, business, agriculture, food, major, program development

INTRODUCTION

The demand for food keeps increasing as the world's population grows. By 2050 the world is expected to reach as many as 9.9 billion people, which is an increase of more than 25% from the current population (Population Reference Bureau, 2021). The increase of people is putting an even greater importance on the agriculture and supply chain. Advances in technology and science have increased production of available food; yet, there are a number of aspects within the farm to table supply chain that will continue to be an issue of concern. One of the concerns is the ability to recruit and maintain a strong workforce in professional agriculture fields (National Academies of Sciences, Engineering, and Medicine, 2021). The need for people to make it all happen is and will be imperative. Higher education, especially in business, has an opportunity to assist in filling the agribusiness employment gap.

This article examines the process of starting an agriculture and food program in a college of business (COB) to address the need of developing students for careers in the agribusiness and food industry. However, the university is not a Land Grant Institution, nor does it have a school or college of agriculture; hence, the title's paradigm of growing (starting) an agriculture-related program without traditional agriculture resources. It should also be noted the program refers to both agribusiness and food. While doing due diligence on the establishment of the program, the faculty at the school found students understood and positively resonated more with the word food than agriculture or agribusiness. Thus, food was included in the program name. Similarly, the word innovation was also included as it implies knowledge, creation, and cutting-edge. Agriculture is depicted as farm, dirty, and hard work which turns students away even before looking into the career opportunities in the industry.

LITERATURE REVIEW

This brief literature review explores the contextual significance for development of agribusiness and food programing in a college of business. The agriculture education landscape and workforce needs are examined before presenting the process of starting the program.

Undergraduate Education in Agriculture and Business

Business and agriculture are interwoven at many levels from marketing to finance to supply chain. As early as the mid-1930s, the Land Grant system realized that agriculture education needed to broaden its input to include business (Wallace, 1988). Wallace also noted it was not until 1957 that Harvard recognized the importance of the interconnectedness and first coined the term "agribusiness." Agribusiness education has mostly resided in the agriculture domain at land grant institutions; although agribusiness education is becoming more common at other non-land grant schools.

The USDA and Purdue University have examined agriculture employment opportunities every five years since 1980 (Fernandez et al., 2020). The latest report for 2020-2025 indicates that each year there will be an average of 59,400 open positions in food, agriculture, renewable natural resources and the environment (FARNE) for graduating bachelor-degree students. However, new FANRE college graduates will fill only 61% of the openings.

The good news for business schools is 42% of open positions in FANRE will be in business and management (Fernandez et al., 2020). Overall, growth of all positions is predicted to increase each year. FANRE recruiters should recognize the need for students with business knowledge and skills; thus, tapping into business majors outside of traditional agribusiness programs and schools of agriculture.

Recruiting business majors for agriculture careers is not a completely new concept, although higher education has yet to embrace agriculture education in business schools. Nearly 30 years ago, Burckel and Watters (1992) encouraged business majors to consider a career in agribusiness management. Similar to today's society, the authors also noted the change in the way farmers conduct business has created a market for trained and experienced agribusiness managers. Colleges and universities must do more to attract more students into the agribusiness field.

Agriculture and Food Workforce

There were about 2.6 million people who worked directly in on-farm positions in 2019, which was only 1.3% of the U.S. population, (Lepley, 2019; USDA Economic Research Service [ERS], 2021). Compare that to 1840 when farm jobs made up 70% of the workforce. Urbanization has definitely changed the workforce landscape; however, the change may not be what it seems. The ERS also indicated that agriculture and food industries accounted for almost 11% of U.S. employment with 22.2 million full and part-time jobs (2021). Yet, the problem still exists as a large number of employment opportunities in agriculture and food are not being filled. For example, Bowyer (2021) found that the talent shortage was the second largest issue of concern for agribusiness wanting to grow; while a similar finding by AgriGrowth (Olson, 2021) found the agriculture employee shortage was the number one issue overall.

The shortage of employees in the industry can be partially attributed to a decline in rural population. People have less of a connection to agriculture as they move to urban settings, which can translate into less of an affinity for careers in agriculture. Other competing factors like attractive and lucrative careers in other industries are also making an impact. Approximately 82% of people in the United States live in an urban setting (Population Reference Bureau, 2021). Even though there is the movement towards greater urbanization, people still need food, fuel, fiber and other aspects within the agriculture supply chain.

The review briefly highlighted a few historical and big-picture reasons why more institutions should look at starting an agribusiness program. There is much more available research in these two areas to delve into; however, the focus of this article is on the of the program development. The following section explains more specific reasons one COB started its program and then describes the process, milestones, and outcomes of the curriculum development and related activities.

AGRIBUSINESS AND FOOD PROGRAM DESIGN

Why Start the Agribusiness Program?

The institution is a mid-size, comprehensive state university in the Midwest which is in the heart of agriculture. However, the university does not have significant agriculture programming other than a few courses and related majors such as food science, plant science, and environmental science. The COB did not have any courses related to agriculture or food prior to the start of the program; although, a number of business graduates have taken jobs with agriculture and food organizations and some went on to become prominent agriculture industry leaders. Some of those alumni became members of the COB advisory council; subsequently it led to the recommendation to explore the feasibility of establishing an agribusiness program. The resulting industry analysis showed there was a need, while the academic program analysis showed many of the courses needed to develop the curriculum were already in place. The business concepts and skills needed in the agriculture industry are structurally the same as those already being taught.

It also should be noted that a year before the COB leapt into agribusiness, the institution as a whole took a major step into the agriculture realm by applying to become a certified Non-Land-Grant College of Agriculture. The application was successful and it opened the door to more opportunities for federal research funding for all departments.

Innovation and Entrepreneurship

The COB had recently gained momentum around innovation and entrepreneurship and experienced success in starting a program that worked across majors. Thus, a model for starting a new interdisciplinary program had been recently developed and could be followed. In addition, there are many overlaps with entrepreneurship and agriculture and food. It has been said farmers were the first entrepreneurs. A number of agriculture entrepreneurship programs have been developed in the past decade, although most reside in agriculture colleges (Conner, et al., 2014; McElwee, 2006; Mehlhorn, et al., 2015).

Initial Steps

Once a decision was made to enter the agribusiness realm, the first step was to appoint a faculty member to lead the initiative. In this instance, it worked out well that a new faculty member was hired in a line from a retiree within the management department. The new hire taught regular management courses but was given one course release and extra duty days to start the agribusiness initiative. Donations from two alumni helped fund the duty days and initial miscellaneous expenses.

The first semester of the initiative focused on developing a network of professionals from the regional agriculture and food communities –in both education and business. The new faculty member engaged interested faculty from across campus as well as with local community colleges and secondary schools. In addition, the faculty member attended a higher education agriculture conference to learn best practices. Alumni who worked in the industry were identified, as well as local companies who wanted to help support the program development both financially and structurally.

A little luck did play a factor in the very beginning. The new faculty member was teaching a professional sales course the first semester and decided to implement an activity of selling a hog that was donated by an alum who was the CEO of a regional agriculture company. The \$400 hog turned into more than \$4,000 and drew media coverage. The lucky part was just by chance there were a number of students in the course with agriculture backgrounds that convinced the class that the profits should go towards starting an agribusiness club, which gained even more publicity. The start of the club was an important step as students began to learn of peers with similar interests in ag and food careers. The professor and members of the class also partnered with the athletic department to host an agriculture-themed event at a home football game.

On the curriculum side, developing an agribusiness course was a priority in order to gauge interest of students. To start, a special topics course was designed and offered the second semester. The agriculture-themed course filled fast giving the department a glimpse into the potentials of offering further curriculum.

Curriculum Development

The AgriBusiness and Food Innovation program developed over a course of four years. The process was initiated by identifying a faculty member with interest in agribusiness, then the curriculum design began with a single course, then a minor, then a major.

AgriBusiness in the Modern Economy Course

The first course was a special topics survey course titled “AgriBusiness in the Modern Economy.” The course was designed and taught by the new faculty member in the management department. Each week a different aspect of the agriculture and food industry was explored. In addition, an industry professional attended or a company tour was part of each lesson. A key takeaway from having a number of companies engaged was increasing the awareness that the COB was entering the agribusiness education realm. The companies became supportive both financially and through employing graduates and interns. Plus, the industry professionals brought knowledge and depth of multiple careers into the course that a single professor could not do at that level.

After offering the course for two spring semesters with full enrollment, the management department decided to submit the course into the university curriculum design process to make it a permanent offering as an elective within the management major. Once established, the course was included in other related agribusiness and food programs across campus which strengthened the enrollment numbers to the point of offering the course every semester.

Minor in AgriBusiness & Food Innovation

As mentioned earlier, the COB entrepreneurship program was going strong when the first agribusiness course and related activities started taking place. The faculty noticed that a number of student start-ups were related to agriculture or food. In addition, attendance was strong at events related to both entrepreneurship and agribusiness. The events

also included regional community members and alumni who were eager to be involved with the new initiatives. As a result, the decision was made to design a minor with a focus on innovation within the agribusiness and food realm.

The 17-credit minor used three elective business courses that were already in the program along with the recently created AgriBusiness in the Modern Economy course. The minor was rounded out with a 4-credit internship. The internship was required because of the skills and knowledge gained while working, especially the agriculture and food intricacies not taught in the classroom. It was the first required internship in any program within the COB, which shows the level of importance by the faculty.

The courses in the AgriBusiness and Food Innovation Minor are:

- AgriBusiness in the Modern Economy (300 level, 3 credits)
- Creativity and Innovation (300 level, 3 credits)
- Entrepreneurship (400 level, 3 credits)
- Technology and Intellectual Property Law (400 level, 3 credits)
- AgriBusiness Internship (400 level, 4 credits)

The AgriBusiness and Food Innovation minor was developed to offer students an option to add a focus to their major and prepare them with skills to start their own business. The use of current courses allowed for faster implementation while keeping salary costs down as only one new course was created. The required internship did not require much of an investment either. The minor is open to other majors outside of the COB which helps increase credit hours to the department.

Major in AgriBusiness & Food Innovation

The COB decided to move forward with a major one year after the start of the minor because of program growth and momentum. The ensuing due process showed a need for an agribusiness major. Many regional high school and community college students were leaving the state to attend schools with agribusiness programs. In addition, there were a number of students already at the institution who chose a traditional business major, yet still had agriculture interests and industry aspirations. Research by the faculty also showed most students at the university did not realize the different career paths within agriculture, nor the number of available opportunities that are open each year. The fact of the growing world's need for increased food production, the subsequent need for innovations, and the need for people to work in the supply chain propelled the establishment of the new major – not to mention the continuous encouragement from industry.

The major curriculum was designed by a committee made up of one faculty member from each of the different COB departments. The five-person committee, led by the management faculty member hired three years prior, worked for three months to design the overall major, four new courses, and a four-year student academic plan. The design of the agribusiness major (Figure 1) using “major restrictive electives” from various majors was based on a similar design of the COB's international business major. Students select three courses (nine credits) of major restrictive electives from a single desired area of interest such as marketing or finance. Those previously-offered courses were identified by the faculty as pertinent to the agribusiness major. Thus, this model gives the students an area of emphasis within the AgriBusiness and Food Innovation major.

The agribusiness initiative was housed in the management department at the start because that was the home of the director. However, once the major was approved, the program moved out of management and the director reports to the dean's office with no department chair because the faculty are from different majors. A new course designator was also developed for the major – AGBZ. Similar to the minor, the major does not require a large investment in faculty. The new agriculture courses are spread out across different departments while the other regular core courses are already being taught.

Non-Curricular Initiatives

The faculty member assigned to lead the agribusiness initiative was named as the director starting the second year which allowed for more activities to be developed. Figure 2 displays some of the more successful activities. The activities were an integral part of starting the program as they increased awareness of career opportunities for the students as well as show the regional community that the university was developing a quality agribusiness program to help address workforce needs.

Figure 1: AgriBusiness and Food Innovation Major

<ul style="list-style-type: none"> • Overall Graduation Requirement – 120 credits • Required General Education – 44 credits • Unrestricted Electives – 6 credits • Prerequisites to College of Business – 8 credits • College of Business Common Core – 34 credits (300 and 400 level) • Required of all AgriBusiness and Food Innovation Majors – 13 credits <ul style="list-style-type: none"> ○ AgriBusiness in the Modern Economy (300 level, 3 credits) ○ AgriBusiness Supply Chain (300 level, 3 credits) ○ AgriBusiness Finance (300 level, 3 credits) ○ AgriBusiness Internship (400 level, 4 credits) • Major Restrictive Electives – Choose 9 credits from a designated course list in one of the following areas: <ul style="list-style-type: none"> ○ Accounting, Entrepreneurship, Finance, International Business, Marketing, Supply Chain • Major Unrestrictive Electives – Choose 6-8 credits <ul style="list-style-type: none"> ○ AgriBusiness and Food Study Abroad Tour (400 level, 3 credits) ○ Choose from a list of 30-plus courses related to agriculture and food in other disciplines across campus
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Figure 2: Activities and engagement within the AgriBusiness and Food Innovation program

<ul style="list-style-type: none"> • A donation from an alumnus helped establish a year-long program called the Ag Innovators Leadership Development Program. Fifteen students selected from various majors with about half from the COB. Each month the students travel to a company, an Ag conference or participate in leadership development activities. • Added Ag, Food and Beverage category to COB signature entrepreneurial business plan competition • Created agribusiness and food study abroad course (to Spain but on hold because of COVID) • Established a regional newspaper column focusing on talent and careers in agriculture and food • China Town Hall with agriculture focus (each fall semester) • Applied and received a state grant for educating high school teachers on careers in agriculture • Applied and received USDA grant with agriculture education focus, especially with BIPOC students • Annual Food Entrepreneurship Series executive lecture • Partnered with local chamber to conduct a state-wide survey and focus groups to analyze the state of agriculture • Pitched program-related agriculture stories and received media hits in newspapers, television, and radio
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The four years from faculty hire to major approval went by fast, but a lot was accomplished. Table 1 shows the yearly progression with key activities related to the development of the AgriBusiness and Food Innovation program.

Table 1: Four-year program development key actions

<p>Year 1 - Fall semester</p> <ul style="list-style-type: none"> • Hired new faculty member with ag interest • Join and network with Ag/food organizations 	<p>Year 2 - Fall semester</p> <ul style="list-style-type: none"> • Faculty member named Director of Agribusiness • Started and submitted proposed minor format 	<p>Year 3 - Fall semester</p> <ul style="list-style-type: none"> • Started Ag Innovators Leadership program • Created study abroad course in Ag & Food 	<p>Year 4 - Fall semester</p> <ul style="list-style-type: none"> • Started and submitted proposed major format • State of Ag research
<p>Year 1 - Spring semester</p> <ul style="list-style-type: none"> • First agribusiness course • Received grant for teacher development • Started student Ag club 	<p>Year 2 - Spring semester</p> <ul style="list-style-type: none"> • Minor approved • First year of Ag & Food category in business plan competition 	<p>Year 3 - Spring semester</p> <ul style="list-style-type: none"> • COVID hit, eliminating many Ag activities • Research on farmer gigs, ag careers, ag language 	<p>Year 4 - Spring semester</p> <ul style="list-style-type: none"> • Submitted and received large USDA grant • Major approved by HLC to start in following fall

Research

The curriculum development and associated activities provided opportunities to conduct research in the agribusiness realm. As a result of having to examine workforce needs to start the program, the faculty established research threads around workforce development and career motivations of students. In addition, the strong entrepreneurship program within the COB created opportunities to examine ag entrepreneurs.

DISCUSSION

The agriculture and food industries need talent to run successful companies and grow. However, the shortage of available, interested employees is imposing a serious concern as the world's demand for food increases. One way to address the agriculture and food industry employee gap is to look at non-traditional populations such as business students.

Traditionally, agribusiness education has resided within colleges of agriculture. This article presented a framework of agribusiness curriculum and activities developed by an AACSB college of business. Much of the same knowledge and skillsets learned in business schools can be applied to agriculture and food companies. The challenge is to get students to see it and then act upon it.

The curriculum model in this article can be easily implemented at other business schools. A major advantage of this model is there is not a large financial investment. Very few new faculty need to be hired because a majority of the courses were already being offered. Although, there needs to be some level of investment in at least one faculty member to lead the initiative. In this case, the director received one course release and extra duty days which went a long way in developing the program and gaining momentum. The associated activities are important to engage students as well as bringing awareness to the agribusiness community. Another benefit of the engagement with the agribusiness industry is that it creates opportunities for donations and sponsorships which helps grow the program.

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The Impact of the COVID-Induced Shutdown on Learning: The Measurable Experience of One Business Program

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ABSTRACT

In March 2020, many colleges and universities quickly transitioned to remote teaching as a result of the COVID-19 pandemic. Instructors scrambled to deliver their courses in any number of methods, from e-mailing topic summaries to their students to developing videos of lectures, either live or in an asynchronous mode. The question of the effectiveness of the instruction that occurred during this disrupted semester has been the subject of numerous anecdotal reports. This study attempts provide an empirical analysis of the teaching effectiveness at one particular institution by comparing the score on the Educational Testing Service's Major Field Test in business taken in 2021 with the past scores.

Keywords: Teaching effectiveness, Educational Testing Service, COVID

INTRODUCTION

When the 2020 Spring semester began in January, who in academia would have predicted that the normal pattern of the semester would fall apart in mid-March? After all, the World Health Organization learned that there was an outbreak of a "viral pneumonia" in Wuhan, China, from a media statement from the Wuhan Municipal Health Commission (Timeline, 2021). There was no universal call to arms or realization as to just how pervasive and deadly this virus was to become.

By mid-March, the world was a different place. Quarantines had been enacted, business were closed, and rules for how people would interact were being developed daily. The uncertainty caused shortages to occur in goods that people bought every day. Toilet paper disappeared from the shelves, along with flour and other baking products. People discovered that items that they had never purchased, such as face masks and hand sanitizer, were difficult, if not impossible to find.

College campuses were equally disrupted. Fearing major outbreaks if students returned after Spring Break, many colleges opted to deliver the remainder of the Spring Semester in a non-traditional manner. While many schools had a rich history of delivering courses (and even entire programs) online, other institutions had previously eschewed the use of such technology in course delivery. Their thinking had always been that in-person instruction was best. It is difficult to justify the tuitions charged if students are watching video lectures.

But with the advent of the pandemic, this in-person instruction was no longer a viable option. Instruction had to shift, and shift quickly, to an alternative format. Instructors found it necessary to become somewhat proficient in these remote delivery systems. Institutions often found themselves lacking sufficient software infrastructure and/or technological support to assist in this massive and immediate transformation.

OUR EXPERIENCE

Our institution, the United States Coast Guard Academy, was no different. We are the smallest of the federal service academies at approximately 1000 cadets (what our students are called). We espouse a teaching-centric culture. Classes are generally small (our student-faculty ratio is 7:1), taught in-person, and only during the day from 8:00 AM until 4:00 PM. Before March 2020, we might post assignments, homework answers, or short quizzes online, but little else.

The Coast Guard Academy contacted all of the cadets during Spring Break and informed them NOT to return to the Academy. Spring Break was extended for a week to give faculty time to shift to a new mode of instruction. The goal

was to complete the semester and graduate the class of 2020 on time. The cadets who were graduating seniors had received their initial billet assignments prior to Spring Break, so the fleet was waiting for them. Suspending the semester was not an option. Since students generally do not go on Spring Break with their academic support materials, the cadets' textbooks, notebooks, and computers were collected (all of our students live on campus) and mailed to them.

Faculty scrambled and discovered multiple ways to deliver their course material. Assignments were modified to accommodate the distance learning. Ultimately, the semester was completed, cadets received course credit, and the seniors graduated. The question of what was actually learned in this disjointed environment was not addressed.

The Management Department at the Coast Guard Academy is in a unique position to access the quality of the learning that actually occurred. Our business program is accredited by AACSB. As part of our annual assessment and continuous improvement, we administer the Major Field Test in Business to each of our majors. We have employed this instrument as an assessment tool since 1996, so we have a historical base of performance for comparison.

The ETS test is a broad-based exam of 120 questions. It covers all of the major aspects of the business discipline. The topics covered and their approximate percentage of the exam are listed below. (Note: The percentages were provided by ETS. They are rough estimates and, as such, do not sum to 100%.)

Accounting	15%
Economics	15%
Management	15%
Quantitative Analysis	11%
Information Systems	10%
Finance	15%
Marketing	15%
Legal & Social Environment	10%

Questions about international business are not considered as a separate category, but rather are covered as they apply in the various business fields above (ETS).

ETS reports the performance of a business program on their major field test in business as a raw score and also as a percentile. The percentile score shows where your cohort ranks relative to the groups from other schools. If you are in the 70th percentile, then your group of students as a whole outperformed 70% of the schools who also used the test. The raw score is a measure of the absolute number of correct answers. Both measures are useful, as your raw score may increase while your percentile ranking could decline. This implies that while your students are doing better on the test (an indication that your teaching effectiveness has increased), students at other schools have improved even more than yours.

We generally administer the test in early February. Thus, the Class of 2020 had already taken the test before the COVID disruption in March 2020. However, the Class of 2021 were juniors in the Spring of 2020. Furthermore, that semester, our juniors were taking the business core courses in finance, marketing, operations and project management, as well as a course that combined elements of leadership, organizational development and change. (This is a broad-based course that incorporates many of the elements in a standard introduction to management course.) They had already taken the business core courses in economics, accounting, quantitative analysis, information systems, and business law. Table 1 shows the plan of study for a management major and which semester the courses are generally taken. (There are some exceptions, but the cadets move through the courses with the cohort that they entered the Academy with.)

We also take advantage of the 30-question practice test supplied by ETS. This gives the students examples of what to expect in the actual test later on. After the practice, we review the test with the cadets, incorporating a quick review

of the various disciplines. Our students find the review helpful, as most took their first economics course as a freshman.

RESULTS

Table 2 shows how our cadets have performed on the ETS major field test in business over time. These results are not the raw scores, so they do not reflect the percentage of questions answered correctly. Rather, these scores provide a ranking relative to other undergraduate business programs that use the major field test. A 70% result for an institution indicates that their group of students taking the ETS test outperformed 70% of the other schools also taking test. The results from 2021 showed an 11-percentage point decrease over the average of the previous 25 years, as the scores declined from the 89th percentile to the 78th percentile. However, the declines were not uniform across all of the test areas. In fact, the cadets performed better than average in three areas, accounting, management, and finance, although the increases were small. Two of the decreases were also slight. Quantitative analysis and marketing both experienced a 6-percentage point decline. Larger declines were seen in the other areas. Economics, as well as legal and social environment, each declined by 11-percentage points. International issues fell by 29-percentage points and information systems deviated 44- percentage points from the average.

As stated earlier, the business courses most impacted by the COVID disruption for this class were marketing, finance, and operations and project management. The cadets' performance in finance was essentially unchanged (a 1-percentage point difference). Marketing saw a 6-percentage point decrease, but that difference is not significant at the 5% level. The operations and project management course has applications in management and quantitative analysis. Management majors improved relative to the average while quantitative analysis was lower than the average by the same amount, but only the difference in quantitative analysis was statistically significant.

IMPLICATIONS

The impetus for this study was to ascertain the effect that the COVID disruption (and subsequent shift to remote instruction) had on teaching effectiveness and student learning. We were not surprised to see that the scores declined. However, we were surprised to see the declines in areas not affected by the COVID disruption, those areas that delivered the core business courses during Spring 2020, namely, marketing and finance. These two areas did not show significant differences from the historical average performance.

If the transition at Spring Break to remote instruction for this class of cadets did not adversely affect teaching effectiveness and learning, why then did the ETS area scores decline so significantly? What was so different about the Class of 2021 from their predecessors to cause such a decline? We propose two unrelated possible explanations. First, the Class of 2021 was larger than normal. This put a strain on instructional resources at every point in their program. With more students than normal, it is not unreasonable to assume that the level of learning for some students is lower than before. Larger class sizes make it more difficult to ensure that every student comprehends the concepts presented. The correlation coefficient between cohort size and ETS score is $-.303$. This suggests that nearly a third the lower ETS score in 2021 had its seeds in the larger cohort size rather than any COVID-related disruption. Table 1 shows the ETS scores for the various class years.

The class cohorts are comprised of two distinct subpopulations. Many of the cohort either selected management as their major as part of their initial application to the Coast Guard Academy or changed their major to management early in their academic career. The remainder of the cohort are those non-management majors that did not perform well enough to remain in the initial major of choice. Cadets are generally required to complete their degree in four years. Extensions are sometimes given, but that number is in the single digits each year. For the graduating classes from 2017-2021, the Office of Institutional Research at the US Coast Guard Academy reported that over 98% of our graduates finished in four years. While most of these students perform well in their new major, others are less enthused by the change. They remain in the management major because they want to be a Coast Guard officer, and an undergraduate degree is required to receive a commission.

A second difference is that we had our students take the ETS test electronically. Previously, we had used the paper version. Could it be that if students were taking the paper version, they would already have a pencil in their hand, making it easier to perform a calculation required for the answer? However, if their fingers were on the keyboard and poised to click on an answer, perhaps these calculations were performed in their heads erroneously or not made at all.

We contacted the Educational Testing Service representative with this question in mind: Do scores decline when the test is administered electronically vs on paper? They reported that their analysis did not find a significant difference in the test results based on how the test was administered. This may be the case for students at large universities, where they are exposed to electronic tests in numerous classes. However, it may not be true for small institutions that test using a more traditional format.

CONCLUSIONS

It is difficult to ascertain the causes of a one-year aberration in test performance. The decline that we experienced certainly justifies looking for the cause. This will be a continual area that will require attention for the next few years. However, in a few years, the only people associated with the management major who directly experienced the COVID disruption of 2020 will be the faculty members.

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TABLE 1 – Plan of study

CADET: _____

MANAGEMENT – General Plan of Study

Class of 2021

	Fall Semester		G	Complete		Spring Semester		G	Complete
	<i>4/c Year</i>	<i>Credits</i>					<i>Credits</i>		
2111	College Composition*	3.00			0901	History of the USCG*	1.00		
2263	American Government	3.00			213X	Cultural Perspectives*	3.00		
3111	Calculus I	4.00			2142	Comp Problem Solving	3.00		
4102	Prin Fitness/Wellness I	1.00			3213	Probability & Statistics	3.00		
4111	Swimming I	0.25			4103	Personal Defense I	0.25		
5102	Chemistry I	4.00			4112	Prin Fitness/Wellness II	1.00		
6101	Fund of Navigation	3.00			5162	Physics I	4.00		
					8115	Macroeconomic Prin*	3.00		
	<i>Third Class Year</i>	<i>Credits</i>					<i>Credits</i>		
4204	Lifetime Sports I: RQB	0.25			7310	Intro to Cyber Tech	1.50		
4214	Lifetime Sports II: Golf	0.25			2393	Morals and Ethics**	3.00		
52X6	Lab Science**	4.00			8331	Management Info Sys	3.30		
6201	Ships & Maritime Sys	3.00			4222	Professional Rescuer	2.00		
6202	Apps in Nav Lab	1.00			5444	Atmospheric & Mar Sci	1.50		
8201	Intro to Business	3.00			8246	Financial Accounting	3.00		
8211	Org Behavior & Ldrshp	3.00			8241	Legal Environ Bus	3.00		
8217	Microeconomic Prin	3.00							
	<i>Second Class Year</i>	<i>Credits</i>					<i>Credits</i>		
6301	Maritime Watch Officer	4.00			4303	Personal Defense II	0.25		
2398	Law	4.00			4304	Lifetime Sports III: Tennis	0.25		
8348	Managerial Accounting	3.00			8342	Marketing	3.00		
8351	Research Methods	3.00			8349	Financial Management	3.00		
8357	Human Resources Mgmt	3.00			8363	Ops & Project Mgmt	3.00		
					8366	Ldrshp/Org Dev/Change	3.00		
					_____	Major Area Elective	3.0-4.0		
	<i>First Class Year</i>	<i>Credits</i>					<i>Credits</i>		
6401	SelTop 100 Ton Master	3.00			2485	Global Studies	3.00		
6402	SelTop 100 Ton Lab	1.00			8445	Public Mgmt Consulting	3.00		
8443	Strategic Management	3.00			_____	Major Area Elective	3.0-4.0		
8444	PMC Prep	1.00			_____	Major Area Elective	3.0-4.0		
_____	Major Area Elective	3.0-4.0			_____	Free Elective	3.0-4.0		
_____	Major Area Elective	3.0-4.0			_____	Physical Education	Note		
_____	Free Elective	3.0-4.0							
	Physical Education	0.50							

* These courses may be scheduled during the fall or spring semester.

** These courses may be scheduled during fall or spring semester.

TABLE 2 – Historical ETS results

Class year	Overall score	Quant				Legal & Soc env	Int'l issues	Info systems		
		Acc'ting	Econ	Mgmt	analysis				Finance	Marketing
1996	99%	96%	97%	99%	99%	98%	86%	89%	66%	
1997	96%	85%	90%	98%	99%	79%	84%	96%	57%	
1998	97%	83%	96%	96%	99%	98%	74%	94%	37%	
1999	99%	99%	95%	98%	99%	98%	90%	86%	37%	
2000	96%	90%	96%	99%	99%	89%	59%	71%	35%	
2001	99%	90%	98%	98%	99%	98%	90%	86%	71%	
2002	97%	85%	99%	98%	99%	97%	81%	99%	86%	
2003	90%	80%	90%	90%	95%	85%	20%	60%	90%	
2004	93%	85%	90%	60%	95%	95%	70%	85%	80%	
2005	85%	65%	85%	80%	95%	85%	50%	85%	85%	
2006	85%	60%	95%	55%	95%	95%	45%	90%	65%	
2007	55%	20%	85%	70%	85%	70%	50%	15%	60%	65%
2008	70%	25%	85%	50%	85%	80%	75%	50%	65%	85%
2009	80%	30%	95%	85%	95%	70%	95%	50%	65%	80%
2010	75%	55%	80%	35%	75%	55%	60%	25%	35%	95%
2011	95%	80%	65%	95%	75%	60%	95%	95%	90%	90%
2012	89%	87%	69%	88%	90%	87%	89%	76%	88%	88%
2013	85%	80%	90%	90%	67%	74%	79%	52%	91%	90%
2014	91%	91%	78%	89%	97%	76%	93%	88%	87%	96%
2015	94%	96%	84%	79%	95%	80%	92%	85%	85%	73%
2016	89%	79%	82%	84%	98%	76%	73%	97%	49%	92%
2017	98%	90%	97%	99%	99%	91%	35%	31%	83%	95%
2018	89%	82%	92%	75%	88%	80%	78%	97%	35%	93%
2019	92%	87%	92%	92%	88%	44%	94%	96%	79%	96%
2020	93%	94%	93%	61%	97%	77%	92%	99%	67%	64%
Mean	89%	77%	89%	83%	92%	81%	74%	76%	68%	86%
Std dev	10%	22%	9%	18%	9%	14%	20%	24%	19%	11%
2021	78%	82%	78%	87%	86%	82%	68%	65%	39%	42%

VITA: Service Learning for All Disciplines

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ABSTRACT

Service learning has long been recognized as a valuable pedagogical tool that provides benefits to students with regards to both intellectual outcomes such as knowledge of course content as well as personal outcomes such as professional skills (Rama, Ravenscroft, Wolcott, & Zlotkowski, 2000). The Internal Revenue Service Volunteer Income Tax Assistance (VITA) program utilizes volunteers to provide tax preparation assistance to low income and disadvantaged tax payers. As a volunteer effort providing a technical service to the community, VITA presents an excellent service learning opportunity which has not been overlooked in business education although it has primarily been utilized in the accounting discipline. In this paper, a unique approach to offering a standalone VITA service learning course is described as well as suggestions for overcoming many of the commonly cited challenges.

Keywords: service learning, Volunteer Income Tax Assistance, community engagement, course design

INTRODUCTION

As faculty, we not only want to teach our students discipline specific, technical content but also want to prepare them to be successful within the business environment as well as to be well-rounded citizens. Employers are looking to hire college graduates with not only a strong foundation of discipline knowledge but also with strong professional and interpersonal skills. Hiring managers have acknowledged soft skills as one of the important considerations in the hiring process. Service learning provides an opportunity to incorporate the development of professionalism and interpersonal skills while having students apply their technical knowledge by making the connection from classroom theory to real world application. Service learning balances instruction and service so as to provide students with hands-on, real world application of course concepts while also instilling the importance of teamwork, civic responsibility, and professionalism (Wilson, Crozier, & Hadidon, 2020). Service learning enriches the student learning experience while at the same time benefitting the community.

Bringle and Hatcher define service learning as a “course-based, credit-bearing educational experience in which students (a) participate in an organized service activity in such a way that meets identified community needs and (b) reflect on the service activity in such a way to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility” (1995, p. 112). This definition brings to light three key characteristics of service learning being the educational experience, meeting community needs, and reflecting upon the experience. With service learning, the student moves from being a passive consumer of knowledge to being an active participant in their knowledge development.

Godfrey, Illes, and Berry (2005) contend that service learning pedagogy can create breadth in business education by balancing “academic rigor with practical relevance, set in a context of civic engagement” (p. 309). Achieving this balance and incorporating civic engagement continues to be an important goal for business education. Reflecting society’s calls for businesses to demonstrate social responsibility, the Association to Advance Collegiate Schools of Business’s accreditation standards encourage business schools to “create a shared sense of responsibility to impact society positively” (AACSB 2020, pg. 9). And as students become more socially aware, they also believe that business education should provide coverage of social issues and prepare them to be civic leaders and to solve social issues (Weber, Weber & Craven, 2008; Sleeper, Schneider, Weber, & Weber, 2006; Lopez-Navarro & Cipres, 2015). Service learning is one tool that can help business education respond to this call.

The Internal Revenue Service (IRS) Volunteer Income Tax Assistance (VITA) program provides an excellent service learning opportunity. Utilizing the VITA program as a service learning activity within the university setting is not a novel idea, but its use in the past has primarily been within the accounting discipline targeting accounting majors, and it has also primarily been offered as a project within a class or as a volunteer activity (Blanthorne & Westin, 2016; Andrews, 2007). In this article, a unique approach to utilizing VITA as a service learning opportunity is presented. In this case, the VITA program was incorporated into a stand-alone, for-credit service learning course and was offered as an interdisciplinary general business course thus affording the service learning opportunity to a wider range of

students. The course was also designed in a such way as to overcome some of the challenges typically associated with service learning courses.

DEVELOPING THE VITA SERVICE LEARNING COURSE

The VITA program is an IRS initiative which began in 1969 for the purpose of providing free tax preparation assistance for taxpayers with low-to-moderate income, senior citizens, persons with disability, and those with limited English proficiency. VITA seeks to achieve four tax preparation needs: affordability, accessibility, quality, and education (Center on Budget & Policy Priorities, 2019). The IRS provides grants to groups to support the opening and management of VITA sites within community settings across the country. The IRS also provides training materials to train volunteers to provide the tax preparation and other services necessary to maintain the VITA sites. All tax preparation volunteers must complete the required tax law training and pass an IRS certification exam before providing tax assistance in a VITA site (Internal Revenue Service, 2021, Publication 1084).

The VITA service learning course was designed and offered by a small, private, urban university in the southern United States. The accounting faculty were approached by a representative of the local United Way (UW) who served as the coordinator for the VITA sites and volunteers for the county. The accounting department had worked with UW in the past to promote VITA as a community service volunteer activity, but at this time, UW requested that the accounting department consider offering course credit for students to volunteer with VITA. From UW’s perspective, they felt that this would demonstrate the value of the learning experience as well as provide an appropriate “return on investment” for the students. Although the faculty concurred that VITA would provide a valuable learning experience, they initially declined due to the State Board of Public Accountancy not recognizing VITA volunteer hours as an accounting internship for purposes of meeting the educational requirements for the CPA exam. After further consideration, the faculty realized that this would provide an excellent learning opportunity for all students, regardless of declared major, and as such that it could be offered as an advanced general business elective as opposed to being offered as an accounting course. This would open the course to a larger student population as well as eliminate any potential confusion with accounting students or the State Board of Public Accountancy with regards to upper level accounting course credit for CPA exam purposes. The IRS provides training each year for VITA volunteers with no prior tax knowledge or experience required; therefore, interested students of any major can be trained to participate as a VITA tax preparer. Regardless of major, a knowledge of basic tax law is beneficial to all students as most students will eventually need to file a federal income tax return and pay tax on his or her taxable income at some point in the future if not already. The Dean agreed that this would be a valuable course offering and assisted the faculty with ensuring the course was designed to meet all university and accreditation requirements.

The course was designed based upon service learning best practices while also utilizing the school of business’s internship course structure as a guide. The course is a standalone VITA service learning course offered as an upper level general business elective. It is taught in the spring semester as a hybrid course requiring a combination of both in person and online class sessions. A distinguishing characteristic of service learning is that there is an inherent link between the service activity and the course learning objectives (Prentice and Garcia, 2000). In this way, the service learning activity enhances the student learning experience by providing further understanding of the course content (Bringle and Hatcher, 1995). The learning objectives for the VITA course provided a clear link between the service activity and the desired learning outcomes which are presented below in Table 1.

Table 1: Course Learning Objectives

Learning Objective	Program Goal
To interact in a professional & respectful manner in a client service environment.	Communication Skills
To understand and apply basic tax law in order to prepare federal tax returns for low-income taxpayers in the local community.	Use of Information Technology, Analytical & Critical Thinking Skills
To discuss basic tax issues in an understandable manner with these taxpayers.	Communication Skills
To identify social, economic, and political issues impacted by federal taxation and relate these to the taxpayers serviced by the VITA program.	Analytical & Critical Thinking Skills

The learning activities and assessments for the course were designed to help students achieve the stated course learning objectives and included required training and certification, required volunteer hours, and required reflection and presentation. The learning activities and their course weightings are presented in Table 2 below.

Table 2: Course Learning Activities and Weighting

Learning Activity	Weighting
VITA tax preparer training and certification exam	20%
Volunteer hours (60 hours as tax preparer required)	40%
Weekly reflection journal	24%
University College Day group presentation	16%
Total	100%

All students taking the VITA course are required to volunteer as a tax preparer, and in order to do this, the student must complete the tax preparer training and pass the IRS certification exam. There are two levels of VITA tax certification. The basic certification qualifies the volunteer to prepare the simpler returns which primarily encompass wage earner type returns. The advanced certification qualifies the volunteer to prepare the full scope of VITA returns (Internal Revenue Service, 2021, Publication 1084). The first year the course was offered, students were only required to complete the basic certification. With this level of certification, the volunteers were very limited in the returns they could prepare. Based upon feedback from both students as well as the UW VITA coordinator, the course has required advanced certification in all subsequent offerings.

All tax returns completed through the VITA program are submitted to the IRS electronically. The IRS has partnered with TaxSlayer Pro software, a copyrighted software owned by Rhodes Computer Services (Internal Revenue Service, 2021, Publication 4012), and all tax returns prepared through the VITA program are prepared utilizing this professional tax software. As part of the volunteer training, students are trained to properly utilize the tax software by appropriately entering taxpayer information. The tax software website includes a practice lab, and students complete several mock returns during the training in order to become comfortable with the input screens as well the software help functionality for use when they are unsure of where or how to input specific information.

During the training process, student volunteers must also complete the Volunteer Standards of Conduct (VSC) training which outlines the volunteer’s ethical responsibilities to prepare accurate returns and to provide quality service to taxpayers. This training includes passing a VSC exam and signing a VSC agreement. As long as the VITA volunteer is only preparing returns within the scope of the VITA program and following the VSC, s/he is protected under the Volunteer Protection Act of 1997 (Internal Revenue Service, 2021, Publication 1084). Although student volunteer names are associated with the taxpayer returns that s/he prepares via the student’s tax software login information, the student does not sign the return as a tax preparer or enter a preparer tax identification number. Each return filed through the VITA program is identified as such with a unique Site Identification Number and Electronic Filing Identification Number. Additionally, as part of the VITA process, all returns prepared by volunteers are required to undergo a quality review prior to submission to the IRS in order to ensure that the tax law was properly applied and the return is error free based upon the information provided by the taxpayer (Internal Revenue Service, 2021, Publication 1084). The quality review is conducted by a designated reviewer or through a peer-to-peer review process at each VITA site. Student volunteers are encouraged to seek help anytime they encounter a situation for which they are unsure of how to report on the return. The student may seek help from the VITA site coordinator, the designated quality reviewer, or other experienced volunteer tax preparers on site.

As a service learning course, the required volunteer hours were a key component of the course. The course required sixty volunteer hours as a tax preparer in order to earn full credit for this course component. The students had a six to eight-week time frame between the time that they passed the certification exam and the April 15th tax filing day during which they could complete the required volunteer hours. The course allowed flexibility as to how each student scheduled their volunteer hours. Each student could determine a volunteer schedule that best worked for them and was able to choose among multiple VITA locations in which to serve. Students who were unable to complete the full 60 volunteer hours earned partial credit based upon the number of hours they completed.

Another key aspect of service learning is the need for reflection which aids the student in making the connections between the service activity and the desired learning outcomes (Rama, 1998). Bringle and Hatcher (1995) defined reflection as the “intentional consideration of the service experience in light of particular learning objectives” (p. 115).

Reflections can be effectively incorporated before, during, and after the service learning experience (Chiang, 2008). The VITA course incorporated reflection as a significant course component requiring weekly reflection journals as the volunteer hours were being completed as well as a small group presentation at the university's annual University College Day (UCD) which is a day where students and faculty share significant research and learning experiences with the university community. In the weekly reflection journals, the students were asked to reflect upon their VITA experiences and respond to prompts such as describe a difficult client situation and how you handled it, describe a client situation that made a significant impression upon you and why, or describe an unfamiliar tax issue that you encountered and what you learned from it. These weekly reflections provided valuable feedback to faculty bringing to light issues that needed to be addressed with the VITA coordinator as well as enabling the faculty to provide support to students and thus enhance the learning experience. The UCD presentations allowed the students to reflect upon what they learned from their experience and to share their insights with the university community. Students were very creative with their UCD presentations with topics ranging from a comparison of management styles across various VITA locations, student benefits of volunteering with VITA, and how various federal income tax guidelines impact the low-income community. In addition to the formal written reflections and group presentation, the class also engaged in informal reflections through class discussions each time the class met.

The course was a 3-credit hour course delivered over a 15-week semester. The initial class meetings were spent completing the tax preparation training in order to prepare students for the IRS certification exam. After completing the IRS certification, the class began meeting online during which time the students completed their required volunteer hours while submitting weekly reflection journal postings. The last few weeks of the semester consisted of on campus class meetings and were devoted to wrap up and debrief along with bringing guest speakers into the classroom. These guest speakers provided further insight into additional socio-economic issues facing members of the low-income community who were served by the VITA program. Guest speakers have included representatives from various non-profits such as the Low Income Tax Clinic, Community Enrichment Center, Meals on Wheels, and an IRS representative who worked with the VITA program. A summarized class schedule is presented in Table 3 below.

Table 3: Course Schedule

Weeks	Meeting Format	Learning Activities
1-4	Face to Face	Complete VITA tax preparation training, complete IRS certification exam
5-11	Online	Complete VITA tax preparer volunteer hours, submit weekly reflection journal postings
12	Face to Face	University College Day Presentations
13-15	Face to Face	Guest speakers, class reflections on service learning experience

STUDENT EXPERIENCE

Students were very receptive to the course. As a small university with an average class size of 16, the course enrollment was on par with the average class size demonstrating solid student interest. Although course enrollment reflected a significant percentage of accounting majors which was to be expected, there was also a good mix of other business majors represented within the class as seen in Table 4 below.

Table 4: Student Majors

	# of Students	Accounting	General Business	Marketing	Finance	Management	Total
Year 1	14	50%	21.5%	0%	7%	21.5%	100%
Year 2	21	57%	9%	5%	0%	29%	100%
Year 3	9	22%	45%	11%	0%	22%	100%

In end of course surveys, students expressed various motivations for taking the course ranging from getting involved in the community, gaining legitimate experience, learning more about preparing taxes, as well as the opportunity to earn a certification. One student observed that her motivation changed once she began working with clients. "After my first or second day volunteering, I found a new motivation. That new motivation was helping people. I have helped and volunteered at other places before, but I have never helped someone with personal information or received trust from strangers before. Helping people became my push, my motivation throughout the tax season."

Student comments offer confirmation that the VITA course provided numerous benefits including deeper learning and the development of professional and personal skills. At the end of the semester when asked whether they found the course beneficial, the students overwhelmingly agreed citing direct benefits such as helping the community, gaining work experience, and learning more about basic tax law. Many students were also able to identify the less obvious benefits including the opportunities to further develop the professional skills and soft skills desired by employers. One student stated that the experience “definitely helped with my communication skills and time management skills. Actually doing returns and having that interaction with the client is what makes it different from the classroom.” Another student noted that it “helped boost my self-confidence, enhance my skill set, and helped me to better understand social issues effecting our community.” And yet another student noted that the class “sparked my want to continue volunteering” providing an example of how a service learning experience can motivate continuing community engagement even after the class is over.

When asked if they would recommend this course to a fellow student, all students responded in the affirmative. Many students identified the unique opportunity to gain real-world experience as a key reason for recommending the course. Several students noted that they would recommend the course to students of any major “because everyone gets their taxes done so why not learn about it and maybe even do your own” and “it gives people the opportunity to add something to their resume while also gaining helpful tax knowledge”. At the same time, students also acknowledged the significant commitment required. A student commented “The course is work, and it takes commitment. This is not for students who want to ‘take an easy course’. However, the experience was rewarding and fulfilling.” One student comment provided great insight and overview of the benefits of the VITA course. “I would [recommend the course]. This is an experience where you get the best of both worlds. You learn how to build your confidence, how to talk and interact with clients, problem solving, critical thinking and all at the same time you’re helping out the members in your community.”

OVERCOMING CHALLENGES

Incorporating service learning opportunities into the curriculum offers many benefits. As noted in the above section, most directly are the benefits to the students who gain invaluable professional skills while applying course concepts in a relevant setting as well as the benefits to the community through the services provided. Additionally, service learning can accrue benefits to faculty through enhanced associations with community and students as well as professional development and to the university through strengthened connections to its community (Strupeck & Whitten, 2004; Wakefield & Sissom, 2013).

Despite the many benefits of service learning, adopting this teaching pedagogy also involves some challenges. In reviewing the VITA service learning literature, Blanthorne and Westin (2016) noted that faculty time, administrative support, and volunteer ability and interest were the most commonly cited challenges to implementing a VITA service learning activity. The way in which this VITA service learning course was designed provides some methods for overcoming or minimizing these obstacles.

Service learning projects involve much planning and coordination on the part of the faculty in preparation for the activity, and VITA is no exception. In this case, the faculty worked closely with a local nonprofit which was ultimately responsible for the planning, organizing, staffing, managing, and advertising all of the VITA locations. Having these administrative duties fall under the responsibility of the nonprofit greatly minimized the upfront and ongoing time commitment of the faculty who was solely responsible for managing the students as they completed their volunteer hours.

Another challenge with VITA projects is the significant upfront training that must be provide to students as each volunteer is required to demonstrate a base level of tax knowledge by passing the IRS certification exam. Once again in this case, the sponsoring local nonprofit had qualified professionals to deliver quality training as a result of them providing the training for all community volunteers. The faculty coordinated with the trainers to bring them into the classroom to deliver the IRS training. The faculty worked with the trainer to determine the best use of class time to deliver the content, to develop a student-centered approach to delivering the material, and to identify appropriate homework assignments to supplement the classroom training. This training model would also be very beneficial in a situation where the faculty member did not have a tax background.

From a student perspective, there were concerns regarding student interest and ability particularly since VITA requires a specific knowledge base and the required volunteer hours were significant. With regards to student interest, several

approaches were taken to confront this challenge. First, informational flyers were strategically placed to make students aware of the course offering, the requirements, and the training to be provided. This information was also provided to business faculty as well as the academic advising center in advance of advising and open registration. Second, substantial flexibility was built into the completion of the volunteer hours. A large portion of the student population is commuter students who often work many hours and have families. As a result, we knew that volunteer locations and flexible hours would be key to student participation. Being an urban metroplex, there were twelve operating VITA locations available and students were able to complete their hours at any location. The twelve locations offered different tax preparation hours which also allowed students flexibility in working around family and job responsibilities. Additionally, the course did not require students to commit to a pre-determined number of volunteer hours every week, but instead allowed students to adjust their schedule week by week as needed in order to provide further flexibility. Many students took advantage of spring break week to complete a significant portion of hours. With regards to student ability, the classroom training was carefully planned with the knowledge that many students would have little to no knowledge of tax law. All students who completed the training and took the certification exam were able to pass the exam, and the majority then completed the required volunteer hours. The drop/fail rates for the course provide some evidence in support of students' ability to be successful in the course. In year 1, several students registered for the course without fully understanding the volunteer time commitment involved resulting in a 21% drop rate. In year 2, there was a 0% drop/fail rate for the course. Year 3 was spring 2020 which was impacted by the pandemic with some students withdrawing from classes entirely once the university went 100% online resulting in a 22% drop/fail rate.

CONCLUSION

In preparing business students for a successful career, it is important that schools of business provide opportunities to develop students' professional and personal skills as well as their discipline knowledge. Service learning is an important pedagogical tool that enables the development of both content knowledge as well as soft skills while providing relevant experience. The IRS VITA program provides an excellent volunteer experience that can be utilized as a service learning project not just for accounting students but for students of any major. This article presents the course design for a standalone, for credit service learning course based upon the VITA program which was successfully offered as a general business elective. The course design also offers insight into ways to overcome some of the often-cited challenges of utilizing VITA as a service learning opportunity.

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Creating an Intra-governmental Entrepreneurship Center Partnership: How One Public College Launched a Regional Entrepreneurship Center and Enhanced Community Engagement During a Pandemic

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ABSTRACT

Professors serving as co-directors of a university-based entrepreneurship center undertook a unique venture in partnering with the economic development department of the resident county to develop a regional entrepreneurship center dedicated to serving students and members of the local community. This intra-governmental partnership is novel in its approach, design, and impact. This paper discusses the various stakeholders involved, impact, and implications as a novel model for entrepreneurship education.

Keywords: Entrepreneurship, Research center, Student engagement, Community engagement, Intra-governmental partnerships

INTRODUCTION

In 2016, embracing an entrepreneurial mindset and in response to a steady stream of student inquiries about entrepreneurial activities and interest, three faculty members at a fast-growing regional college launched a Center for Entrepreneurship (CE). This grassroots effort recently resulted in a formal intra-governmental partnership through creation of a Regional Entrepreneurship Center (REC) supported by many diverse stakeholders and headed by CE's director. This paper discusses CE's team-based method of engagement, CE's research driven approach, and how CE can now engage more students and the broader community with combined CE and REC resources.

The CE provides students with guidance on and exposure to practical issues in business ventures. The center coordinates activities through various stakeholders on and off the college campus to create and sustain an ecosystem of services for emerging businesses, entrepreneurship, and business development. The CE leverages these collective experiences to support student engagement, learning, and collaborative research activities.

As suggested by their research, CE faculty believe that their method of fostering an entrepreneurship education ecosystem is one that transfers relatively easily. Any institution can make a meaningful impact in its community through having a genuine interest in helping others realize their dream of owning their own business. Grants and other sources of local, state, federal, and private funding are available for these economic development efforts. Furthermore, collaboration with the many other stakeholders can yield valuable resources to aspiring entrepreneurs, whether they be high school or college students or other community members.

Without engaged guidance, especially in the communities and constituents served by this CE, aspiring entrepreneurs might never find resources on their own. Most businesses fail in the nascent stages of their existence. However, with guidance, education, and community support, success rates can and do improve. Increased success among small-to-medium sized enterprises drives real economic growth that can raise the standard of living for the individual entrepreneurs, their families, and the communities around them. This is the kind of change the CE faculty embraces.

LITERATURE REVIEW

Research by Chowdhury *et al.*, 2019 presents a picture of the overall positive economic effect of entrepreneurship within a region. Past research well documents the benefits of entrepreneurship in terms of job creation, product or service innovation, and societal development (Ács *et al.*, 2002; Fetters *et al.*, 2010; Ferreira *et al.*, 2017; Greene and Rice, 2007; Hill and Lendel, 2007; Kuratko, 2005; Kuratko *et al.*, 2015; Ogbo *et al.*, 2012; Reynolds *et al.*, 2005).

In furtherance of entrepreneurship or entrepreneurial endeavors, institutions of higher education offer varying levels of exposure to entrepreneurship theory or practice (Bischoff *et al.*, 2018; Dickson *et al.*, 2008; Katz, 2008; Man and Yu, 2009; Mattare, 2010; Nabi *et al.*, 2017; Peterman and Kennedy, 2003; Piperopoulos, 2012). These efforts include the creation of university-based institutes and centers with the focus of promoting student entrepreneurship (Pittz and Hertz, 2018). Many student-focused benefits are associated with these types of centers (Winkel *et al.*, 2013).

The most recent innovations in this space have seen the evolution of university-led entrepreneurship centers into full-service centers that foster student-created entrepreneurial ventures (Morris *et al.*, 2017). For instance, incubation services focus on fostering company growth and development throughout the startup and growth phases (Finer and Holberton, 2002; Petrou *et al.*, 2010). This may include any combination of work facilities, operations and design equipment, coaching or mentoring, professional services (i.e., accounting and law), connections to debt and equity funding, and networking (Bergek and Norrman, 2008; Rice *et al.*, 1995). Acceleration, another common function, generally refers to the education and coaching provided to the entrepreneurs during the formation and growth of the business (Kefang and Shuhua, 2009). University-based enterprise creation may include one, some or all of these services (Kirby, 2006).

Only recently have researchers begun to examine the role of entrepreneurship within the university and its effect on all stakeholders affected by this activity. In fact, recent research by Karami and Read (2021) makes the case for shifting the focus of entrepreneurship research from the individual unit or organization to a broader understanding of entrepreneurship as a process consisting of numerous stakeholders who contribute to the creation of novelty in the environment. Collectively, these stakeholders make up the entrepreneurial ecosystem within and around the university. As such, this paper accepts the definition of the entrepreneurial ecosystem put forward by Maritz *et al.*, 2016 as “a system, network or group of interconnected elements, formed by the interaction of the entrepreneurial community of stakeholders or organisms with their environment” (p. 10).

Extant research demonstrates the interconnectedness of the university, business and financial community, government agencies, non-governmental organizations, and other universities as part of a greater entrepreneurial ecosystem (Fetters *et al.*, 2010). Particularly, Winkel *et al.*, 2013 noted the need for support to and collaboration with local, regional, and federal agencies. In this same vein, extant research notes a relationship or interconnectedness between resource availability and market success of entrepreneurial ventures (Kellermanns *et al.*, 2016; Nason and Wiklund, 2018).

Pittz and Hertz, 2018 explore the specific role played by the entrepreneurship center and how it contributes to the regional entrepreneurship ecosystem through entrepreneurial culture and co-curricular learning. This research gives distinct focus on the requirements of the director of the entrepreneurship center to be successful in managing center activities and ultimately benefiting the external ecosystem. While research exists that demonstrates the benefits of these types of entrepreneurship centers can be replicated within the university through alternative approaches (Bell and Bell, 2016), there is ample evidence identifying and acknowledging the unique benefits that these centers provide.

Of importance to this research is the effect of student involvement in entrepreneurial ventures – not as the entrepreneur – rather, as employees, or, more commonly, interns at entrepreneurial ventures. Noteworthy research by Maaravi *et al.*, (2021) identifies the benefits to student interns who work with or contribute to entrepreneurial ventures as interns.

COLLEGE CENTER FOR ENTREPRENEURSHIP (CE)

The CCE was the first center established after the college’s founding ten years prior and is housed in the college’s School of Business. The college is in an ex-burb county of a large and growing southern U.S. city. At the time of the college’s founding, the host county was the largest in the U.S. without a 4-year higher education institution. With a growing diverse population in the region, students reflect the community’s makeup and entrepreneurial spirit. Table 1 shows selected student demographics from 2020. In fact, a local high school has an entrepreneurship academy rated as one of the most outstanding in the country. Thus, great was the opportunity for creating an impactful entrepreneurship center for the college’s students.

The team-based method of mentoring and the research-driven approach employed by the faculty members in developing the CE make the center unique in that many such centers embody a single perspective or even a single administrator’s vision for the services they provide. In contrast, the CE is built on the collective experiences of its directors and the guidance derived from an extensive study of academic literature on entrepreneurship education ecosystems. This philosophy hinges upon utilizing the resources already available within the community rather than duplicating services for the sake of keeping clientele “in-house”. Hence, the CE can serve many more students than if its directors were trying to avoid the many partnerships it maintains.

This approach is expected to produce better outcomes for all stakeholders. One reason other centers operate differently is because they often have different motivations. The CE services are available at no charge to all of the college’s students, regardless of their area of study. Furthermore, unlike many accelerators or incubators, the CE takes no interest or ownership in students’ ventures.

Table 1: Selected Student Demographics

	2020
White	26.7%
Black or African American	32.6%
American Indian and Alaska Native	0.1%
Asian	11.2%
Native Hawaiian and Other Pac. Islander	0.1%
Two or more races	3.8%
Hispanic or Latino	24.8%

Research

CE faculty has developed a research program focused on understanding and leveraging entrepreneurship education ecosystems. Since 2017, the CE faculty has been awarded three of the college’s competitive seed grants for a total of \$12,000, presented four times at the USASBE entrepreneurship education conference, and created a foundational project which catalogs the linkages between the inputs to, outputs from and stakeholders of entrepreneurship education ecosystems.

From this basis, the directors have continued their inquiry to establish a research agenda to assess the conceptual model and various stakeholders’ perspectives on both the model and the current trends in entrepreneurship education. Their hope is that this work will guide others engaging in similar pursuits so that, much as the CE aims to aide entrepreneurs for greater success in their ventures, it can also support educators in contributing to the entrepreneurship ecosystems around them. As proof of this, at present, the CE faculty have published in four conference proceedings. One paper is now under review at an academic journal and three additional projects are in progress.

Impact

Initially, the CE’s reach was limited to the college’s students. This made sense for several reasons. First, the center originally relied strictly on very limited college funding. As a state school with public funds as its primary means of financial support, regulations required that we consider our own students first. Secondly, the student body at the college is extraordinarily diverse. In fact, *US News & World Reports* recognized the school in 2021 as the most ethnically diverse student body among regional colleges and ranked the college among the most economically diverse schools of that type.

Furthermore, many of the college’s students are either immigrants or among the first generation of their families to be born in the United States. Thus, many students at the school do not come from backgrounds that are typically associated with access to the kinds of social and financial capital that facilitate entry into and success in the world of entrepreneurship. This is even more of an impetus to support these underserved students in entrepreneurship.

Student engagement

Despite the ongoing Covid-19 pandemic, the CE continues to provide faculty and resource support to the student-led entrepreneurship networking organization (SENO). SENO provides students with numerous benefits including peer-mentorship, a sounding board for ideas, potential synergies among their business ventures, and camaraderie. SENO actively seeks students interested in leadership opportunities as well as new members and all students, from the School of Business and all other schools at the college, are encouraged to join.

In addition to CE's work with SENO, CE faculty work with student organizers as part of the School of Business' spring professional development conference. Students plan and orchestrate the conference as a part of a School of Business elective course which also includes a business pitch competition. Competition winners, as judged by members of the school's Board of Visitors, become eligible to represent the college in external state and regional business pitch competitions. Three on-campus pitch competitions have been held with approximately 10 students in each competition. Some of these students have since graduated while others are still on campus pursuing their entrepreneurial endeavors.

Beyond supporting the on-campus competition, CE faculty work with student winners to prepare for the external competitions. Since its founding in 2016, CE faculty have mentored and coached many students in developing their entrepreneurial ideas and continue to mentor every student who enters regardless of whether they win or not.

Faculty

The faculty who work in the CE share a passion for entrepreneurship and are diverse in their educational backgrounds, with areas of expertise that include marketing, business law, and management information systems. They are also all active in their own entrepreneurial pursuits. Thus, they have ample knowledge and experience to draw upon in guiding student-entrepreneurs. Of course, CE faculty consult with or refer students to other faculty as needed.

Student results

SENO has proven very popular since its creation. As of fall 2021, the club's contact list boasts over 200 members representing a broad range of ethnicities as well as students at all different stages of their entrepreneurial quest, and different classifications (freshmen, sophomores, etc.). SENO members also come from a range of major areas of study both inside and outside the School of Business.

While business creation and growth are the ultimate goals of SENO and all of CE's activities, students' success has been realized in other ways, such as an audition for TV's Shark Tank, participation in TiE's The Young Entrepreneur contest, events such as I-corps South's Customer Discovery Training, and a statewide technology innovation competition. Other ways CE has directly influenced students include the hiring and supervision of multiple student workers who have worked to educate other students, aided in the creation and promotion of on-campus events, and contributed to CE research activities.

ENGAGING THE COMMUNITY

Throughout the center's existence, CE faculty have regularly engaged with the local community and, since 2018, have worked to broaden the center's reach. In keeping with the ecosystem metaphor, CE has established working relationships with local middle schools, high schools and the county government, serving both future and past students as well as those currently enrolled at the college. In this way, CE faculty encourage and support student entrepreneurs at all stages of their education and even continue that assistance after they complete a degree. These relationships take the form of "Shark Tank"-style mentoring events with a local middle school and the development of programs to support high school students and educate them about the opportunity to continue their entrepreneurial pursuits upon graduating.

Demographics

Table 2 shows selected demographic of the county from the 2019 US Census estimate (<https://www.census.gov/quickfacts>). In 2019, the population estimate was more than 936,000 indicating growth of more than 16% since the 2010 census.

Table 2: Selected 2019 City and County Demographic Estimates

	2019 City Estimates	2019 County Estimates
White	42.4%	53.8%
Black or African American	37.6%	29.8%
American Indian and Alaska Native	0.1%	0.8%
Asian	6.1%	12.5%
Native Hawaiian and Other Pac. Islander	0.1%	0.1%
Two or more races	4.0%	2.9%
Hispanic or Latino	25.9%	21.7%
Foreign-born persons	26.4%	25.8%
Language other than English (at home)	37.3%	35.4%
High School graduate or higher	83.2%	87.7%
Bachelor's degree or higher	23.1%	36.9%
Per capita income	\$25,057	\$30,636
Persons in poverty	20.1%	9.2%

Support and resources

CE administers one-on-one mentoring as its primary form of support for entrepreneurs. Besides discussing business ideas and brainstorming sessions for those in the ideation stage, CE faculty provide guidance and instruction on business concept development through tools like The Business Model Canvas. CE also helps with the creation of business plans and key processes like feasibility studies, entity creation and licensing, customer discovery, competitive analysis, and intellectual property protection. Finally, CE leads workshops on various topics related to venture creation and hosts guest speakers who may provide focused and topical lectures or simply share their own experiences or words of encouragement.

Beyond direct contributions such as these, and perhaps more importantly, CE acts as a signpost to the many other resources in the entrepreneurship ecosystem it serves. A foundational tenet of the CE's philosophy is to avoid duplicating efforts. Thus, CE frequently refers entrepreneurs to services such as SCORE, a nationwide network of volunteer business coaches, and other regional and local organizations and centers dedicated to fostering business creation and growth.

College and county collaboration

While the college does not have a direct interest in economic development, various levels of government do. In contrast, the county does not maintain the capacity for business instruction an essential element critical to entrepreneurs' long-term success, which, in turn, drives economic development. These complimentary interests led the CE to work with the surrounding county to explore innovative approaches for supporting entrepreneurship. Through these efforts CE worked with economic development managers to plan, design, and create a community learning center.

THE REGIONAL ENTREPRENEURSHIP CENTER (REC)

The partnership with the surrounding county described above culminated in the creation of a Regional Entrepreneurship Center. Through this partnership and the funding source it represents, CE can now offer support not only to its former students at the college but also to the broader community. As a stipulation of the grant that partially funds the REC, it will target low-to-middle-income member businesses. REC will offer educational and business development support services, as well as workspace, for regional entrepreneurs and businesses that will reside in the REC's dedicated facility located a short distance from the college.

The REC

Through the REC, CE and the county government will provide dedicated workspace, co-working space, office utilities such as copying and printing, a physical business address, and individual business coaching to approximately 48 member businesses at any given time. Businesses will rotate into and out of the center and each member will have an individualized graduation plan to increase its chance of business success and growth. The REC will provide educational programming and information resources to both members and the public. Ultimately, the REC should act as an engine for economic growth in transforming both individuals' lives and the business environment in the county and the state all while operating on a not-for-profit basis for both the college and the county. Despite the COVID-19 pandemic, the REC is on track to open its doors by the end of 2021.

CE's director also directs the REC and supervises a dedicated staff member hired by CE to serve as the REC's operations manager. In early 2021, REC hired a center manager who had experience guiding small business owner participation in the county chamber of commerce and who also had experience working as a small business consultant. The new manager's knowledge of the county and regional entrepreneurship ecosystem is critical to the launch success of the REC. As of summer 2021, REC began accepting and reviewing applications for membership and began collaborating with the REC advisory team composed of leaders of organizations from the local entrepreneurship ecosystem.

Programs

As REC becomes fully operational, the CE is recruiting faculty across many disciplines at the college who have an interest in developing and providing relevant educational programming to REC member-businesses, community entrepreneurs and small business owners. The primary goal is helping current and aspiring business owners develop the skills and knowledge needed for business success. Planned offerings include accounting, bookkeeping, enterprise creation legal issues, web design, start-up marketing, and small business human resources. Ultimately, the REC will likely offer a Small Business Management Certificate program in collaboration with the CE.

Operating structure

As is the case with establishing most any intra-governmental enterprise, the operational details required much diligent work on the part of all stakeholders. In the case of the CE, the CE's director, the Dean of the college, college attorneys, county officials, and the local chamber of commerce worked for months to develop a contract that worked for all involved. The result of these negotiations is that the REC is owned by the county who is also responsible for the REC's construction, maintenance, liabilities, and management including marketing, website maintenance, press releases, and similar communications. The county also has a designated county employee who represents the county's interests by providing guidance and acting as an approval authority for REC operations. Personnel assigned to the REC by the college may be employees of the college, independent contractors, or interns. The county supplies necessary equipment excluding computers and office supplies which are furnished by the college.

DISCUSSION

From the inception of the CE, the faculty have sought to maximize their resources to help entrepreneurs. Entrepreneurs almost always initiate their business ventures with incomplete knowledge and skills. Often, entrepreneurs have very little or no background in the practice of running a business, let alone creating one. As such, they need guidance in many different areas to increase their odds of success.

As CE has grown and evolved, the range of activities it conducts has increased. Most significantly, the target for CE's efforts has expanded to include practically everyone in the geographic area around the college. As such, CE has adapted most of its practices to accommodate this diverse group of entrepreneurs. Despite all of this change, the underlying approach at the CE has remained constant.

Most student entrepreneurs opt for the security of employment with an established business upon graduation. However, a small portion of the dozens of student entrepreneurs who pass through the CE continue developing their business ideas after their time in college. Specific instances include concepts rooted in food products, marketing consultation, point-of-sale automation, and even social media platform creation.

CE continues to serve as a conduit between entrepreneurs and the many resources available in the community around them. This requires a combination of partnerships with the many other organizations dedicated to the advancement of entrepreneurship and education of entrepreneurs both in the business practice and the existence of these other organizations. Through outreach to the various stakeholders and coaching those in pursuit of new venture creation, CE works to increase both efficiency and effectiveness of the entrepreneurship ecosystem. This mission continues with the creation of the REC.

While the REC is still in its formative stages and plans to officially open by the end of 2021, community interest is already evident. At the time of publication, approximately 70 businesses have applied for REC membership. The screening process has transitioned from application review to candidate interviews. The candidate pool represents a wide range of business sectors including construction management, work force development, pet care, house cleaning, IT support, and technology development, among others.

A contrast in the approach taken at CE (and now at the REC) and the approach taken at many small business centers, accelerators, and incubators is that CE has no profit motive. This engenders a collaborative strategy as opposed to a competitive one. This leads CE to avoid duplication of services allowing for better use of funds, time, and effort. The expectation is that CE's approach should lead to greater success for everyone involved and the community at large.

CONCLUSION

The pivotal role of small to medium enterprises in driving economic growth is well established. The emergence of the “gig economy” and the fallout from the COVID-19 pandemic have only reinforced the importance of these ventures. As people set out to create their own businesses, they face steep odds of success. Fortunately, many opportunities for assistance and guidance are available to shift those odds in the entrepreneurs' favor. Through a collaborative approach, CE works to increase awareness of these opportunities with the ultimate goal of improving outcomes for all stakeholders. This model can be duplicated in any entrepreneurship ecosystem through a deliberate approach and the dedication of effort and a modicum of financial resources.

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An Innovative Approach to Improving Financial Literacy of College Students

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ABSTRACT

Much has been written about how weak the average person's knowledge base is when it comes to financial literacy. Many schools, at both the high school and college level, have responded to this lack of financial literacy by offering a variety of courses and approaches to address the problem. This paper looks at one college's use of an innovative software tool designed to improve a student's financial literacy and to give the students confidence in making decisions related to personal finance.

Keywords: personal finance, financial literacy, online module, gamify

INTRODUCTION

There has been much written in the popular press in recent years about many people's lack of financial literacy. From questionable mortgages to obscene interest rates on payday loans to inadequate funding for retirement, this lack of financial literacy may be preventing millions of individuals from leading financially secure lives. (Harris, 2018)

Some of the numbers are eye-opening. According to the Federal Reserve, 44% of adults lack the funds to cover a \$400 emergency, the median household headed by someone age 55 to 64 has little more than \$100,000 in retirement savings, and 11% of borrowers who started repaying federal student loans in 2015 had defaulted within three years. (Tergesen, 2019)

A CALL FOR FINANCIAL LITERACY EDUCATION

Concerns about student debt, the growth of the gig economy, and a shift from employer-provided pension plans to self-funded retirement accounts has sparked an increased interest in financial education. (Carrns, 2020) Like the financial crisis more than a decade ago which ignited a flurry of financial literacy proposals in state legislatures, the COVID pandemic is raising awareness of the issue once again. (Carrns, 2021)

The options for teaching financial literacy range from a full-semester course on personal finance to modules embedded in other courses to online programs sponsored by both public and private organizations to employer-sponsored programs.

A growing number of states are enacting laws that require schools to teach financial literacy, reflecting concern over the impact that money problems are having not only on residents' lives but on states' budgets.

According to the Council for Economic Education (2020), as of early 2020, high school students in 21 states were required to take a personal finance course to graduate. Currently there are five states, plus the District of Columbia, that do not include personal finance as part of their standards.

There are also some colleges that offer a range of options for learning about financial literacy. Here are some examples:

- The Wharton School and University of Pennsylvania offer two financial literacy courses. Consumer Financial Decision-Making looks at economic models of household decisions and examines evidence on how consumers are managing (and mismanaging) their finances. (Wharton, 2021) Inequity and Empowerment: Urban Financial Literacy not only covers topics related to financial management, such as investing, understanding debt, and how to buy a car or a home, but intertwines these conversations with the effects of longtime inequities, such as, concerning redlining or unfair banking structures. (Hertzler, 2019) It is also interesting to note that a student enrolled in the MBA program at Wharton, considered to have one of the top finance programs in the country, started a club, Common Cents, that was designed to elevate awareness around Personal Finance within the Wharton community. (Patel, 2018)

- Bucknell University’s Freeman College of Management offers a Personal Finance course that is open to all Bucknell students. The course is designed to help ensure that students can plan for their lives ahead and truly thrive post-graduation. The course starts with the development of an individualized, post-graduate budget which then evolves into a multifaceted financial plan over the course of the semester. Topics covered include: gross and net pay, wants-versus-needs spending, managing credit and debt, saving and investing, and insurance. (Bucknell University, 2020)
- University of Rhode Island offers two courses related to financial literacy. “Money Skills for Life” focuses on one’s own family finances, while “Personal Finance” involves case studies and financial planning, helping train students to become financial advisors or counselors. (University of Rhode Island, 2020)
- Montgomery County Community College offers a course in Personal Finance that covers topics such as saving, borrowing, purchasing insurance, social security, home buying, investing, and estate planning. (Montgomery County Community College, 2021)
- Goodchild et al. (2020) describe a course at Quinnipiac University in practical accounting that includes a one week module on Personal Finance.

There are also some colleges that offer a full bachelor’s program in Personal Finance/Financial Planning, such as:

- University of Wisconsin (University of Wisconsin, 2021)
- University of South Florida (University of South Florida, 2021).

EFFECTIVENESS OF FINANCIAL LITERACY PROGRAMS

One concern with all these educational options is the effectiveness of such courses and programs. Studies of the effectiveness of financial literacy programs at both the high school and college level have been mixed.

The School of Business of South Carolina State University (SCSU) partnered with the Society for Financial Education and Professional Development (SFE&PD) to implement the Financial Literacy Student Ambassador (FLSA) Program. The program is designed to educate students about financial literacy through a peer-to-peer approach to prepare students to make sound financial decisions. Students’ knowledge of “Credit Management” and “Budgeting and Financial Goals” were measured before and after the program, and the results indicated statistically significant improvement in financial literacy after the program. (Ma and Feng, 2018)

The Programme for International Student Assessment (PISA) coordinated by the Organization for Economic Cooperation and Development (OECD) has assessed the financial literacy of 15-year-olds around the world every three years, starting in 2012. While the full report on the latest PISA financial literacy assessment shows a disappointingly high proportion of teenagers who struggle to understand money matters, comparing the results from 2012 to 2015 indicated that it is possible to improve financial literacy. (Lusardi, 2017)

Research by Peng, et al. (2007) suggests that participation in a college level personal finance course was associated with higher levels of investment knowledge when former students were surveyed years later.

Brau et al. (2019) examined financial literacy as a function of family and background, formal learning activities, and experiential learning. Results indicated that family and background have little impact, some types of formal learning activities enhance literacy, but the most significant impact is associated with experiential learning.

Urban and Stoddard (2020) found that when students receive financial education, there are increased applications for aid, an increased likelihood of receiving a grant, students borrow more sensibly (lower cost loans), and there is decreased likelihood of holding credit card balances.

The Consumer Financial Protection Bureau (2019) found that rigorously implemented financial education can lead to improved credit scores and decreased delinquencies.

Ehrlich and Guilbault (2017) offer guidance on how their college created an approach to enhance financial literacy by offering a voluntary three-week financial literacy for high school students. The course outcomes show improved measures of financial literacy across a wide range of demographic factors.

Research by LaBorde and Mottner (2016) indicates that a college personal finance course can increase a student's knowledge of financial literacy, as well as lessen the disparities that exist in financial literacy based on gender, age/year, and ethnicity.

Brau et al. (2015) describe an approach to teaching a college level financial literacy which uses a combination of principle- and application-based pedagogy, teaching students how to create their own personal financial plan. The course has been well received by its students.

Despite these success stories, a comprehensive meta-analysis of financial-literacy program evaluations, published in the journal *Management Science* in 2013, found that financial-literacy education was responsible for just a 0.1 percent change in financial behaviors, such as increased savings or reduced borrowing. Part of the issue is that while such courses improve the student's knowledge of financial literacy, it seems to have little impact on the behavior of the students. (Ogden, 2019)

Overall, the research seems to suggest that while financial literacy courses may be successful in improving knowledge of such topics, they may not lead to changes in actual behavior related to such topics.

Perhaps what is needed is an approach that teaches financial literacy topics, but in an applied setting, where students have a chance to make personal finance related decisions.

INCLUDING A GAMIFIED PERSONAL FINANCE MODULE IN AN INTRODUCTION TO BUSINESS COURSE

In response to the need for individuals to be more financially literate, and to the apparent value of offering personal finance education, a decision was made to include an online, gamified tutorial related to personal finance topics in an Introduction to Business course.

The online module is meant to be completely separate from the Introduction to Business course in that there is no class time devoted to teaching the personal finance topics, but rather students use the software exclusively to teach and then test themselves on their knowledge.

The software used was Inkwiry. According to its website (<https://inkwiry.com/personal-finance-101>), the Personal Finance module is meant to take approximately four hours, during which students will gain fundamental money skills and knowledge for life using an online, gamified experience.

The objectives of the Personal Finance module are as follows:

- Gain the money skills and knowledge you need to make informed financial life decisions, grow your net worth and achieve financial freedom.
- Learn the language of money so you are open to opportunities and can grow your wealth.
- Build a financial life toolkit of essential money management strategies such as saving and investing to capitalize on compounding growth, budgeting income and expenses, learning to manage debt and more.
- Discover smart moves you can start using immediately to avoid life's traps and pitfalls, which means you end up with money saved plus money not lost.
- Improve your financial lifestyle by managing your money like a pro.
- Learn how to ask "what if?" and use Inkwiry's tools to find your own best answers, minimizing your risk and maximizing reward.
- Grow your confidence about planning and how it can provide peace of mind.

The gamified experience is designed to give students the opportunity to apply the knowledge they are learning to real life scenarios. Such an approach may lead to not only an increase in knowledge, but to improved behavior related to financial literacy.

Here is the scenario which students work through:

You just landed your dream job. But now you need to think about opening a new bank account in a strange city, arrange direct deposit of your paycheck, consider 401(k) options and buy renter's insurance for your new apartment. Oh and by the way, you don't have a budget, an investing strategy or even a sketchy plan to reach your goals.

Inkwiry was first pilot tested in three honors sections of the Introduction to Business course in 2019. Anecdotal evidence indicated that students felt that their knowledge of personal finance had improved as a result of completing the module, and they found the tool an engaging way to learn the material.

Based on this evidence, the personal finance module was voluntarily rolled out to over 240 students in the fall of 2020. Summary data was collected before and after the students completed the Personal Finance module.

Pre and post survey questions related to financial literacy knowledge were asked, and the results show an increased mean of 62% to 80% on a range of personal finance topics.

Students were also asked three subjective questions upon completion of the module, with the mean response score (on a 10-point scale) shown at the end of each question:

1. Additional personal financial education such as going into more detail on Personal Finance 101 topics or building my own financial life plan would benefit me. (8.8)
2. I feel more confident in my financial life skills and knowledge after completing Personal Finance 101. (8.9)
3. Future students would benefit from taking a personal finance course. (9.2)

Figure 1 offers overall student (n=247) satisfaction with the Personal Finance module and their thoughts about Personal Finance. Here are the questions that were included in the survey:

- 1) Personal Finance 101 improved my money skills and knowledge.
- 2) I wish I could learn more about personal finance.
- 3) I believe other students would benefit from taking Personal Finance 101.
- 4) Personal Finance 101 was engaging and easy-to-use.
- 5) Would you recommend Personal Finance 101 to a friend?
- 6) I want to plan for higher education and for my career.
- 7) I want to know what my net worth will be in 10 years

These results suggest that the online module was successful in teaching students about personal finance topics and improved their confidence in their ability to make personal finance decisions. The results also seem to suggest that students would like to learn more about personal finance issues.

CONCLUSION

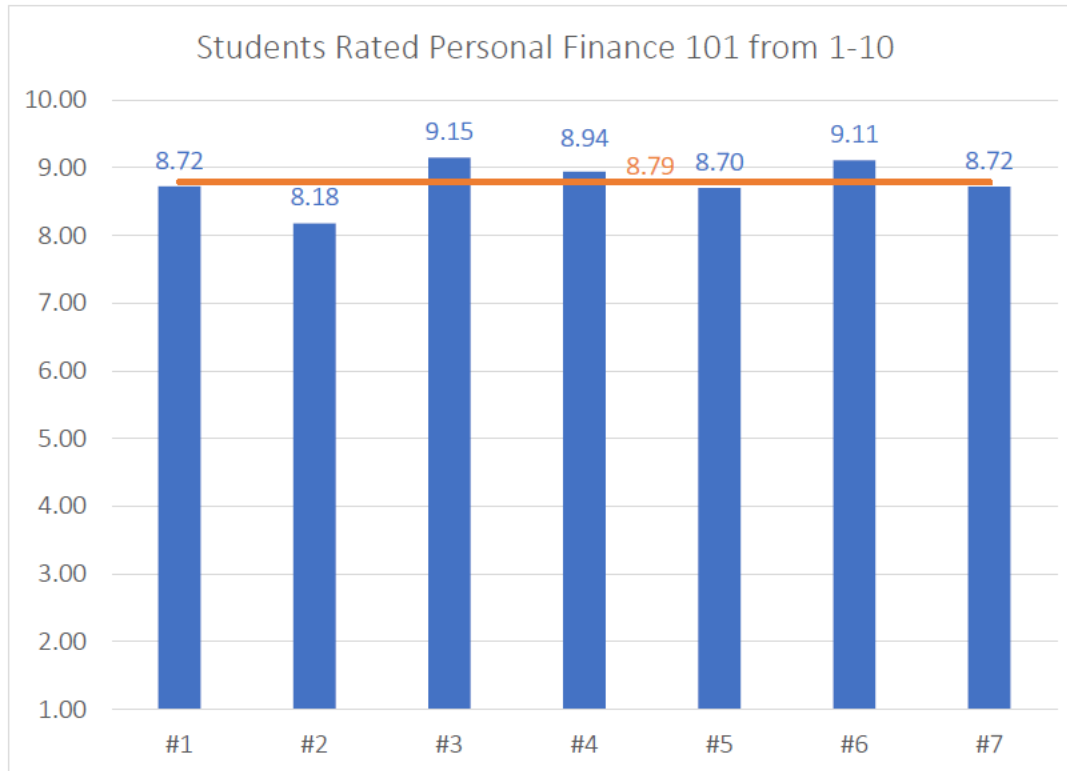
There is a pressing need for people to become financially literate, and schools are being called on to provide this information.

This paper looked at one approach to providing this knowledge, a standalone, online module that gamifies the learning process.

Results indicated that the module improved the financial literacy of the students, and gave them enhanced confidence in their decision making abilities when it comes to personal finance. The module also seemed to whet the students' appetites for more information related to personal finance topics.

A possible extension to this paper would be to follow-up with students five years after their graduation and compare the students who took the Personal Finance module with those who did not, and see if there is any difference in their financial literacy at that stage of their life and career.

Figure 1: Student Survey Results



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The Variable Effects of Goal-Performance Discrepancies on Future Goal Setting: A Test of Four Moderators

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ABSTRACT

This field study investigates student goal setting related to exam grades and final course grades. More specifically, the study attempts to further clarify the variable effects of goal-performance discrepancies on self-set goal change. Performance judgment accuracy, long-term goals, learning goal orientation, and performance goal orientation were tested as moderators of the relationship between goal-performance discrepancy and self-set goal change. The results clarify the goal-setting process over time. Implications for goal setting theory and higher education are discussed.

Keywords: goal setting, self-regulation, self-monitoring, proximal goals, distal goals, goal-performance discrepancy, learning goal orientation, performance goal orientation.

INTRODUCTION

Goal setting is one of the most supported theories of motivation (Locke & Latham, 1990) and a useful self-regulation technique (Bandura, 1986; Day & Unsworth, 2013). Over 1,000 studies have examined goal-setting theory across a wide variety of settings (Locke & Latham, 2013b), including learning situations (Schunk, 1991), training (Baldwin & Ford, 1988; Goldstein, 1993; Kraiger, Ford, & Salas, 1993), and higher education (Martin, 2013; Morisano, 2013; Wood & Locke, 1987). In the context of higher education, goal setting has been applied in relation to a wide variety of tasks including career planning (Grant, Ratliff-Miller, & de la Rosa, 2016), general academic performance (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010), business simulations (Mayer, Dale, & Fox, 2020), and exam or course performance (Kimmel, Trouard, & Robbins, 2020; Wood & Locke, 1987). In fact, approximately 80% of students in business courses reported that they frequently engage in goal setting and planning related to exams (Kimmel et al., 2020).

Goal setting is believed to work well because it requires a person to use forethought to regulate performance when performing a task. Once goals are set, people try to reduce the discrepancy between the present performance level and their goal. Nearly all goals will ultimately have some type of deadline which, when reached, results in a comparison between performance and the goal. This creates a goal-performance discrepancy (GPD). Despite numerous empirical studies related to the basic tenets of goal setting theory, much of the research related to goal revision and self-regulation has been conducted in laboratory settings, and “it is important to understand self-regulation processes ‘in the wild’ as well” (Day & Unsworth, 2013, p. 162). The first contribution of this study is that it contributes to the literature by investigating the goal revision process in the real-world university classroom setting.

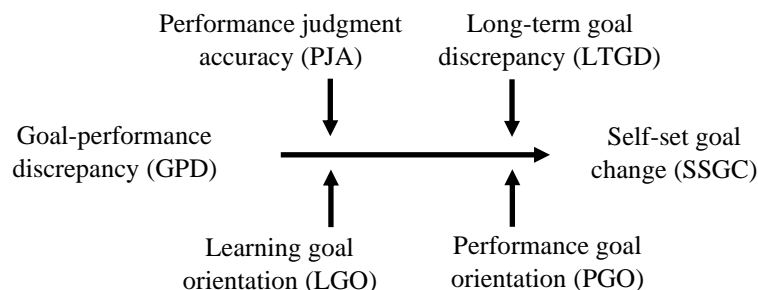
At some point in time, the goal-setting process necessitates feedback to determine past or present performance, which serves as the basis for determining the GPD. Feedback is often thought of as knowledge of results either formally or informally provided by a source outside of one’s self (e.g., educators or supervisors). However, individuals may also continually generate their own internal feedback as they monitor and regulate their performance. Goal setting typically does not occur in isolation; previous goals, performance, and GPDs influence present and future goals. A positive GPD results in a person’s raising of subsequent goals (Bandura & Cervone, 1986). However, a negative GPD is understood less well and has variable effects on subsequent goals (Bandura & Cervone, 1986), suggesting that moderators may influence the relationship. Morisano (2013, p. 502) observed that “there is solid experimental evidence accruing that helping students to set personal or academic goals while in school improves their academic outcomes..., however, ...the mechanisms by which these changes occur have to be further investigated and disseminated.” Additional research is needed to better understand the variable GPD effects. Therefore, a second contribution of this study is that it provides insight into the varying effects of the GPD.

Furthermore, until recently, there was little research examining the simultaneous use of multiple goals, such as proximal and distal goals (Locke & Latham, 2013a; Sun & Frese, 2013). In reviewing the extant research, Sun and Frese conclude that having proximal and distal goals leads to higher performance than distal goals only. However, they also note that little is known about the development of proximal goals. In addition, there is a lack of research

related to proximal and distal goal dynamics in the context of academic course performance. A third contribution of this study is that it examines the dynamic interplay between proximal and distal goals in the classroom setting.

In sum, this field study investigates how student goal-setting processes unfold over time in the undergraduate classroom environment. The main purpose of this field study is to provide additional insights into why a negative GPD has variable effects on subsequent self-set goals through the examination of four potential moderators of this relationship: performance judgment accuracy (PJA), long-term goal discrepancy (LTGD), learning goal orientation (LGO), and performance goal orientation (PGO). A summary of the hypotheses is depicted in Figure 1. It is hypothesized that GPD will have a direct positive effect on self-set goal change (SSGC), as found in previous research. It is also hypothesized that four variables will moderate this relationship: PJA, LTGD, LGO, and PGO.

Figure 1: Hypothesized Model



Performance judgment accuracy

Formal feedback and knowledge of results are effective for increasing performance because they explicitly inform a person of exactly how he or she has performed. Feedback is critical in the context of goal setting because this knowledge allows people to compare their performance with their goals and to determine their GPD. They then reflect on their past performance and GPD to determine if future goals need to be revised.

In addition to receiving formal feedback from external sources, a person could also receive implicit feedback just by performing the task itself, and by actively and continually noting to themselves via self-monitoring how they are performing. Self-monitoring is one of the three sub-functions of self-regulation (Bandura, 1986) and it involves attending to aspects of one's behavior. Self-monitoring and self-regulation both have been shown to be related to performance in the classroom setting (Kimmel et al., 2020; Lan, 1996; Morgan, 1987).

Accurate internal feedback may serve as a substitute for external feedback. Individuals who can accurately judge their performance might already know how they have performed, what their deficiencies are, and how to make up for them. Therefore, PJA is expected to moderate the effect of a GPD on change in future goals. Self-report measures are typically used to measure this form of internal monitoring. These measures may be biased since they are based on beliefs about one's own monitoring ability instead of their actual ability. This study attempts to improve upon self-report measures by more objectively determining how accurately one can judge one's own performance.

Long-term goal discrepancy

Another explanation for the persistent increase in SSG (even when goals are not attained) is the influence of long-term goals (e.g., see Donovan & Williams, 2003). Students' final class grades (or distal goals) may be more important to them than exam grades (or proximal goals), however, they must also do well on exams to achieve their final grade goal. If students do not achieve their exam goal (i.e., there is a negative GPD) they may need to set higher goals and do better on the next exam in order to achieve their final grade goal. Hence, the difference between performance and final grade-goal level (i.e., LTGD) is expected to be a moderator in the relationship between GPD and SSGC.

Learning and performance goal orientation

Dweck and Leggett (1988) described two types of goal orientation: LGO and PGO. People who are high in PGO desire to obtain positive appraisals of their performance and ability and try to avoid negative appraisals which will display their inadequacy. They focus on the evaluation of their performance and would rather perform an easy task and succeed than fail at a difficult task. This type of person strives to *prove* his or her ability. People who are high in LGO strive to *improve* their abilities. This type of person desires to increase his or her competence and tries to acquire new

knowledge and skills for improving or mastering task performance. They are less concerned with performance evaluations and do not mind failure as long as they can learn from it in order to improve future performance.

High PGO individuals are more likely to believe an entity theory of their ability; that is, they believe their ability is fixed and uncontrollable. In contrast, people with a high LGO are more inclined to believe an incremental theory which states that performance is in their control and is affected by effort, ability, and experience (Button, Mathieu, & Zajac, 1996; Dweck & Leggett, 1988). If performance is viewed as fixed and unchangeable (as it is with PGO) one could also infer that they believe it is stable. Thus, high PGO individuals may have little reason to revise their goals above their current level of performance. Also, when a high PGO person fails to attain his or her goal, they may be less likely to maintain the goal and try harder, and more likely to lower their goal. They may view performance as being stable, so in order to achieve a positive evaluation, goals must be manipulated – or lowered.

Alternatively, a high LGO person may be less likely to lower their goals, even in the event of failure, and would probably be more accepting of failure. They are less concerned with the evaluation and want to learn and master the task. They may be more likely to push themselves by maintaining goals when they fail, and by raising goals after they are attained. They may increase their self-efficacy and future goals when there is a small negative GPD. In contrast, a high PGO person may lower their goals with a small negative GPD because failure is a failure no matter how large or small.

METHOD

Data were gathered as part of a larger study. Undergraduate students completed three surveys that examined goals for academic performance and several other variables. The first survey was completed during the class period before an exam was taken (T₁). The second survey was completed the class period after the exam was taken, but before formal feedback (i.e., the grade) was provided (T₂). Finally, the third survey was completed after exam feedback/grade was provided (T₃).

Participants

There were 257 participants, of whom 243 completed survey 1, 195 completed survey 2, and 200 completed survey 3. In addition to surveys, grade point average (GPA) and scholastic aptitude test (SAT) scores were obtained. Data were reduced to participants who completed all three surveys and whose GPA and SAT scores were available ($N = 127$).

Instruments

On the first survey, self-set grade goal for the exam (SSG) was measured using the four-item scale ($\alpha = .81$) used by Wood and Locke (1987). Self-set grade goal for the overall class (i.e., final class grade) was measured using a scale similar to that used for assessing exam grade goal ($\alpha = .84$). LGO ($\alpha = .88$) and PGO ($\alpha = .80$) were assessed using a 16-item scale (8 items for each dimension) developed by Button, Mathieu, and Zajac (1996). Additionally, demographic variables such as gender and age were also acquired via the initial survey given that previous research suggests demographic differences in goal orientation (Button, Mathieu, & Zajac, 1996). The second survey measured expected exam grade (for the exam just taken) with one item: Now that you have taken your last exam, what grade do you think you obtained on the exam? The third survey measured SSG ($\alpha = .84$); however, the referent for the items on this survey was the next exam.

SSG change (SSGC) was calculated by subtracting SSG at T₁ from SSG at T₃. The participants' actual exam grades were obtained from the instructors with the students' permission. GPD was assessed by subtracting a person's SSG at T₁ from their actual exam grade. PJA was calculated as the absolute value of the difference between estimated exam grade and actual exam grade. Higher accuracy is indicated by a lower score and vice versa. Finally, participants' academic ability was measured by obtaining participants' overall GPA and SAT scores from the university registrar with the students' permission.

RESULTS

Before testing the hypotheses, the relationships between goals and performance were examined to determine if they are consistent with previous research. The correlation between exam grade goal and exam grade is statistically significant ($r = .22, p < .01$). The correlation between final course grade goal and final course grade is also statistically

significant ($r = .27, p < .01$). These results are consistent with the findings from numerous previous studies (Locke & Latham, 1990, 2013b).

All hypotheses were tested using hierarchical regression analysis. The results of the analyses are shown in Table 1. Age, gender, GPA, and SAT scores were controlled for in the regression analyses given that they are expected to be correlated with some of the variables of interest.

Table 1: Hierarchical Regression Analyses Results: Dependent Variable Self-Set Goal Change (SSGC)

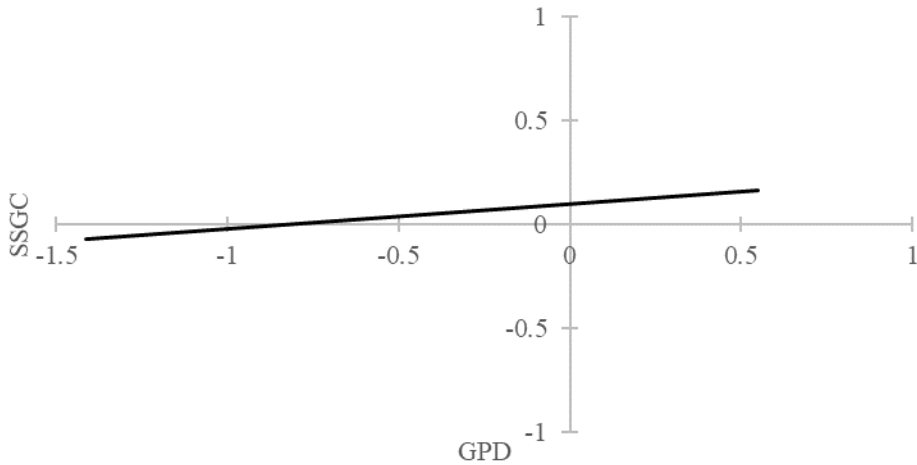
	R ²	Δ R ²	Δ F	Unst. b	SE	St. β
Step 1: Control variable ^a	.097 *	.097	3.305 *			
Age				-.028	.024	-.113
Gender				.129 *	.050	.228
GPA				.114 *	.050	.219
SAT				-.000 †	.000	-.173
Step 2: Independent Var.	.250 ***	.152	24.791 ***			
GPD				.118 ***	.024	.427
Step 2: Main effects	.323 ***	.226	20.177 ***			
GPD				.147 ***	.024	.532
PJA				.123 ***	.034	.298
Step 3: Interaction	.365 **	.043	8.059 **			
GPD x PJA				.077 **	.027	.438
Step 2: Main effects	.311 ***	.214	18.742 ***			
GPD				.472 ***	.110	1.707
LTGD				-.358 **	.109	-1.281
Step 3: Interaction	.479 ***	.169	38.893 ***			
GPD x LTGD				.096 ***	.015	.787
Step 2: Main effects	.265 ***	.168	13.818 ***			
GPD				.127 ***	.024	.459
LGO				-.041	.026	-.137
Step 3: Interaction	.271 ***	.006	.999			
GPD x LGO				.030	.030	.259
Step 2: Main effects	.259 ***	.162	13.218 ***			
GPD				.122 ***	.024	.440
PGO				-.033	.026	-.098
Step 3: Interaction	.291 ***	.032	5.440 *			
GPD x PGO				.088 *	.038	.712

^aFirst step for all 5 separate regressions depicted in Table.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

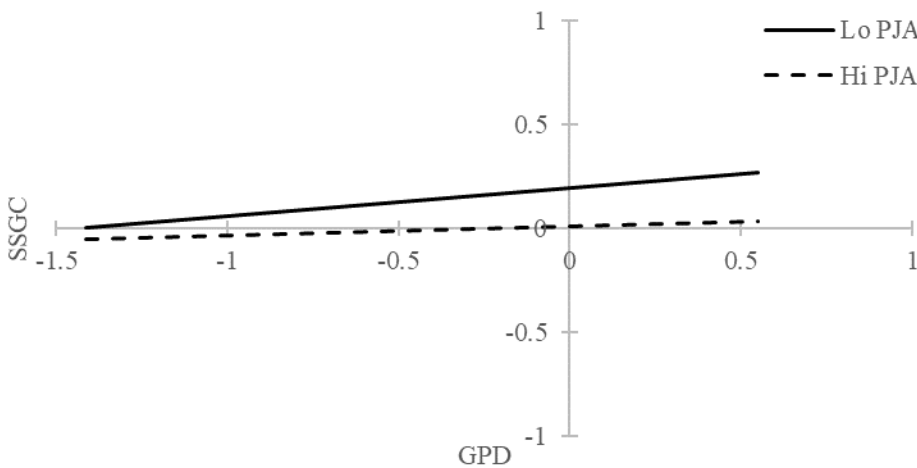
As expected, GPD has a positive effect on SSGC. Furthermore, the nature of the relationship is as expected (see Figure 2). When GPD is positive (i.e., when performance exceeds goals), SSGC is positive (i.e., goals are increased). When GPD is negative (i.e., when goals are not achieved), goals are sometimes increased and sometimes decreased.

Figure 2: Effect of GPD on SSGC



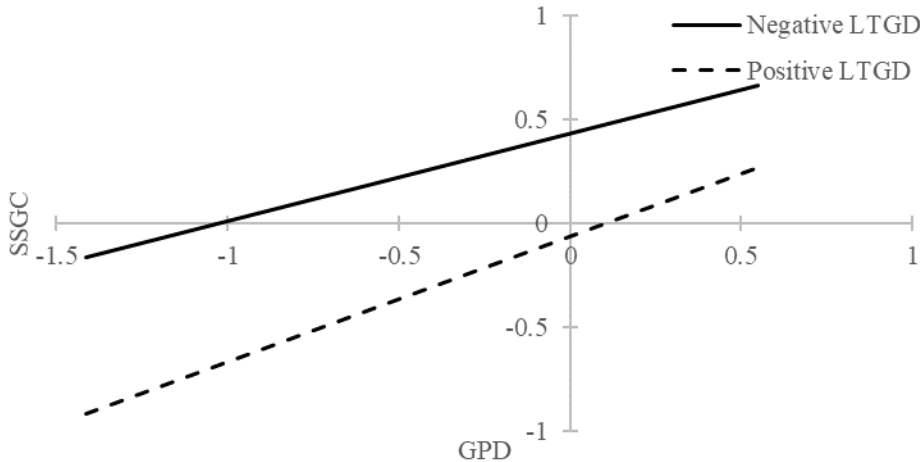
PJA moderates the effect of the GPD on SSGC. When PJA is high, SSGC increases when GPD is positive and decreases when GPD is negative (see Figure 3). When PJA is low, SSGC tends to increase regardless of the size or direction of GPD. Hence, it appears that PJA may be driving the inconsistent effects of the negative GPD. Contrary to expectation, goals are more likely to increase as a result of a negative GPD when PJA is low rather than high.

Figure 3: Effect of GPD on SSGC Moderated by PJA



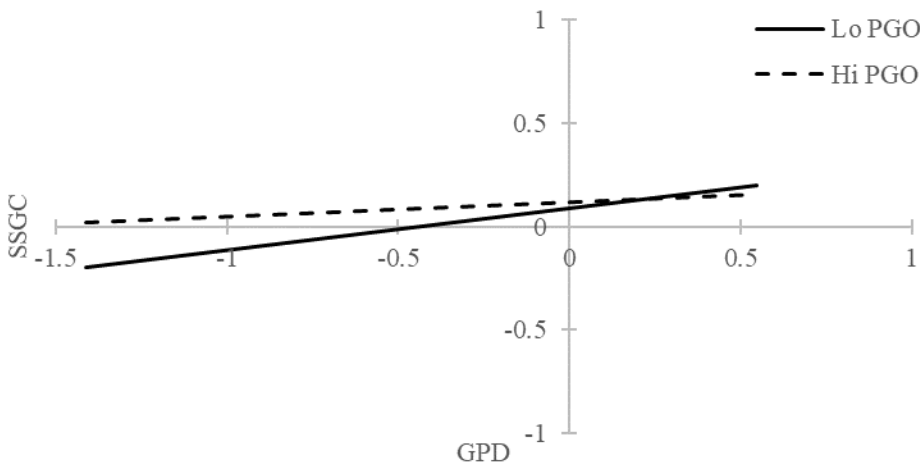
The LTGD moderator is also significant. When exam grade exceeds the final grade goal for the course (i.e., a positive LTGD), goals increase when there is a positive GPD and decrease when there is a negative GPD (see Figure 4). When exam grade is lower than the final grade goal for the course (i.e., a negative LTGD), goals increase even when there is a fairly large negative GPD. Participants raise their goals even when previous goals are not achieved in order to attain their long-term goals. This suggests that long-term goals may influence current goals and they may drive the variable effects of a negative GPD.

Figure 4: Effect of GPD on SSGC Moderated by LTGD



LGO does not moderate the effect of the GPD on SSGC. However, the relationship is moderated by PGO. Contrary to expectation, when the grade is less than the goal (i.e., when GPD is negative), SSGC decreases more when PGO is low rather than high (see Figure 5).

Figure 5: Effect of GPD on SSGC Moderated by PGO



DISCUSSION

With respect to academic motivation and achievement, Anderman (2013, p. 187) indicates that: “it is important that teachers help students set realistic, appropriately challenging academic goals and monitor their own progress.” Similarly, Morisano (2013, p. 503) recommends that “teachers, classroom aids, guidance counselors, and parents should...consider promoting the setting of specific, challenging goals by students, and asking them to choose and reflect on personally important short- and long-term goals.” In support of Anderman’s and Morisano’s advice to teachers, this study confirms that goal setting is an effective technique in the real-world university classroom environment. For both exam grade and overall course grade, goals are correlated with performance. It should be noted that the goal-setting program that was used in this study was very informal and required very little in terms of resources – it required only a few minutes of class time for students to set their own personal goals. Yet, this simple and quick motivation and self-regulation technique appears to yield positive results in terms of academic performance. The positive return on investment provides a compelling reason for faculty to ask students to explicitly set goals in the

classroom environment, at least for final grades and major performance tasks such as exams. The goal-setting process could be as simple as asking students, at the beginning of the semester, to use a journal to set and document their goal for the overall course grade. As exams approach (e.g., the week before the exam), students could be asked to establish and document (e.g., in a journal) their goals for the exam. After the exam, and/or periodically throughout the semester, the professor could prompt students to reflect on their goal progress and to consider any strategies or corrective actions that may be needed to attain their final grade goal.

The results also show that GPD has a positive influence on goal change. The direct relationship indicates that people change their goals not only based on past performance, but also in response to the relationship between prior goals and performance. Goals for the subsequent task increase even when the negative GPD ranges up to a moderate size. The moderators help explain why goals sometimes increase when there is a negative GPD.

PJA moderates the relationship between GPD and SSGC. Hence, the magnitude of the GPD is important for determining the direction of SSGC depending on participants' level of PJA. When PJA is low, the relationship is stronger, and participants are more likely to raise goals even when prior goals are not achieved. When PJA is high, goals increase when prior goals are attained (i.e., a positive GPD) and decrease when prior goals are not attained (i.e., a negative GPD), although goal change is small. Therefore, for students who are able to more accurately judge their performance, future goals are adjusted (albeit slightly) to the degree of prior success or failure. They do not appear to believe their future performance will be much above or below prior success or failure. Perhaps, people high in PJA use self-monitoring and internal feedback to regulate their behavior and do not have a desire to use goals. Since people low in PJA might use these techniques less well, they might rely on other regulating mechanisms such as setting goals.

Unexpectedly, goals for the subsequent task increase when PJA is low regardless of whether or not previous goals are attained. One explanation for the unexpected findings is that when PJA is low, participants may have had inflated perceptions of their ability and increased their goals as a result. Alternatively, when PJA is high, participants may have more realistic expectations and revise goals based on previous performance since they may have had a better idea of why they achieved a particular performance level.

Another explanation for the increase in goals when the GPD is negative is the role of long-term goals. LTGD moderates the relationship between GPD and SSGC and it appears to be driving the inconsistent effects of a negative GPD. When performance is not adequate enough to achieve the long-term goal, goals are increased – even when the GPD is quite large and negative. It appears that goals are increased to close the gap on the long-term goal. However, when performance is above the final goal, goals increase when there is a positive GPD and decrease when there is a negative GPD. When participants have performed at a level likely to exceed their long-term goals, it appears that they do not lower their goals in response to the slack that has been created. Hence, it appears that participants revise short-term goals based on the future (or long-term goals) when they are not making adequate progress toward the long-term goal. Alternatively, participants revise short-term goals based on the past, or the GPD, when making adequate progress toward the long-term goal. Comparisons of the effectiveness of distal vs. proximal goals have led to mixed results (Locke & Latham, 1990; Sun & Frese, 2013). The findings of this study suggest that it might not be a question of effectiveness but, rather, a question of how long-term goals, short-term goals, and past goal attainment interact over time.

The relationship between GPD and SSGC is also moderated by PGO. Contrary to expectation, when PGO is high, goals for the subsequent task increase regardless of whether or not previous goals are attained. The relationship suggests that participants tried to prove their ability as indicated by always increasing their goals. However, this relationship might suggest that participants did not perceive their performance or ability as stable. If performance was perceived as stable, they would probably adjust their goals downward when GPD was negative because of their desire to prove their ability. Another explanation might be that participants were trying to prove their ability through performance alone, and not via the attainment of goals – they might have lacked commitment to their goals.

One reason for the presence of a PGO moderator and a lack of an LGO moderator could be due to the independent variable (i.e., GPD). GPD is a measure of goal attainment and, since goals were based on performance and not learning, the GPD may be more relevant to those who are PGO and less relevant to those who are LGO. Had the GPD been based on learning goals it may have been more relevant to those high in LGO.

Implications for goal-setting theory

The results of this study have several implications for goal-setting theory. This study provides evidence for why failure has variable effects on goal revision. Individual differences (such as PJA, LGO, and PGO) may result in compensatory strategies for some and decreased goals for others. These individual differences may help explain why goal setting is less effective when an individual has had repeated failures. For some individuals, failure may initially result in decreased goals, and repeated failures may eventually lead to withdrawal from the task. Future research should further explore the variable effects of failure. Future research should also attempt to identify if there is a threshold, or critical GPD value, at which goals are decreased vs. maintained vs. increased.

This study may also have implications for task complexity differences in the goal-performance relationship. The effects of goals on performance are stronger when performing simple tasks than complex tasks (Wood, Mento, & Locke, 1987). Researchers have proposed that the difference may be due to the lack of adequate task strategies that are available when performing complex tasks (Locke & Latham, 1990; Wood et al., 1987). An alternative explanation may be an individual's ability to monitor and judge performance. For example, it may be more difficult to judge how well one is performing when the task is complex as opposed to simple. The relationship between goals and performance may be strong for individuals who can effectively monitor their behavior and accurately generate internal feedback. These individuals may generate and receive accurate feedback as they perform the task, as with a simple task. Alternatively, when individuals cannot effectively monitor their performance or generate accurate internal feedback, they may be less effective at regulating their performance since they cannot adequately regulate their behavior until feedback is received from an outside source.

Implications for business schools and higher education

This study also has several implications for business schools and higher education. Morisano and colleagues (Morisano, 2013; Morisano et al., 2010; Morisano & Locke, 2013) note that many universities attempt to enhance student success through programs such as mentoring, freshman-interest groups, learning communities, and service-learning, despite a lack of rigorous research supporting their effectiveness. Goal setting, in contrast, offers “a quick, effective, and inexpensive intervention for struggling undergraduate students” (Morisano et al., 2010, p. 255) that is backed by hundreds of empirical studies in both the lab and field (Locke & Latham, 1990, 2013b). Goal setting can be initiated by students, faculty, counselors/advisors, or others, and can be used to enhance the motivation and academic performance of all students, including struggling students.

The findings of this study suggest that both proximal goals (e.g., exam grade) and distal goals (i.e., course grade) interact with one another, so it is important for students to focus on both types of goals. This study also suggests that accurate feedback is important in the context of grade goals. Therefore, to maximize the effectiveness of goal setting, it is important for faculty to provide feedback to students regularly so that they have an accurate assessment of their goal progress. Finally, although goal setting appears to be an intervention that can be used successfully with all students, goal-setting processes do not work the same for all students. A student's goal orientation may influence the types of goals they set and how they respond to positive or negative GPDs. Therefore, students should be encouraged to set both learning and performance goals.

Limitations and future research

Goal-setting theory states that specific, difficult goals increase performance, or lead to higher performance than easy, do your best, or no goals. However, goal-setting research has not fully addressed the meaning of goal difficulty. “How challenging is challenging?” (Locke & Latham, 2013a, p. 624). Difficult goals fall somewhere between easy and impossible; a more precise definition would be beneficial to theory and practice (cf. Grozav, 2018). Goal difficulty cannot be operationally defined as a certain goal level since individuals have different abilities. However, goal difficulty could potentially be defined in comparison to past performance (e.g., a percentage increase above past performance). Future GPD research should attempt to identify an optimal goal difficulty in an effort to precisely define what goal difficulty means.

One limitation of this study, due to the task, is floor and ceiling effects. Floor effects are a potential problem in the educational setting since an “F” is the lowest performance level possible even though it spans a large range. Ceiling effects may have been a problem in this study since performance was skewed with many students receiving an “A”.

Even though this study illustrated how student goals change over time, it did not demonstrate how, or if, these changes affect course performance. Future research should examine these relationships across two or more tasks to determine

if goal change results in performance change over time, or if people are simply manipulating their goals while performance remains stable.

Future research should also take into account student self-efficacy. Self-efficacy has been shown to be an important variable in the effectiveness of goal setting. Its relationship to performance is very similar to that of goals and performance; it has a positive relationship with performance (Button, Mathieu, & Aikin, 1996; Mathieu & Button, 1992; Phillips & Gully, 1997; Wood & Locke, 1987). Furthermore, GPD influences self-efficacy for future tasks and has the same variable effects on self-efficacy as it does with goals (Bandura & Cervone, 1986). As such, the effect of the GPD on SSGC may work through self-efficacy change.

In summary, this study has attempted to clarify the processes through which students (in a classroom field setting) regulate their behavior via goals over time. The study provided support for goal setting theory as well as for self-regulation theory. Students' self-set goals are related to exam and course performance. Students adjust goals, upward or downward, based on GPDs. When students achieve goals, they adjust goals upwardly. When they do not achieve goals, goal revision depends on PJA, LTGD, and PGO. Goal setting is an elegant theory. Behavioral regulation is a complex phenomenon and is quite flexible depending on the past, present, and future, as well as individual differences. Yet, the foundation of goal-setting theory and its basic tenets are straightforward, and it is a simple but highly effective technique for enhancing student motivation and performance.

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Persuading With a Collocutor's Values

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ABSTRACT

The purpose of this study is to propose online pedagogical exercises instructing MBA students (MBAs) on the use of a persuasion technique. This technique calls for the framing of oral arguments with a collocutor's values. MBAs experience this framing technique in a role play. Then, they identify opportunities to employ this technique in their workplace. Free-form surveys and ratings completed by MBAs and collocutors (i.e., role-play partners) suggest preliminary support for basing one's conversational arguments on the values of a collocutor. Such a persuasion strategy may be an effective way of moderating the other person's opinion.

Keywords: oral persuasion, values, communication framing, MBA, online pedagogy

INTRODUCTION

Persuading is a significant competency for success in the workplace (e.g., Bartram, 2005). Of the 967 jobs featured on the Occupational Information Network (O*NET, n.d.), persuading skills are identified as *important to extremely important* to possess in 356 (37%) of these jobs. CEOs must persuade board members and stockholders. Salespeople try to persuade customers. Entrepreneurs seek to persuade investors. Persuasion is crucial in employee relations and labor relations. Managers persuade employees and leaders persuade followers. Even entry jobs call for oral persuasion. Indeed, there is a need for persuasive individuals across organizational levels and professions who can bring stakeholders together.

Although persuasion is an oral communication skill that can be developed (Brink & Costigan, 2015), Reinsch and Shelby's (1997) research indicates that persuasion is one skill that has given young business practitioners the most challenge in doing it right. Developing MBA students' oral-persuasion skills that foster common ground instead of polarization with a collocutor (i.e., another individual) seems prudent. We think that persuading with the other person's values may be one avenue to achieving this end. This online pedagogical study reports on an exploratory effort to instruct MBAs in the use of persuasion with a collocutor's values.

REVIEW OF LITERATURE

Oral communication is defined as "linguistic communication that exchanges information vocally and aurally" (Brink & Costigan, 2015, p. 206). There are three types of oral communication: presenting, listening, and conversing (Barry & Fulmer, 2004). Conversing behavior is characterized by high interactivity meaning that the oral communication is synchronous, live, and two-way (Barry & Fulmer, 2004). Along with influencing, explaining, informing, describing, advising, negotiating, and resolving conflict, persuading is an example of conversing behavior (Brink & Costigan, 2015). Not to be confused with the influencing behavior which can have a persuasive side (e.g., rational persuasion, inspirational appeals) as well as a social-interaction feature (e.g., building coalitions, exchanges), persuading is more narrowly understood as a rhetoric strategy that focuses on the strategic wording of message content delivered by a particular source to a particular audience – audience analysis, message construction, and message delivery are key features of persuasion (Costigan & Brink, 2020). The present study focuses on persuasion, not influencing behavior.

Communication framing is a persuasion technique intended to capture the attention and agreement of the targeted audience, directing them towards salient characteristics of the message (Druckman, 2001). This saliency in communication framing tends to activate the use of "cognitive shortcuts or heuristics in processing information," speeding judgments in an intended direction (Shen & Edwards, 2005, p. 796). Druckman (2001) has documented the strong effects of communication framing on attitudes, behavioral intentions, and behaviors of others. A particular framing strategy deemed highly potent by Druckman (2001) entails the use of value-based language to surround message content. Communicated values are strategically positioned to inspire recipients to accept a particular stance. Druckman (2001, p. 490) asserted that "values ... are powerful and reliable weapons in the persuader's arsenal."

Differentiating "surface attitudes" and "attitude roots" (Hornsey & Fielding, 2017, p. 460) is essential to understanding

a gulf between differing viewpoints. Surface attitudes reflect highly specific yet superficial opinions about issues whereas attitude roots are hidden motivations giving underlying explanations for surface attitudes and their strength. The deep roots of surface attitudes are values (Hornsey & Fielding, 2017). The them-versus-us stance on so many controversial topics is built on opposing value systems. It is difficult to have success changing attitudes without first understanding the values upon which these superficial attitudes are formed. Trying to change surface attitudes is likely to fail whereas developing persuasive arguments that focus on underlying values of a surface attitude will be more successful.

Liberalism versus conservatism is one example of fundamentally different value systems, which, in turn, produces an opposing set of attitudes (Graham, Haidt, & Nosek, 2009). When targeting opponents for persuasion, both liberals and conservatives frame arguments with their own moral values, not the values that are more acceptable to the opposition (Feinberg & Willer, 2015). It is a default-like persuasion strategy, arguing in a way that we know best. Individuals on both ends of the continuum tend to speak past one another, advocating for a given position with value-laden language they find most appealing. Opponents' attitudes remain unchanged with this form of argumentation (Feinberg & Willer, 2015). Nonsensically, individuals keep forming arguments in the same unsuccessful way, only hardening the negative feelings in some relationships.

Feinberg and Willer's (2015) findings suggest a promising alternative. Persuaders tend to be more successful in changing an opponent's extreme attitudes when arguments are framed in language reflecting the adversary's values. Resembling other communication-framing studies, Feinberg and Willer's (2015) results are based on "paper-and-pencil" effects. That is, written or videotaped stimuli presented as experimental manipulations have been the primary research methods for investigating a variety of framing effects (Druckman, 2001). Framing studies in communication (e.g., Shen & Edwards, 2005), management and industrial-organizational psychology (e.g., White, Charles, & Nelson, 2008), and political science (e.g., Nelson & Garst, 2005) have employed a sterile experimental setting for examining framing effects. Our study takes a different tact having MBAs persuade in the interpersonal realm of a live conversation: the role play. The principal aim of this pedagogical study is to develop MBAs' capacity to persuade with collocutor values in a two-step learning process. First, MBAs develop their persuasion skills in framing their arguments with a collocutor's values in a role play. Next, they apply this technique to their workplace identifying relationships that this framing strategy can be employed.

Research Question 1: Can students develop persuasive arguments framed with the collocutor's values in a role play?

Research Question 2: Can students identify workplace relationships that persuasion with collocutor values could be used?

METHOD

Participants

Students enrolled in two sections of an elective Business Communication course in a Northeastern college's MBA program participated in this study. The unit of persuasion instruction consisted of online exercises spanning a few days. After course grades were submitted, the first author contacted former students by email asking if their assigned work could be used in a formal study. One MBA requested that his work not be included; another student did not complete the assignments. The sample consisted of 28 MBAs (16 males and 12 females). All were working in some capacity while enrolled.

Procedures

MBAs were provided examples of arguments developed according to Feinberg and Willer's research and Graham et al.'s conservative-liberal values (see Table 1). The examples in this table pertain to minimum wage. Should the national minimum wage be raised to \$15 per hour or kept at \$7.25? These examples were intended to give MBAs an understanding of how to construct arguments for the role play.

Table 1: Examples of Arguments Framed With Collocutor Values

Example #1: Assume that a liberal role-play partner wants to argue for raising the national minimum wage to \$15 per hour. Your task is to give arguments in favor of keeping the national minimum wage at \$7.25. Your arguments should be framed with the role-play partner's liberal values. Examples of these arguments are provided below. Note that the bolded words reflect Feinberg and Willer's liberal values: caring and nurturing of others, protecting others from harm, giving to others, social justice, fairness.

- 1) Raising the minimum wage to \$15 an hour might spur the less educated populations to drop out of school for these higher paying jobs – in the long run, these high school dropouts **will be greatly harmed** due to their lack of education, producing a longer-term **injustice**.
- 2) Such a large increase in the hourly wage rate could lead to more labor-saving automation (e.g., McDonald's kiosks) and overseas outsourcing that would permanently replace the less-skilled workers which includes minorities. This does not seem **fair**.
- 3) For companies that cannot afford to raise their hourly wage rate by \$8, such an increase could mean that fewer employees would be employed. Such a raise may lead to layoffs. Which employees would **suffer** the most? Minorities who tend to be the last employees hired and let go first ... the unemployment rate of minorities could actually rise ... how **fair** is this?

Using facts in the message content instead of more general messaging – computer searches would be needed for these facts:

- 4) For companies that cannot afford to raise their hourly wage rate by \$8, such an increase could mean that fewer employees would be employed. Such a raise may lead to layoffs. A recent Congressional Budget Office Report forecasts that 1.4 million jobs would disappear. Which employees would **suffer** the most? Minorities who tend to be the last employees hired and let go first ... the unemployment rate of minorities could actually rise ... how **fair** is this?

Example #2: Assume that the conservative role-play partner wants to argue for keeping the national minimum wage at \$7.25. Your task is to give arguments in favor of raising the national minimum wage to \$15 per hour. Your arguments should be framed with the role-play partner's conservative values. Examples of these arguments are provided below. Note that the bolded words reflect Feinberg and Willer's conservative values: patriotism, loyalty, respect for authority, respect for tradition, self-discipline, self-sufficiency, sanctity, purity for maintaining good health.

- 1) The additional income will be spent by these higher-paid employees -- this increased spending will ripple through the economy **creating even more jobs** benefitting other low-income folks – **this is how the U.S. economy is supposed to grow ... traditionally through job creation**.
- 2) An increase in the minimum wage to \$13 to \$15 per hour raises the standard of living of low-income workers -- the health of these workers and their families will greatly improve; these folks and their children will be **less susceptible to sickness and long-term health risks**.
- 3) Higher take-home pay will help these less-skilled workers become more **self-sufficient** and **less reliant on government**.

Using facts in the message content instead of more general messaging – computer searches would be needed for these facts:

- 4) Higher take-home pay will help these less-skilled workers become more **self-sufficient** and **less reliant on government**. A recent Congressional Budget Office Report supports this indicating that 900,000 Americans would be lifted out of poverty with such a wage increase over the next few years.

A key to a successful role-play outcome is knowing the other individual's liberal/conservative convictions ahead of time; hence, each MBA selected a role-play partner (collocutor) who they knew well, such as a coworker, classmate, friend, or family member. After identifying a suitable role-play partner, MBAs asked the partner to choose one issue

to discuss. Sample issues are listed in Table 2. Given that sociopolitical topics are often discussed in the workplace and are common sources of heated conflict, we did not limit the role-play choices to business only. The role-play partner was asked to let the MBA know ahead of time what issue they wanted to discuss and what side of the argument they preferred. A successful role play depends on making sure the partner's chosen side of the argument corresponds with their liberal or conservative leaning. Regardless of their own liberal or conservative leaning, MBAs were instructed to take the opposite side of the argument from their partner's chosen position. MBAs and role-play partners were given time to think of arguments supporting their positions. MBAs were reminded to frame their arguments with their partner's liberal or conservative values like the examples shown in Table 1; they were asked to develop five or more arguments. Then, they completed the role play. The average time spent on these role plays was 23 minutes. After finishing the role plays and post role-play assessments, MBAs fully debriefed their partners on how this persuasion technique is supposed to work. The second exercise required MBAs to explain how communication framing with another person's values could be utilized at work.

Table 2: Sample Role-Play Topics

Description of Role-Play Topics:

- CEO pay is much too high and indefensible versus CEO pay is appropriate and defensible.
- Equal employment opportunity laws (protecting against illegal discrimination) and affirmative action are needed in today's workplace versus EEO laws and affirmative action are no longer needed.
- Should not be legal for companies to fire employees for smoking off the job versus companies should be allowed to fire employees for smoking off the job.
- Businesses should serve all customers including LBGTQ folks without discriminating versus businesses should be allowed to refuse service to LBGTQ customers for bona fide religious reasons.
- Tuition at public universities should be cost-free versus tuition at public universities should be the responsibility of the student.

Note: In the examples above, the side of the argument presented first is the liberal viewpoint; the argument presented second is the conservative viewpoint.

FINDINGS

To address Research Question 1 (i.e., could MBAs use this study's persuasion technique effectively in a role play), we employed multiple assessment methods and multiple rating sources. To begin, we had two raters (first author and research assistant) assess whether the MBAs formed their arguments according to the instructions (i.e., framing arguments with the role-play partner's liberal/conservative values). More specifically, the raters discussed Feinberg and Willer's (2015) procedures, the examples in Table 1, and Graham et al.'s (2009) conservative/liberal values. Then, they independently coded the arguments developed by the 28 MBAs for correctness. A coding of "1" was given if the values used to form the arguments were mostly correct and a coding of "0" was given if the values were mostly incorrect. The agreement level for the two raters was 96.5%. Given that chance could have yielded such high agreement (i.e., 27 of 28), we computed Cohen's kappa to assess this possibility. We found high interrater reliability (.89) with Cohen's kappa (Lombard, Snyder-Duch, & Bracken, 2002). A third research assistant was called on to resolve the one coding discrepancy. After attaining high reliability, the raters' ratings indicated that 22 students formed their arguments according to the instructions while six did not. This 79% success rate (21% failure rate) suggests that this technique was difficult for some.

To assess the extent to which MBAs perceived that their persuasion skills were developed in the role play, they completed the following: "This role-play activity improved my skills on how to use values to persuade others." The anchors for this item are: "1 = strongly disagree" to "5 = strongly agree." The mean rating on this 5-point scale is 4.20 (SD = .63), suggesting that the 22 MBAs (those forming arguments correctly) recognized the development of their persuasion skills after experiencing the role play. In the free-form assessment, MBAs provided responses to the following: "Critique your performance in the role play and what would you do differently if given another chance?" Most of the comments made by the 22 MBAs were positive giving another endorsement of this activity. Table 3 presents samples of favorable and unfavorable comments.

Table 3: MBA Critique of the Role-Play Experience

Favorable Comments:

- Our conversation was productive and worth every minute – we presented our different views without defending or shutting down our opinions.
- I did a decent job of not arguing but more exploring my partner’s reasoning.
- It allows for both sides to communicate without getting defensive and arguing in a way that only convinces the speaker.
- The technique was definitely more influential than had I debated from a conservative standpoint only.

Unfavorable Comments:

- My arguments could have been stronger if I used all of the conservative values instead of a couple.
- The topic chosen by my partner was challenging – it was difficult to come up with arguments because my side of the argument clearly goes against my conservative values.
- My authenticity would be stronger if I were talking about a topic I had an interest.

MBAs asked their role-play partners (prior to the debriefing): “The extent to which the MBA’s arguments had changed, if at all, his/her views on the discussed issue.” An 11-point scale with “0 = not at all,” “5 = moderately influenced,” and “10 = greatly influenced” was utilized. The mean rating on this item is 5.36 (SD = 1.53, $n = 22$), suggesting that framing with the role-play partner’s values had a moderate influence in producing an opinion change. In the free-form assessment, MBAs asked their role-play partners: “To elaborate more on what they experienced in the role play.” The most frequent response was reduced defensiveness. One partner volunteered: “We could have a more open discussion. It allows for both sides to communicate without getting defensive and arguing in a way that only convinces the speaker.” Another added: “None of his arguments made me feel defensive or irritated.” A third indicated: “I didn’t feel that my opponent (MBA) was trying to change my opinion on the topic. As a result, I felt more willing to listen to what he had to say.” A fourth partner added that “She was shocked that she agreed with the MBA on some of the arguments.”

In sum, the high mean ratings and mostly positive free-form responses made by MBAs and role-play partners and the assessments made by the instructor and assistants on the correctness of MBAs’ arguments seem to affirm the development of MBA persuasion skills (i.e., framing oral arguments with the partner’s values) with this study’s role-play exercise.

To assess Research Question 2 which had the students identifying workplace relationship(s) that the framing technique could be used, the first author assigned a grade on the quality of the applications submitted. All applications shown in Table 4 met the instructor’s standard for acceptability. Each application was proposed by multiple students suggesting veridicality due to such a strong consensus.

Table 4: MBA Responses Extend Framing With Collocutor Values to Workplace Relationships

<i>Relationships That This Persuasion Could Be Used</i>	<i>Number of MBAs Giving This Response</i>
• When relating to a coworker, the employee could present ideas framed with coworker values.	9
• When relating to a subordinate, the manager could present instructions framed with the employee’s values.	7
• When relating to the boss, the employee could present ideas framed with the boss’ values.	6
• When considered for a promotion, present why you deserve the promotion framed in the values of the decision maker.	5
• When selling a product/service, sell the product/service features that relate to the prospective customer’s values.	4
• When presenting proposals in a cross-functional meeting, give ideas framed with the functional values of each participant (e.g., HRM idea framed with an accountant’s values).	4

Note: There were 35 responses submitted by 28 MBAs.

To supplement this finding, 15 MBAs in the second section were asked to develop a written dialogue of a workplace exchange demonstrating how this persuasion technique could alter another person's opinion. The instructor's grading indicated that the 15 dialogues were completed satisfactorily. Sample dialogues by four MBAs are shown in Table 5.

Table 5: Using Collocutor Values in the Workplace

*Instruction: Explain how you could use persuasive arguments framed with collocutor values in your workplace. More specifically, provide a hypothetical interpersonal dialogue that demonstrates the use of this persuasion technique. Use **bold font** to highlight the values of the other person in this dialogue.*

Student #1: My grocery store had a pest-control problem. An outside pest-control specialist was contacted to eradicate the problem. A fellow manager noticed that the problem was not getting better. In frustration, she took photos building a case against the store manager. If the pest problem wasn't resolved in one week, she was planning to contact corporate giving evidence that he wasn't doing his job. As her coworker, I encouraged her to take a different, less-confrontative tack. I knew she valued **honesty, loyalty, teamwork, and good communication**. I asked if she had ever experienced a situation when someone went behind her back complaining about her to the boss? Did she feel **betrayed** and expect more **loyalty**? Did she think the store manager would react in a similar way as she did? Wouldn't it make sense to give the store manager an opportunity to give an **honest** explanation as to why things hadn't improved? **Two-way communication** is needed here: **listen to understand** his take and then give an **honest** appraisal of how the problem is being handled. Did she want to preserve the **good relationship** that she has with the store manager? All of the managers have worked as a **team** including the store manager – why not ask him if there is anything that you could do, as a **team player**, to mitigate the problem.

Student #2: I have a sales representative job. My supervisor wanted me to go directly from the home office to the store where I was running in-store promotions – he didn't want me making any unscheduled stops or breaks. My supervisor valued **hard work, hustle, commitment until the job is completed, and good results**. I argued that “We should be able to stop along the way for food, gas, or at home. It shouldn't matter how quickly we arrive at the store as long as we **work hard and hustle** while there and come away with **good results**, which is more sales.” The supervisor argued: “The longer you are in the store, the higher your chances of getting those sales because you are spending more time with the store's personnel.” I would counter: “We can **stay late at the store until the job is successfully completed**, to make up for lost time along the way.”

Student #3: My boss has multiple one-on-one coaching meetings each week. His primary value is **increasing sales productivity**. In my opinion, these individualized coaching sessions are excessive in number. I would ask: “Considering our daily standards are 40 dials, three opportunities, and two presentations, do you think that having these individualized meetings could be taking too much time away from our **selling activities**? Perhaps, we could come up with a different tracking system or metric to monitor **performance improvements/drop offs** without so many meetings each week.”

Student #4: In my pre-pandemic job, I wanted more freedom to work part of my workweek from home. My manager who was more traditional was against this. He valued **high performance, efficiency, low costs, and commitment to work**. I would argue: “While **productivity** may be a concern, we now have technology available allowing you and other managers to track the **performance** of each employee throughout the work week. The **amount of time** that the employee is not engaged on his/her computer can also be monitored. In the few times I've worked from home, I've felt more **committed, less distracted, and really more productive**.” “New technology also allows employees to do everything at home that they would do at the office, including attending meetings through video conferencing. There would be **no additional costs** because employees could provide their own equipment needed for conferencing.”

DISCUSSION

Although Hornsey and Fielding (2017, p. 471) recommended the use of persuasion with an adversary's values in the context of science, they saw “no reason to think that it could not apply to other issues that are infused by hot cognition and captive polarizing inter-group dynamics.” Our data support their thinking suggesting that framing oral arguments with the values of a collocutor could be successfully employed in role-play conversations involving contentious business and sociopolitical topics. As indicated in their self-ratings, most MBAs seemed to learn how framing with

collocutor values is supposed to work after participating in the role play. Role-play partner ratings suggest preliminary support that an opinion change occurred for most. The free-form responses of the MBAs and their partners also corroborated its efficacy. The gestalt of these responses is that it is a smart persuasion technique, lessening the likelihood of defensiveness.

Admittedly, this tactic might give the agent of persuasion an advantage in a discussion or disagreement. Winning with this framing strategy should not be the primary goal – moving towards a shared understanding and some form of agreement is the preferred outcome. It might open opportunities for healthier interactions, better listening, and suspended judgments. Framing arguments with another's values seems to have the potential for keeping emotionally charged conversations more positive. Apparently, the civility in the role-play activity was not compromised even though the discussed issues could easily have degenerated into some antagonism. Such outcomes are still speculative until confirmed in future research.

The significance of our second findings suggests that the persuasion technique could travel beyond the more stereotypical liberal-conservative value systems to specific values uniquely held by a collocutor. We especially found this generalizability in the 15 supplemental submissions in Exercise 2, four of which are provided in Table 5. As shown in Table 4, 13 MBAs responded that this technique might be helpful in boss-subordinate relationships. Value congruence theory (e.g., Meglino & Ravlin, 1998) might give an understanding of this. This theory suggests that when a boss and subordinate's personal values are similar, both experience increased satisfaction in the relationship. On the other hand, when the boss and employee's values differ, this value incongruence likely produces dissatisfaction, eventually leading to a severed relationship. To preempt this, either the boss or the subordinate could use our study's framing technique. Pitching ideas and proposals in terms of the other person's most cherished values, such as quality of work, integrity, and customer service, could increase value congruence between the two individuals, thereby raising relational satisfaction and adding commitment to the relationship. Because seven MBAs thought that it might be difficult to identify the key values of another individual such as a boss or subordinate, this conclusion is still tentative until future research verifies that employees can accurately identify the most cherished values held by others in the workplace.

Pedagogical Implications

Six MBAs apparently found the role-play exercise to be a challenge. Framing oral arguments with another individual's values can be a complex activity. It probably makes sense for MBAs to experience this persuasion technique multiple times prior to attempting it at work. As a start, role-playing this technique with a trusted person is better for sorting out its potential before it is tried elsewhere. This approach worked well for our MBAs. Going forward, we recommend a closing exercise be added. Extending this persuasion technique into an actual workplace relationship involving a real difference of opinion would provide a good finish to the development of these persuasion skills. Reporting back to the class on their experience and receiving feedback would add to the MBAs' learning.

We also think that learning this kind of persuasion at the undergraduate level is feasible. It certainly seems justified given that communication is the most frequently employed learning goal in AACSB-accredited undergraduate business programs (Brink, Palmer, & Costigan, 2014). A focus on oral persuasion would help reduce the misalignment between what is emphasized in business schools and what is desired in the workplace (Brink & Costigan, 2015). On a different note, we consider our study's instructional methodology flexible enough to be applied in a traditional or online classroom.

Instructor Considerations

The two online exercises in our study required self-directed learning. Having the instructor more involved in the assessment process could enrich student competence even more. Indeed, persuasiveness can be a complex conversing skill requiring quick back-and-forth speaking and listening. Increased instructor feedback could deepen and broaden the experience. After video-recording each role play, the instructor could observe the video and then provide in-depth feedback on the extent to which: (1) role-play interactions were free of defensiveness, (2) MBA's verbal and non-verbal behaviors were suitable, (3) good listening had occurred, (4) the presentation and ordering of MBA arguments were effective, and (5) consensus was reached. We would encourage the use of behaviorally anchored rating scales (BARS) to aid the instructor's observation and evaluation of role-play behaviors (see Costigan and Brink, 2020, for examples of BARS for assessing communication skills). As an aside, students might also be required to observe their performance in the recorded role play for self-learning purposes.

Practical Considerations

A few MBAs proposed in the second exercise that framing arguments with another person's values might be beneficial in the cross-functional context, moving a small group conversation with cross-functional participants towards consensus in their decision making. Framing a human resource proposal, for example, with values prized by the accounting types or marketing people, might better position it for acceptance. This might seem like an obvious tactic to use but how often is this done in the workplace and how effective is it in producing agreement in cross-functional meetings? Future research might consider such questions.

Cross-cultural applications might be another possibility for this persuasion strategy. Consulting sophisticated cultural value systems (see Hofstede, 1980, and Schwartz, 1992) could help with the proper framing with values across diverse cultures. For example, framing arguments in terms of collectivistic values (i.e., emphasizing the collective interests and priorities of one's family, close friends, and coworkers) may be more persuasive when relating to a co-worker who comes from a collectivistic background than crafting arguments around individualistic values (i.e., emphasizing self-interests and personal gains).

How transparent is our study's persuasive framing technique to the other party in a conversation? Do they realize that their values are being utilized to persuade them, and if so, what are their reactions to their use? In the present study, we only considered whether the role-play partners moderated their positions. We did not address whether this form of persuasion changed the MBA's opinion as well. Perhaps, the opinions of both parties are modified. What would happen if the two sides in a conversation use this framing strategy? Would a persuasive advantage disappear or would adversaries be more likely to reach agreement while maintaining or even increasing civility? Will the satisfaction level of the conversation be superior when both persons tap into this framing technique? All of these are questions for future research.

Strengths and Limitations

As stated previously, persuasion skills are deemed *important* to *extremely important* to possess in more than a third of jobs appearing in a U.S. Department of Labor database (O*NET). Reinsch and Shelby (1997) warned that persuasion is one of the most challenging forms of communication for young workers. Becoming an effective persuader requires training and practice. Developing these skills in the classroom is crucial because many graduates will need them at the beginning of their careers. Do leading business journals with pedagogical aims help with this education? To what extent do top journals publish oral-persuasion articles that can aid with this kind of instruction in business schools? To answer these questions, we used both ABI/Inform and Google Scholar to search for published pedagogical research relating directly to the development of oral-persuasion skills. We targeted four pedagogical journals: *Business and Professional Communication Quarterly* (formerly *Business Communication Quarterly*), *Business Education Innovation Journal*, *Journal of Education for Business*, and the *Journal of Management Education*. We did not consider articles focused on written persuasion and the persuasive oral presentation. Although influencing and negotiating can involve some persuasion, they too were excluded because they are not equivalent conversing constructs. Only published studies of oral-persuasion skill development in dyadic relationships or small groups were considered in our tally. Over the past couple of decades, the four journals published, all told, three articles demonstrating how oral-persuasion skills can be taught in the business classroom (i.e., Brownell & Jameson, 2004; Kinnick & Parton, 2005; Rawlins, 2014). We are puzzled as to why pedagogical researchers have seemingly overlooked this important job skill. We think that persuading with a collocutor's values makes a worthy contribution to a lean literature.

As for other strong points, our procedures had MBAs engage in a conversation which extends the framing literature beyond inanimate stimulus manipulations to the interpersonal realm. Also, our study incorporated multiple rating sources (i.e., MBA, role-play partner, instructor, research assistants) and multiple assessment methods (i.e., ratings and free-form surveys), providing multiple perspectives in the evaluation of this study's framing technique. Computing interrater reliability with Cohen's kappa of the 28 sets of MBA arguments and finding high interrater agreement is another strength.

As for concerns, the limited sample size puts this online study into a preliminary status. The liking that was probably present between the MBA and role-play partner produces a confound. The friendly partners could have been too lenient in saying how much the arguments changed their opinion. Whether MBAs were less than honest in their ratings to maximize their grades is also a possibility. Controlling for these threats with a more sophisticated research design including a control group is encouraged to move beyond these preliminary findings. Although this was a pedagogical study, single-item measurements are still problematic because reliabilities could not be computed.

Is the framing of arguments with a collocutor's values viewed by practitioners as an acceptably honest persuasion tactic or more deceptive? Future studies might compare the ethicality of our study's persuasion technique with other commonly used persuasion tactics. Our guess is that there is an acceptable level of wiliness present in most persuasion strategies including the framing of arguments with collocutor values.

CONCLUSION

Clashing values can be an underlying cause of interpersonal disagreements at work. Coopting with values depends on understanding a collocutor's values and then utilizing these values to frame oral arguments. In our pedagogical study, MBAs were instructed to "flip the process." Instead of beginning with their own values and then moving forward to form arguments, they were instructed to start with their collocutor's values and then work backwards to construct arguments around these values. This technique seemed to unfreeze the more extreme viewpoint of another individual, perhaps letting both parties reach common ground more easily.

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Turning Around an MBA Program

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ABSTRACT

During the time when many MBA programs all over the US were either experiencing a decline or were flat in terms of student enrollment, one MBA program went from 80 to 1100 enrolled students in just three years. This case study looks at what this program did to achieve such a phenomenal turnaround. We first describe the problem, the setting of the program, and early missteps. Then the strategic and pedagogical changes which led to this rapid growth are discussed. Pedagogical changes included flipped classrooms and co-teaching with corporate executives along with using input from business executives to build new curriculum. Strategic initiatives included hiring instructional experts and assessment directors, mobilizing faculty to change the direction of the program, and finding and engaging key stakeholders. The authors then examine the underlying factors behind the success of the program drawing from self-determination theory, stakeholder theory, and open innovation literature.

Keywords: MBA, Turnarounds, Flipped classroom, Innovation, Stakeholders

INTRODUCTION

MBA programs are facing considerable strategic pressure. According to Andrew Ainslie, dean of Rochester University's Simon School of Business "The MBA market is in dire straits right now." Ainslie further comments that "The joke among deans is that 'flat is the new up.' If we can just hold our numbers, that is an incredible achievement." Ainslie also says that when he meets with fellow deans, "half of our discussion is, 'What are you doing about your MBA program?'" (Ethier, 2019).

While some may be inclined to think the decline in demand for an MBA program is a new phenomenon due to recent issues surrounding COVID 19, the fact is that the U.S. market has been declining since 2013 (Byrne, 2019). The declines have impacted schools across the prestige spectrum with a greater impact at the lower end (Allen, 2019). Even the most elite MBA programs have witnessed declines in interest. Stanford, Michigan, Harvard, and the University of Pennsylvania's MBA program saw double digit declines in their applicant volume during the last three years before the pandemic (2016 thru 2019). In fact, the University of Illinois' Gies College of Business and University of Iowa completely dropped their full-time MBA programs in 2017 and replaced them with online MBA programs. Many schools are either closing their full time, part time and executive MBA programs and/or spending significant resources enhancing their online MBA programs (Ethier, 2019).

Unfortunately for business schools, there are several reasons for the demand decline. Kaplan's (2019) survey of admissions officers at 153 U.S. MBA programs found that a strong job market, uncertainty over the perceived value of an MBA, and the cost of the degree accounted for 60% of the decline in applications. In addition, heightened political uncertainty over the past few years has constrained demand from international students. However, the problem may extend beyond cost and politics to applicability. MBA programs can become overly focused on quantitative factors and theory and lack the skills needed for practice. Some argue that business should be treated more as a practice (Bennis and O'Toole, 2005), similar to law, rather than a science such as physics. Regardless of the main driver for the decline, the reality is that multiple environmental factors have impacted the business of education. Strategic decisions and pivoting from traditional plans appear to be needed.

In this paper, we discuss a college of business that was able to turn around a struggling MBA program via strategic and pedagogical changes. We further delve into the underlying factors that produced the college's success and believe that this example can provide valuable insights to colleges with struggling programs.

The university and COB

The college of business (COB) that we examine is one college within a broader university that itself is part of a university system. The four universities that comprise the system are geographically dispersed across a large, southern metropolitan region in the United States. Each university maintains its own management, strategy, student profile, capital constraints, and degrees offered. Thus, there is quite a bit of autonomy among the organizations. Yet, even with autonomy, there is a degree of competition. The largest university, not the focal point of this study, maintains a higher state and national profile and its resources are considerably deeper. The dean of the COB, similar to a division vice-president or a strategic business unit president, may allocate resources, has decision making capabilities for the college, and the power to enact strategic changes within the scope of the university.

The COB, and the university of which it is a part, engages in a low-cost strategy. It offers an affordable degree with tuition rates being much less than most in the area. A majority of the students attend community college prior to entering the University and many are the first in their family to attend college.

Even with a low-cost niche, financial flexibility at the COB was severely limited. Many factors contributed to the tight financial situation. For example, state funding for higher education had been cut and a transition to formula funding hurt the college and university. In addition, faculty were teaching either at or above full capacity and there was no funding approved to hire additional full-time faculty. Management and faculty decided that a new program, an MBA, was the best answer to the financial pressure the COB faced. If successful, not only would student enrollment increase, but the increased state funding for master's level education would provide extra funding for faculty relief and program support for the students. Therefore, the COB was counting on a double financial benefit that could in turn be deployed to offer long overdue salary adjustments and more time for engaging in research with the hiring of additional resources.

The COB introduced a 2-year MBA program in 2012. The program was traditional in most senses: the classes were face-to-face, the program was general (i.e., it was not oriented towards one industry or profession, and it required a Graduate Management Admissions Test score and work experience). Existing faculty would teach most of the courses. The only unique offering was that the school planned to have each student work on one project that spanned the entire program.

How did the new program perform? The COB enrolled 44 students the first year, but MBA enrollments were declining by the end of the second year. Within the school it was generally believed that the MBA was struggling in one of the largest markets in the US. Looking beneath the surface, there were a host of factors that led to poor performance.

What went wrong?

In this case the COB realized after the fact that it pursued a misguided strategy. Leadership missed the fact that prospective students for this brand were not able to meet the traditional MBA criteria as it relates to the required Graduate Management Admissions Test (GMAT) and a three-year work prerequisite. This posed a demand constraint as illustrated by the data; 44 students enrolled the first year (2012) and even though 80 were enrolled the following year, the sequential semester trend was downward.

If we look more closely at the situation, we find that the brand image for the college was low to negative. This was largely because the university had an open-door policy until 2013 when it became the last university in the state to establish entrance standards (Rohr, 2012). Even though students worked hard to graduate, their degrees were frequently not as valued as other degrees due to brand stigma. This was apparent in the firms interested in hiring the graduates and the types of jobs that were offered to them. Thus, the students that wanted an MBA and had the prerequisite entrance exam and work experience enrolled in other local programs in 2013.

In addition, the planned differentiator failed. The administrative launch team embraced a novel idea – to require the MBA students to work on a single project as they moved through the program. This would have been a unique selling point in the regional market. Unfortunately, this differentiator was an operational bust. The faculty was not unified on the single project and frequently failed to provide coursework that supported the goal. While we are unaware of whether the idea of the differentiator failed to entice the market or whether the students were disappointed and negative word-of-mouth opinions spread, this operational plan failed to materialize.

With only a few dozen enrolled MBA students in a market that enrolled over 1200 MBA graduate students annually, the product was not being accepted. Internally, COB leadership was worried about failure; they believed two options existed: drop the program or forge ahead. Yet neither presented a financial path toward revenue growth, which the COB and the University needed.

The COB was in a bind on both strategic and operational fronts, the usual turnaround levers. On the strategy side, the organization faced several impediments. The COB was neither able to ‘sell’ more of the current product as current demand was met, nor was it allowed to increase its price. This limited product and market expansion avenues, both of which faced daunting issues. The current undergraduate product could have been modified or expanded to offer an online version or a new major; however, there was a lack of support for undergraduate model and focus initiatives. Furthermore, there was no champion for expanding into new geographic markets with a physical model as there was no funding for this at the university level.

Amid the program launch, leadership changed. In 2013 the dean of the COB elected to take a position at another university. Previous research indicates that a new leader often provides a stimulus to try new ideas and take risks (Miller & Shamsie, 2001; O’Kane & Cunningham, 2012); it is often a time of change with few social ties to the new leader.

The new dean, in collaboration with the COB, put forth three strategic options: a) do nothing and see if the original MBA would organically grow, b) cancel the program, or c) revise the MBA. Due to the low enrollment numbers the program was not financially viable, thus eliminating a “wait and see” approach. Additional funding was neither available from the University nor the system. Furthermore, it wasn’t likely that the COB could ask the legislature for capital; funding for secondary education had already been flat for the decade ending in 2016 (Legislative Primer, 2016). Canceling the MBA program would have been problematic in terms of morale, and expectations for positive future value for the COB and the University. The COB chose a hard stop with the intent of altering the future of the program. After all, the faculty and the administration supported and needed the revenue growth.

Rewriting the curriculum

The college of business needed a differentiator that produced value and addressed a need. It was decided that concentrations would be developed using a new model. Concentrations would have five or six courses depending on the specialization. The content and courses in the concentration were developed in a novel way.

First, an invitation went out to business executives to join the college for a focus group. The associate dean led the focus group by asking discipline related questions and these responses were then grouped into categories that provided the basis for the new curriculum.

The content was meant to be practical - to make graduates more attractive to area businesses. This information was then conveyed to faculty who specialized in that area. For example, management faculty addressed the leadership concentration. The dean offered stipends for faculty who chose to develop courses for the concentrations. Initially, one faculty member would take responsibility for a specific course and develop a curriculum and materials for that course. The entire committee would meet again and go over the course proposals to ensure that key areas for new courses were addressed.

The concentrations would all use a flipped classroom model. This flipped classroom moves some traditional classroom activities such as traditional lectures outside of the classroom (Lencastre, Morgado, Freires, Bento, 2020). The COB hired an instructional specialist and a media specialist to enact this model throughout the graduate concentration courses. The media specialists helped faculty create video lectures for their entire class which would then be made available through links placed in the Blackboard shell used for classroom management. One of the useful suggestions made by the media specialist was to keep the videos short, around five minutes since students would be more likely to watch a shorter video. The instructional specialist had a PhD in education and was able to make suggestions for almost any aspect of teaching a subject.

Another important component of the concentrations was assessment. Two steps were required initially: to determine the concentration learning objectives and the learning objectives for the course. It was important for courses to promote learning objectives consistent with the concentration. The COB hired an assessment director to gather assessment results from instructors in the concentrations and prepare reports.

Finally, concentration classes were co-taught by a professor and a business executive. The initial plan was for the business executive to offer practical insights on the material being taught. Not all classes or corporate executives are the same and their contributions varied from the occasional comment to teaching significant parts of the class. Students enjoyed this aspect of the instruction so much that it was made part of the MBA program as well.

While these instructional innovations provided a differentiated product, non-curricular aspects of the concentrations may have contributed more to the rapid growth of the program. First, the concentrations offered convenience. Classes would occur in a hybrid format with one class per week in person while additional assignments would be completed remotely. The classes in the concentration would all be held on the same day of the week with the goal of making scheduling easier for working students. All classes were held at night to allow students to continue working in their professions while advancing their education. However, the greatest draw for the program was the soft start option. Entry into the MBA program required students to take the GMAT. Many students viewed this test as a significant hurdle. The soft start option allowed students who maintained a 3.0 average in the concentration to enter the MBA program without taking the GMAT. One of the authors polled their initial concentration class to see how many wanted to continue into the MBA program. Over ninety percent of the students expressed the desire to continue their education in the MBA.

The next step required the college curriculum committee to examine the proposed courses and provide feedback that would make the course compatible with university requirements. These courses were then forwarded to the university curriculum committee who would go through a similar process as their college counterparts.

Finally, the courses were approved by the provost's office. The creation and approval of six concentrations occurred in less than half a year. The quick development required significant motivation and effort from many parties.

A DEEPER LOOK

Turning around an MBA program is not common. The COB took several substantive steps but what made those steps possible? In this section, we discuss the organizational actions that led to the rapid growth in the MBA program over the next three years.

First, faculty needed to be engaged. The implementation process produced intrinsic motivation, the desire to work due to the enjoyment of the task. Intrinsic motivation increases in the presence of autonomy, competence, and relatedness (Deci & Ryan, 2000). Autonomy gives control to the worker. Faculty and staff were given broad goals but had the power to work out the solution as they saw fit. This was particularly true in the concentrations. Faculty were told to incorporate feedback from industry for their curriculum but the faculty in charge decided what the course would look like. Additionally, those faculty were given the right to teach the course they had created until they chose to relinquish that privilege. Faculty were already highly competent to evaluate their curriculum and had the intelligence and creativity to make a course that had never existed. Finally, relatedness motivated faculty since they worked with other faculty on the overall concentration and had good working relationships with each other.

The next step was to show a positive path forward. The dean proposed a plan to the faculty. By adding a new product (concentrations) and reducing pain points (soft start option), the COB would increase their enrollment. He provided financial projections of revenue coming into the COB showing conservative and optimistic results. He then showed how those revenues would provide faculty with raises and staff to assist them. In the same way, the dean showed the university that enrollment increases would benefit the university as a whole and increase the chances that the state would give them more money for operations in the future. The promise of a better future was made more striking by the presentation of the difficult situation the COB was facing, classes were too small and faculty resources were stretched thin. Recent research shows that new products are more likely to be adopted when hope and anxiety are strong (Lin, Maciness, & Eisengerich, 2020). This occurs because both hope and anxiety enhance planning and effort. By showing the contrast between the current situation, and the better future, faculty were motivated to make action plans to achieve their goals of increased enrollment and stakeholder satisfaction. The dean created an execution committee to assist in achieving parts of the plan which included examining best practices at other universities. Additional curriculum groups were created to develop new concentrations that would permit prospective students to quickly attain specific knowledge and allow the successful students to enter the MBA without taking the GMAT examination.

Engaging stakeholders was another critical step. Colleges have multiple stakeholders who have an interest in the school's success. Before stakeholders can be engaged, they must be identified. Stakeholder claims can be evaluated based on the power of the stakeholder, the legitimacy of their claims, and the urgency of their claims (Mitchell, Agle, & Wood, 1997). One study suggests that power and legitimacy may be sufficient to evaluate stakeholder claims

(Eesley & Lenox, 2006). Power expresses the stakeholder's ability to get another group to take an action while legitimacy refers to having rights based on the norms of business and society. In the past, academia has viewed stakeholders too narrowly, tending to focus on faculty, students, and donors. The COB expanded their stakeholders beyond the boundary of the school and included the community. It was obvious from the beginning that faculty, students, and the university at large had both power and legitimacy in running a business program. Less obvious was that the business community had a legitimate interest in how well our students were prepared to add value to their employers. The business community did not force the COB to include them in building an MBA program, yet they had legitimate reasons for desiring well-trained graduates. Adding corporate fellows to co-teach classes engaged industry executives and motivated them to see the college succeed. Further, building classes around industry input helped to make our curriculum more practical and gave local industry a stake in our success.

A fourth step which offers value for pedagogy is to collaborate and innovate. Good ideas rarely occur in a vacuum. Finding other stakeholders who can benefit from your success can lead to thinking outside the box of the college. The dean went to industry leaders for ideas. This idea was anathema in universities where highly trained faculty were expected to have all the knowledge that was needed. In retrospect, going to industry leaders for help was a courageous decision which paid off. Industry leaders contributed their ideas for curriculum in a day long focus group with administrators while faculty observed but didn't interfere with the process. The result was a practical and academic curriculum which students could implement immediately in their jobs. The practice of innovating with stakeholders closely aligns with open innovation. In open innovation, products are codeveloped with companies, suppliers, customers, and other stakeholders. In the COB's case, industry stakeholder's issues and needs were addressed and incorporated into a new type of course. The originator of the open innovation concept recommends that service organizations interact with customers at several points including customer engagement, co-development, and the exchange of tacit knowledge (Chesbrough, 2017). We can see that these interactions occurred with the COB. By bringing industry executives into the development process, we engaged them and gave them a stake in our success. These interactions allowed them to share their unique knowledge with our school, not only to develop the courses but also to enhance the student experience as co-teachers.

The final step was promoting success. The dean was constantly promoting the successes in the program. This demonstrated that the college was having a real impact outside the walls of the university. The reputation of the college improved as businesses saw improvement in their employees' performance. Promoting and celebrating success also serves to motivate employees since being part of a successful team builds a bond among employees and reinforces team spirit. This in turn leads to greater effort. Motivating faculty can be challenging when they possess tenure and tangible rewards are not immediately forthcoming. However, many of the faculty were motivated by the tremendous growth of the program.

CONCLUSION

The turnaround of the MBA program was a remarkable success. The turnaround began to show a clear growth pattern in 2014 and by the end of the 2015-16 academic year enrollment was above 1000 students where it has remained through 2020. This makes the success of the program even more remarkable because they have maintained their maximum enrollment. As detailed earlier in the paper, most MBA programs are declining

This article presents one example of a successful MBA program turnaround. As noted, many of the traditional turnaround issues were addressed, such as operations and strategic change. However, to shed light on an age-old problem, we highlighted the underlying factors that enabled change for this college. We addressed pedagogical changes such as the flipped classroom and co-teaching with corporate partners. Even though many classes were three hours long, students often stayed after class to continue a discussion. The faculty found that the students often engaged in a bilateral dialogue with their professional peers as they brought their course work back to the office and discussed the application of new topics. Teaching with corporate partners also proved highly successful; the majority offered valuable insights about high-level work in industry, current corporate issues, and factors for success.

We understand that every university and college have a unique set of circumstances to address such as financial resources, demographics, location, reputation, and competition. This does not mean that the success of the MBA program shown here cannot be duplicated but the actions required may be different in each situation. For this reason, we discussed underlying reasons for the program's success. In presenting broader principles such as motivation and stakeholder management, we hope to provide a basis for other business schools to improve their enrollment in graduate programs.

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Illustrating the Chi-Square Test Statistic Distribution via Interactive Excel Simulation Application in Introductory Business Statistics

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ABSTRACT

This article explains an Excel based simulation approach applied to teaching foundational concepts in chi-square goodness of fit hypothesis tests. Students gain hands-on experience using a popular, multipurpose methodology for analyzing whether observed counts are statistically different from expectations. Such applications commonly appear in a variety of areas in business such as market share changes and training effectiveness programs, for example. Our approach allows students to experience for themselves a demonstration of important foundations regarding the methodology. We have found for business students, non-theoretical approaches such as this are effective. In this paper, we describe how to deploy an interactive Excel simulation to bring sometimes esoteric statistical theory to life using a commonly taught methodology.

Keywords: Teaching Hypothesis Testing, Simulation, Business Statistics, Chi-Square Test

INTRODUCTION

A foundational topic in most introductory business statistics courses is hypothesis testing, a methodology in which sample data is collected and analyzed to determine whether a claim of interest can be supported. This “claim of interest” is also called the alternate hypothesis H_1 , or the research hypothesis. Our approach provides students the opportunity to have several “ah ha!” moments in experiencing the development of a common test statistic distribution, with minimal use of formulas and statistical theory. This work reinforces common hypothesis testing theory that is taught in an introductory business statistics course.

The use of simulation has shown to be an enjoyable and effective way to reinforce theory (Johnson & Drougas, 2004; Weltman, 2015; Weltman & Tokar, 2019). Moreover, many students report continued use of the technique in subsequent course projects, internships, and full-time positions. Introducing simulation analysis early in a student’s college career (a typical business statistics course is sophomore year) thus fulfills many productive purposes.

Simulation is a mathematical technique that is used to generate thousands or millions of “trial” scenarios where uncertainty is involved in the parameters that make up a scenario. The technique numerically quantifies and graphically depicts potential results (along with their associated likelihoods) based on uncertain inputs, in our case the rolling of a single die. More broadly, simulation continues to receive attention in the important field of business analytics and data analysis in industry (see, for example Evans, 2019; Moffitt, 2019). Thus, providing students exposure to a powerful business analytics method is useful. Our example application is simply the rolling of a fair die 60 times (a trial). Simulation is deployed where sets of 60 rolls are simulated hundreds of times.

Participants in the exercise we conducted were 108 undergraduate business students of various majors enrolled in an introductory business statistics course at the authors’ home university, Texas Christian University in Fort Worth, Texas. The exercise took place in a regular classroom and was designed to fit within a typical class period (80 minutes). In the preceding weeks, basic concepts of hypothesis testing were covered including chi square tests, single proportion hypothesis tests, and single mean hypothesis tests. We recommend instructors attempting to implement this exercise cover these types of tests and concepts beforehand. Through the workshop and Excel simulation application described, students gain a deeper understanding of hypothesis tests and specifically why the chi-square distribution is deployed in such tests. The Excel simulation is easy to explain, and students gain an appreciation of important foundational ideas regarding the selection of test statistic distribution for goodness of fit hypothesis testing applications.

The application was developed using Visual Basic, an easy-to-use programming language developed by Microsoft. Visual Basic is well suited for creating applications and simulation in Excel. Students work with the application by using control buttons. With a little practice and overview provided by the instructor, the application is intuitive and easy to use. The author is happy to provide the Excel file and Visual Basic code upon request via e-mail for interested readers.

THE CHI-SQUARE GOODNESS OF FIT APPLICATION

The hypothesis test we perform is to see if we have sufficient evidence to infer a die is not fair (H_1). The null hypothesis is that the die is fair and the alternate hypothesis is that the die is not fair as shown in the statements below:

$$H_0: \pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5 = \pi_6 = 1/6$$

H_1 : at least one of the proportions is different from 1/6

where:

π_i = the proportion of outcome i for rolls i (1 to 6)

Since we are performing a multinomial test regarding nominal data with six outcomes, a chi-square test is appropriate (Keller, 2014) where:

- The experiment consists of a fixed number of repeated trials.
- The outcome of each trial is classified into one of six categories.
- On any given trial, the probability that a particular outcome will occur is constant.
- The trials are independent.

The test statistic for chi-square tests is obtained using formula (1):

$$(1) \quad \chi^2 = \sum_{i=1}^k \frac{(f_i - e_i)^2}{e_i}$$

where:

k = the number of outcomes, in our case 6

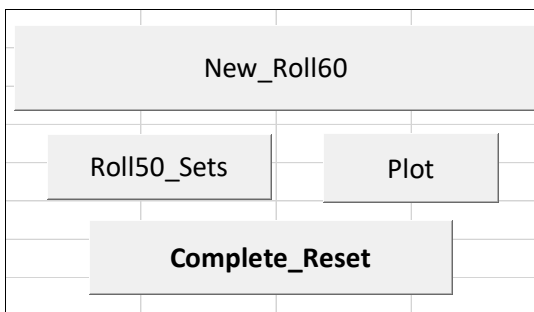
f_i = the observed frequency for outcome i

e_i = the expected frequency for outcome i

An Excel worksheet with control buttons (Figure 1) is used to tabulate results from 60 random tosses of a single fair die and compute the chi-square test statistic value.

Figure 1: The Chi-Square Test in Excel.

outcome	obs, f_i	exp, e_i	Chi-Sq, χ^2
1	9	10	0.10
2	14	10	1.60
3	7	10	0.90
4	11	10	0.10
5	11	10	0.10
6	8	10	0.40
Totals	60	60	3.20



Students are instructed to download an Excel application which simulates sets of 60 rolls of a single fair die. Each time the New_Roll60 button is clicked a new set of 60 rolls is performed with the chi-square test statistic automatically calculated and displayed in the shaded cell as shown in figure 1. Students are encouraged to use formula (1) themselves to validate the spreadsheet calculation and gain confidence in the mechanics of the test statistic calculation. As students use the application to roll the die 60 times repeatedly, several important metrics are being compiled in the background. A counter continuously tabulates the total number sets of rolls. The simulated mean of the chi-square distribution is calculated and displayed each time the Plot button is selected. The simulated mean is simply the sum of all the individual chi-square test statistic values divided by total number of sets rolled. The theoretical mean of a chi-square distribution is equal to its degrees of freedom, so in this application the theoretical mean is 5.00. For chi-square hypothesis tests with 5 degrees of freedom and a 5% level of significance, the critical value is 11.07. Thus, with a fair die, over the long run, about 5% of the time we would expect to have test statistics exceeding this value. In our fair die example, a Type I error is committed when a simulated test statistic value exceeds the critical value (11.07)

causing one to incorrectly reject H_0 . The Type I error percent is continuously compiled and displayed to students each time the Plot button is selected (Figure 2). Bin counts for the histogram displaying the test statistic values are kept up to date and the histogram and counts are displayed each time the Plot button is selected. The percentage of times each number is rolled is also accumulated and displayed. The more sets of rolls a student makes the closer their results are to the theoretical expectations.

We use simulation to obtain repeated chi-square test statistic values, each value the result of 60 random die tosses using formula (1). Progressive histograms and summary metrics of results are shown (Figures 2, 3, and 4). The checkboard patterned columns in the histogram display instances where a Type I error is committed. Students can see the histogram of the test statistic values being built from the beginning. As more and more sets of rolls are performed, the classic right skew chi-square distribution shape is developed and displayed to the student. Students can experience the build of the test statistic distribution over hundreds of sets of rolls. An example of this progression is shown in Figures 2 (20 sets of rolls), 3 (100 sets of rolls), and 4 (700 sets of rolls) below:

Figure 2: Example Simulation Estimate of the Chi-Square Distribution Test Statistic

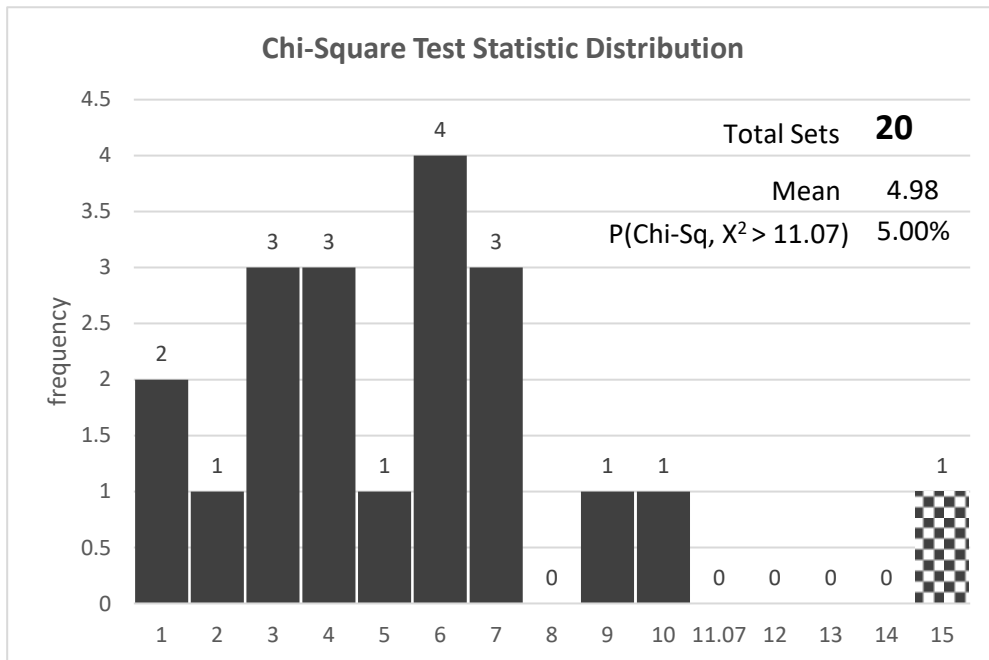


Figure 3: Example Simulation Estimate of the Chi-Square Distribution Test Statistic

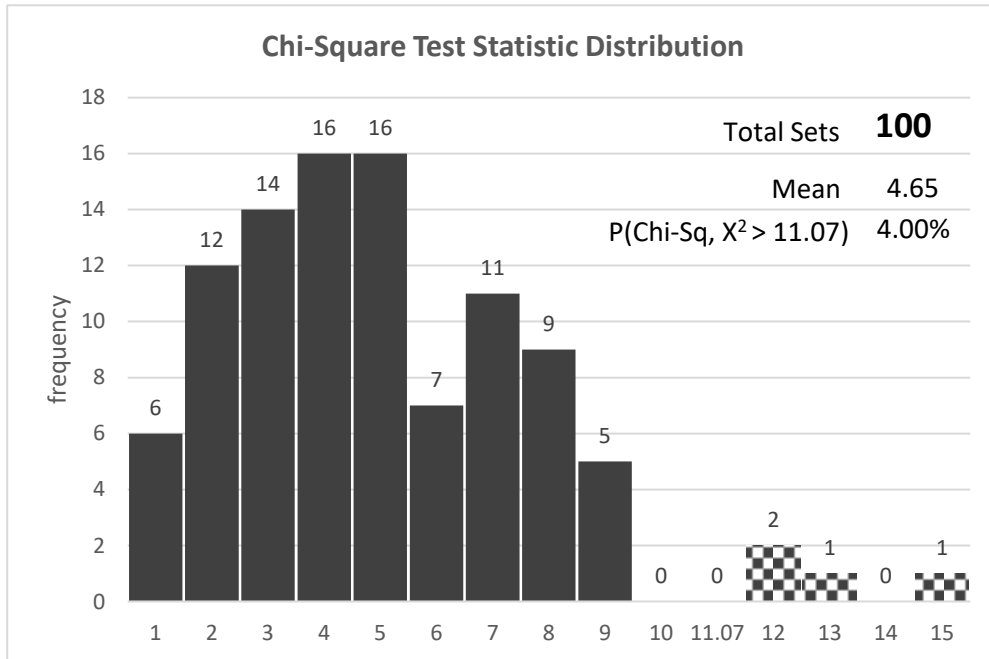
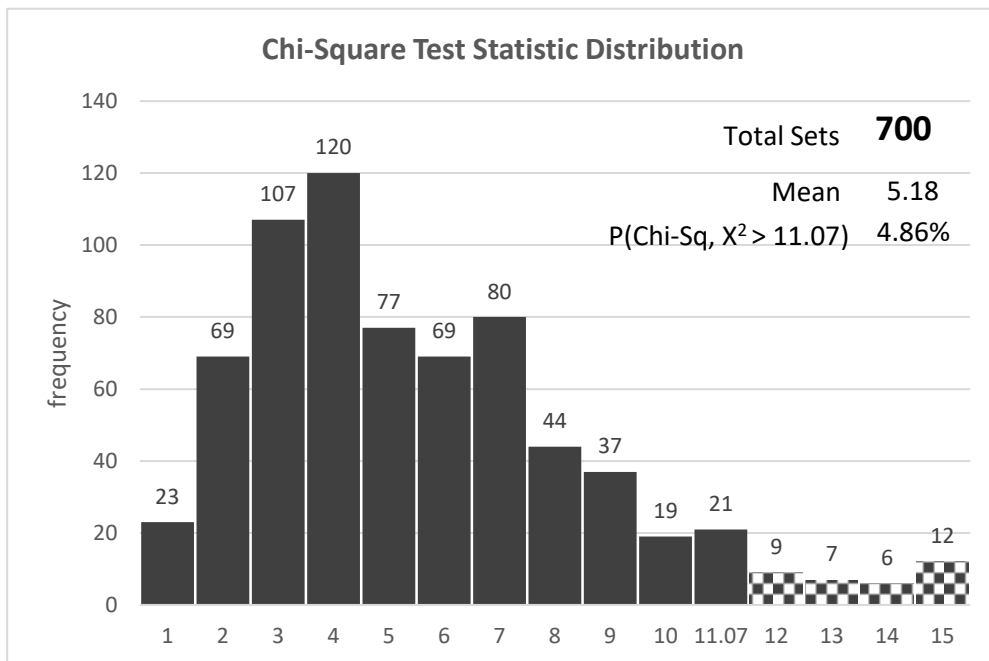


Figure 4: Example Simulation Estimate of the Chi-Square Distribution Test Statistic



The histograms of test statistic values generated progressively takes the shape of a classic chi-square distribution as more sets of 60 rolls are performed. Students experience the generation of the histogram and see that most of the time the test statistic values are below the threshold value of 11.07, above which we would reject H_0 . Since we are tossing a fair die, one would expect that an appropriate test would rarely cause incorrect rejection of H_0 as depicted. Statistical theory is supported in that a Type 1 error occurs about 5% of the time. The simulation results clearly depict the statistical theory regarding the shape of the distribution and the Type 1 error expectations.

ASSESSMENT OF STUDENT PERCEPTIONS

To assess student perceptions and the effectiveness of the workshop, an online (Qualtrics ©) survey was completed by 108 participants from four Business Statistics class sections that were taught in the Spring of 2021. Overall, students responded positively to the experience. A large majority either agreed or strongly agreed to statements regarding the effectiveness of the exercise. These survey results are shown in Table 1*. Comments from students were very positive and they seemed to enjoy working with the application. Representative comments from our post game survey were very encouraging and shown below:

“I really enjoyed it and it helped me understand the material!”

“I thought that the application was really cool!”

“This workshop exposed my shortcomings with hypothesis testing.”

“This workshop helped me picture the entire hypothesis testing process as a whole.”

“I thought this was very helpful! I would love the option to do something like this for each topic to test our knowledge/understanding.”

Table 1: Student Assessments of Effectiveness

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean
Found the workshop to be an effective way to learn.	32	57	6	4	0	4.18
Found the workshop enjoyable (as a learning activity).	33	51	14	1	0	4.17
Allowed us to experience first-hand hypothesis testing concepts and application.	39	54	5	1	0	4.32
The workshop is an effective method for teaching hypothesis testing.	33	51	12	3	0	4.15
The workshop was helpful in learning and applying hypothesis testing concepts.	38	53	6	2	0	4.28

*5-point Likert scale used. Strongly Agree=5; Strongly Disagree=1.

CONCLUDING REMARKS

We have used simulation to demonstrate the validity of hypothesis testing regarding the theoretical distribution of the popular and flexible chi-square goodness of fit methodology. Through our application and simulation workshop students gain “hands-on” understanding of concepts by using a popular general-purpose, commercial software tool. Students work with the tool to understand and experience the distribution of appropriate test statistics. The shape of the distributions match what the underlying statistical theory suggests. Type I errors occur with likelihoods suggested by theory. Students gain a better understanding of how test statistics are calculated, utilized, and interpreted. With easy-to-use simulation tools readily available, we continue to explore powerful ways of deployment in which students can actively experience foundational business statistical theory.

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The Ball Point Game: Teaching Students How to Iterate Effectively

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ABSTRACT

The Ball Point Game provides an opportunity for students to practice iterative problem solving. They learn why iterative approaches may be more effective than linear/sequential processes in many situations. Moreover, this experiential exercise enables students to discover the psychological biases and barriers that inhibit people from engaging in effective learning by doing.

Keywords: problem solving, decision making, iteration, learning by doing, experimentation, prototyping, learning

INTRODUCTION

In recent years managers have tried to embrace iterative processes of action, learning, and adaptation across a range of contexts, including software development, strategic planning, new venture creation, product and service innovation, and operational improvement processes. These efforts have achieved mixed results.

Boris Gloger (2021) invented the Ball Point Game to introduce agile principles and methodologies to software developers. The agile methodology contrasts with the traditional “waterfall” approach to software development. The former is highly iterative, while the latter is linear and sequential (Moser, 2020). The Ball Point Game teaches software teams how to self-organize, work in brief sprints, reflect systematically, and engage in continuous improvement.

This teaching plan represents a substantial extension of Gloger’s work. The game instructions have not been modified from the original version created by Gloger. However, as a consultant, Gloger created the game to teach agile software development and project management methodology to practitioners. His goal was straightforward: show information technology professionals the power of agile project management techniques vs. the waterfall/linear approach. He focused too on helping software teams practice self-organization.

This paper explains how to teach students about the *psychological barriers and obstacles* that individuals and teams typically encounter when trying to embrace iterative problem-solving processes in a range of contexts such as design thinking, strategic planning, and entrepreneurship. Gloger never described or delved into these psychological issues that might make the transition from linear to iterative so challenging. This paper grounds the game in organizational behavior theories that are important to teach and that can help students understand why they might not be effective at iterating despite their best efforts.

The game provides students an opportunity to engage in hands-on practice with iterative approaches to creative problem solving. Students learn why iteration, prototyping, and experimentation have real value, particularly in dynamic environments. Even more importantly, this exercise helps students recognize why managers struggle with the shift from a linear to an iterative mindset. They come to understand why people do not reflect, learn, and adapt quickly and effectively in many circumstances. In short, students learn why many people resist iterating, or struggle mightily when they try.

THEORETICAL FOUNDATION

Researchers have argued for the benefits of an iterative approach in a variety of problem-solving contexts. Schlesinger, Kiefer, and Brown (2012) argued that a linear approach to strategy formulation only functions well in highly stable environments. Linear processes break down in dynamic, turbulent contexts. Other scholars documented the benefits of experimenting and learning by doing when we can’t count on our ability to predict the future accurately (McGrath, 2010). Similarly, the field of entrepreneurship has embraced the concept of the “lean startup” in which new ventures don’t waste excessive amounts of time making financial projections. Instead, they launch minimal viable products (MVPs) to test crucial hypotheses about customer needs, willingness-to-pay, and the like (Ries, 2011; Blank, 2013). Design thinking experts emphasize the value of engaging in multiple rounds of low-fidelity

prototyping. The goal is to create productive failures, i.e., tests that are inexpensive to implement, yet yield valuable lessons. (Brown, 2008; Martin, 2009; Fixson and Rao, 2014).

Unfortunately, many obstacles prevent people from iterating effectively. An understanding of cognitive biases and group dynamics helps us identify those barriers. Attribution error makes it difficult for people to discern the causes of their failures (Ross and Nisbett, 2011). Individuals often seek out confirmatory evidence when gathering feedback about a proposal, and they discount discordant data (Lord, Ross, & Lepper, 1979). Similarly, people tend to remove co-workers from their social network if they provide much negative feedback (Green, Jr., Gino, and Staats, 2017).

The sunk cost effect inhibits the ability to engage in productive learning-by-doing. People become overly committed to ideas in which have invested a substantial amount of time, energy, and money. Rather than cutting their losses, individuals escalate commitment to failing courses of action (Arkes & Blumer, 1985; Brockner, 1992).

Fixation sets in when people become attached to a specific mental set – a way of thinking about a problem based on solutions that have worked in the past. Mental sets sometimes enhance problem-solving efforts. However, solutions drawn from past experience may not be useful in a new context. Fixation prevents groups from experimenting with other ways of framing the problem, or from considering an entirely different category of solutions (Jansson and Smith, 1991; Smith, Ward, and Schumacher, 1993).

Finally, some people fail to iterate effectively because they adopt a “how/best” mindset to solving problems rather than a “why/potential” mindset (Mueller, Wakslak, & Krishnan, 2014). In the former, people approach problems as if one optimal solution exists. The how/best mindset represents linear thinking – one path, and one path only, must lead to an optimal solution. Research shows that creativity suffers when people adopt this mindset. Creativity flourishes when individuals adopt a “why/potential” mindset, i.e., when people presume that multiple viable solutions exist. In this mindset, people tend to ask, “Why might this idea work?” In contrast, those adopting the “how/best” mindset tend to question how a novel idea will be implemented and what obstacles might prevent successful adoption.

The Ball Point Game has four learning objectives related to improving students’ ability to engage in iterative problem solving. The exercise provides an opportunity for students to:

1. Learn the value of learning by doing.
2. Explore barriers that inhibit our ability to listen to feedback, shed our attachments to existing ideas, and adapt effectively.
3. Learn how initial mental models, rooted in past experience, can constrain our approaches to solving novel problems.
4. Discover why groups often might be biased toward incremental improvement, rather than radical innovation.

OVERVIEW OF THE BALL POINT GAME

In the Ball Point Game, teams attempt to design and operate a system through which they must pass as many Ping Pong balls as possible in two minutes. Ideally, teams will consist of 10-12 individuals, though teams may contain as few as 8 and as many as 25 members. Each ball passed successfully through the system earns the team a point, thus the name of the game.

Each team receives a box containing 300 balls, though the instructor should not announce the count. Removal of a ball from that container constitutes “entry” into the system. Teams also receive an empty box; the balls “exit” the system when they find their way into that container. The team must transfer as many balls as possible from the full to the empty box, ensuring that each person touches every ball. One member must touch each ball twice; specifically, the individual who introduces a particular ball into the system also must be the last person to touch that ball when it exits the system.

The balls must have “airtime” when they pass from one individual to another. An appropriate transfer does not occur if two individuals touch a ball simultaneously. Individuals may not pass balls to the person on their immediate left or right. No foreign objects may be used to transfer balls, i.e., no boxes, hats, clothing items, etc. Fourth, balls that touch the floor must re-enter the system at the beginning.

Teams have two minutes at the start to design their system. Then, each team has two minutes to operate their system. Groups announce the number of balls passed successfully through their system to the class. Teams then have one

minute to reflect on their actions. After that period of assessment, teams operate their system again for two minutes. Teams continue this procedure through five rounds of action and reflection (See Table 1 for schedule). Instructors track progress of all teams on a whiteboard (See Table 2 for board grid). After the second round, instructors should announce that past teams have passed more than 200 balls in two minutes. This information typically stuns most groups. Most teams have passed 50 balls or less in the second round, but a few groups surpass 200 balls by the final round.

Table 1: Ball Point Game Schedule

Steps of the Exercise	Timing
Room/Game Set-Up	10-12 minutes
Overview & Game Instructions	5 minutes
Planning before Round 1	2 minutes
Round 1 Game Play	2 minutes
Team Reflection	1 minutes
Round 2 Game Play	2 minutes
Announcement: 200+ Balls Achievable!	1 minute
Team Reflection	1 minute
Round 3 Game Play	2 minutes
Team Reflection	1 minute
Round 4 Game Play	2 minutes
Team Reflection	1 minute
Round 5 Game Play	2 minutes
Debriefing the Exercise	15-25 minutes

Table 2: Ball Point Game Score Tracker

Teams	Round 1	Round 2	Round 3	Round 4	Round 5
1					
2					
3					
4					
...					

DEBRIEFING THE EXERCISE

Instructors should structure the debriefing by posing the following questions and discussing the concepts described below:

1. Would the results have been better with more time allocated to planning and less time devoted to action? Students realize quickly that learning by doing, through rapid experiments, proves superior to lengthy planning processes when facing a novel, ambiguous task. They can describe lessons learned during the early trials and identify many unexpected problems that would have been difficult to anticipate without testing their initial plans. Students come to appreciate the value of an iterative process of learning and adaptation.
2. How many teams started out by the forming two lines, with team members facing one another? Alternatively, did your team start out in a big circle? These two configurations prove most popular at the early stages. However, students describe the many problems with these strategies. Why do you think so many teams start in this manner? This discussion illustrates the power of framing. How you frame a problem can have a powerful impact on the solution that you develop. In this case, the mental model many people adopt involves forming a circle or lining up and passing the ball to another, much as we do in childhood games. You can only develop an effective solution in this game by reframing the problem. The best innovators reframe problems in multiple ways so as

to explore a variety of solutions. However, many of us find ourselves, at times, locked into particular frames based on experience.

3. Did some teams retain the same basic architecture through all five iterations, while constantly refining it? Alternatively, did other teams try quite different configurations, particularly during the first few rounds? During this discussion, instructors can introduce the psychological concepts of fixation and the sunk cost trap. Some teams fixate on an early idea generated within the group, and they have difficulty engaging in divergent thinking. Moreover, some teams find themselves overcommitted to their initial solution. They cannot cut their losses and shift directions.
4. What is the difference between incremental improvement and radical innovation? Why might it be easier to engage in incremental improvement? Students should recognize that it's safer to move incrementally. Scrapping an initial configuration and trying a different approach may result in a setback. The scores may fall in the next round. Fear of failure causes groups to take comfort in their incremental approach rather than embracing a radical experiment.
5. How did you feel when you were told that some teams surpassed 200 balls in prior game play? Many students will describe their initial shock at this news. However, some participants will point out that the announcement encouraged divergent thinking. They rethought their strategy and looked broadly for alternatives. Instructors can describe how teams sometimes grow stagnant due to groupthink. Team members become insular and like-minded. People think they are doing great work simply because the group has a harmonious atmosphere. They mistake harmony for effectiveness. A few team members may have ideas for a better process, but they are afraid to offer them. Dissenters engage in self-censorship. The best groups do not get complacent. They welcome dissent and new perspectives that challenge the status quo. Instructors should emphasize the value of cultivating an environment of psychological safety (Edmondson, 1999; 2018).
6. Is there an optimal solution to this game? Teams will be eager to present their solutions. Instructors should take note if teams achieved high scores using different strategies. Many students will believe that one best strategy exists. However, experience demonstrates quite different systems can achieve high scores (*a quick YouTube search offers examples of markedly different strategies*). Instructors should contrast two problem-solving mindsets: the "how/best" vs. "why/potential" mindset. Students learn how the latter mindset tends to enhance creative problem-solving effectiveness.

CONCLUSION

This exercise enhances students' learning-by-doing capabilities by making them aware of the advantages of iterative problem-solving processes over more traditional linear approaches. More importantly, it enables students to identify the psychological biases and barriers that inhibit our ability to iterate effectively. They come away with an understanding of why learning-by-doing can be challenging, and why teams often miss opportunities to discover innovative solutions to novel problems.

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Manuscript Guidelines, Submission and Review Process

TOPIC AREAS (BUT NOT LIMITED TO THESE):

- Course design – current courses, new courses, new trends in course topics
- Course management – successful policies for attendance, homework, academic honesty ...
- Class material
 - Description and use of new cases or material
 - Lecture notes, particularly new and emerging topics not covered effectively in textbooks
 - Innovative class activities and action-learning – games, active learning, problem based
- Major or emphasis area program design that is new or innovative.
- Assessment – all aspects including AACSB and university level assessment strategies and programs
- Integration of programs or courses with other academic disciplines
- Internship programs
- Business partnerships
- Successful student job placement strategies
- Any topic that relates to higher education business education.

SUBMISSION AND REVIEW PROCESS:

Copyright

- Manuscripts submitted for publication should be original contributions and should not be under consideration with another journal.
- Authors submitting a manuscript for publication warrant that the work is not an infringement of any existing copyright, infringement of proprietary right, invasion of privacy, or libel and will indemnify, defend, and hold Elm Street Press harmless from any damages, expenses, and costs against any breach of such warranty.

Prepare your manuscript

- See the Style Guideline page for specific instructions.
- Articles must make a contribution to business education innovation.
- Manuscripts should be limited to 8 to 10 pages or less, although longer will be accepted if warranted.
- Articles can be either regular research papers, or shorter notes that succinctly describe innovative classroom teaching methods or activities.
- Manuscripts should be completely finished documents ready for publication if accepted.
- Manuscripts must be in standard acceptable English grammatical construction.
- Manuscripts should be in MS Office Word format. Word 2007 files are acceptable, as are earlier versions of Word. If you are using a new version of Word after Word 2007, save in Word 2007 format.

Submit your manuscript

- Manuscripts may not have been published previously or be under review with another journal.
- Submit the manuscript attached to an email to **submit@beijournal.com**
- We will respond that we have received the manuscript.
- Article submissions can be made at any time.
- Submission deadlines: September 15 for December issue, March 15 for June issue.

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- The editor and reviewers will review your submission to determine if 1) the content makes a contribution to innovative business education, 2) is of the proper page length, 3) is written in proper grammatical English, and 4) is formatted ready for publication.
- Submissions not meeting any of these standards will be returned. You are invited to make revisions and resubmit.
- If the submission meets the standards, the manuscript will be sent to two reviewers who will read, evaluate and comment on your submission.
- The editor will evaluate the reviews and make the final decision. There are 3 possible outcomes:
 - Accept as is.
 - Accept with minor revisions.
 - Not accepted.
- Reviews will be returned promptly. Our commitment is to have a decision to you in less than two months.
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If your paper is accepted

- Minor revision suggestions will be transmitted back to you.
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Manuscript Style Guide and Example

An example is provided following these instructions.

This style guide represents style guidelines in effect for future issues, but always check for updates online.

Authors are responsible for checking for correct grammar, construction and spelling. Authors are also responsible for formatting pictures, tables, and figures such that a pdf black and white file sent to the publisher will reproduce in a readable manner.

General Setup:

- All fonts other than exceptions noted below: Times New Roman. 10 point for text. Other sizes as noted below
- Margins: 1 inch on all sides of 8½x11 inch paper size.
- No headers or footers.
- Absolutely no footnotes or endnotes via footnote or endnote formatting. For footnotes or endnotes, place a number of the footnote in the proper location as a superscript. Then at the end of the paper or bottom of the page, add the footnote as text with a superscript number to correspond to that footnote.
- Page numbering bottom centered.
- No section breaks in the paper.
- No color, including url's. Format to black. No color in tables or figures. Use shading if necessary.
- All pages must be portrait orientation. Tables and figures in landscape orientations should be reformatted into portrait orientation.
- All paragraphs should be justified left and right, single spaced, in 10 point Times font, no indent on first line, 1 line between each heading and paragraph.
- One line between each paragraph.

Titles, Authors, and Headings:

- **Title centered 14 point bold.** One line between title and author's name.
- Authors: centered, 12 point. Name, affiliation, state, country.
- One line space to **ABSTRACT** (title 10 point, bold, all capitalized, aligned left; text of abstract 10 point, no bold)
- After **ABSTRACT**, one line space, then **Keywords**. Followed by one line space to first major heading.
- **HEADINGS, MAJOR**, 10 point, bold, all capitalized, aligned left.
The specific headlines will be based on the content of the paper, but major sections should at a minimum include an abstract, keywords, introduction, conclusion, and references.
- **Sub-headings:** 10 point, bold, first letter capitalized, no line to following paragraph. Align left.
- *Third level headings:* *Italic*, 10 point, first letter capitalized, no line to following paragraph. Align left.
- **Keywords:** heading: 10 point, bold, first letter capitalized, no line to following paragraph. Align left. Your list of keywords in 10 point, no bold.

Tables, Figures and Graphs:

- All fonts 10 point.
- Numbered consecutively within each category. Table 1, Figure 1 etc.
- Title: 10 point, bold, left justify title, one space, then the table, figure, etc.
- Example: **Table 1: Statistical Analysis**

References:

- APA format when citing in the text. For example (Smith, 2009).
- References section: 8 point font, first line left margin, continuation lines 0.25 inch indent. Justify left and right. No line spacing between references. List alphabetically by first author.
- Specific references: Last name, First initial, middle initial (and additional authors same style) (year of publication in parentheses). Title of article. *Journal or source in italics*. Volume and issue, page number range.
- Example: Clon, E. and Johanson, E. (2006). Sloppy Writing and Performance in Principles of Economics. *Educational Economics*. V. 14, No. 2, pp 211-233.
- For books: last name, first initial, middle initial (and additional authors same style) (year of publication in parentheses). *Title of book in italics*. Publisher information.
- Example: Houghton, P.M, and Houghton, T.J. (2009). *APA: The Easy Way!* Flint, MI: Baker College.

Example (note that this example represents a change from previous style guides)
Evidence to Support Sloppy Writing Leads to Sloppy Thinking

Peter J. Billington, Colorado State University - Pueblo, Colorado, USA (12 point)
Terri Dactil, High Plains University, Alberta, Canada

ABSTRACT (10 point, bold, all capitalized, left justified)

(text: 10 point Times font, no indent, justified, single space, 150 words maximum for the abstract)

The classic phrase “sloppy writing leads to sloppy thinking” has been used by many to make writers develop structured and clear writing. However, although many people do believe this phrase, no one has yet been able to prove that, in fact, sloppy writing leads to sloppy thinking. In this paper, we study the causal relationship between sloppy writing and sloppy thinking.

Keywords: sloppy writing, sloppy thinking (10 point, bold title, first letter capitalized, left justified).

INTRODUCTION (10 point, bold, all capitalized, left justified).

The classic phrase “sloppy writing leads to sloppy thinking” has been used by many to make writers develop structured and clear writing. However, since many people do believe this phrase, no one has yet been able to prove that in fact, sloppy writing leads to sloppy thinking. Is it possible that sloppy writing is done, even with good thinking. Or perhaps excellent writing is developed, even with sloppy thinking.

In this paper, we study the writing of 200 students that attempts to test the theory that sloppy writing leads to sloppy thinking.

PREVIOUS RESEARCH

The original phrase came into wide use around 2005 (Clon, 2006), who observed sloppy writing in economics classes. Sloppy writing was observed in other economics classes (Druden and Ellias, 2003).

RESEARCH DESIGN

Two hundred students in two business statistics sections during one semester were given assignments to write reports on statistical sampling results. The papers were graded on a “sloppiness” factor using...

Data Collection (Sub-heading, bold but not all caps, 10 point, aligned left, bold, no line after to paragraph)

The two hundred students were asked to write 2 short papers during the semester...

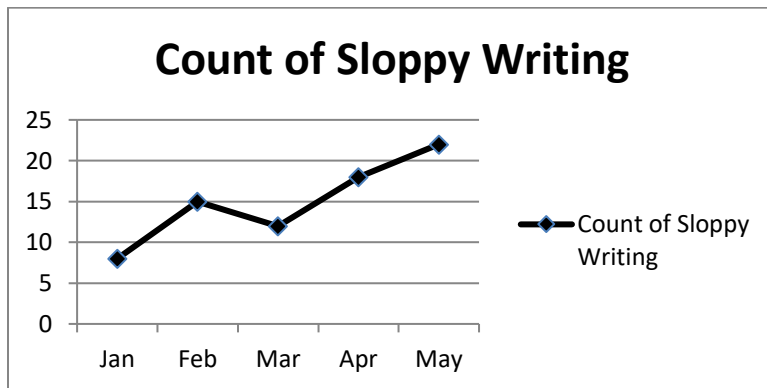
Data Analysis(Sub-heading, bold but not all caps, 10 point, aligned left, bold, no line after to paragraph)

The two hundred students were asked to write 2 short papers during the semester...

DISCUSSION

The resulting statistical analysis shows a significant correlation between sloppy writing and sloppy thinking. As noted below in Figure 1, the amount of sloppy writing increases over the course of the spring semester.

Figure 1: Sloppy Writing During the Semester



The count results were compiled and shown in Table 1 below.

Table 1: Counts of Good and Sloppy Writing and Thinking (bold, 1 line after to table, left justify)

	Good Thinking	Sloppy Thinking
Good Writing	5	22
Sloppy Writing	21	36

*-Indicates significance at the 5% level)

As Table 1 shows conclusively, there is not much good writing nor good thinking going on.

CONCLUSIONS

The statistical analysis shows that there is a strong relation between sloppy writing and sloppy thinking, however, it is not clear which causes the other...

Future research will try to determine causality.

REFERENCES (title 10 point, all caps, bold, align left, one line to first reference)

(1 line spacing) (All references 8 point, indent second line 0.25 inch, justify left and right)

- Clon, E. (2006). Sloppy Writing and Performance in Principles of Economics. *Educational Economics*. V. 14, No. 2, pp 211-233.
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(short bio section optional, can run longer than these examples; removed before sent to reviewers)

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Endnote: (do not use word footnote or endnote formatting to accomplish this; see comments above)