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Welcome to this issue of the *Business Education Innovation Journal*.

The purpose of this journal is to assemble researched and documented ideas that help drive successful learning and motivate business students to learn. The intention is to draw ideas from across both methods and disciplines and to create a refereed body of knowledge on innovation in business education. As a result, the primary audience includes business education faculty, curriculum directors, and practitioners who are dedicated to providing effective and exciting education.

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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Continuous Improvement through Engagement, Innovation, and Impact: Development of a Scoring Model to Measure Scholarly Impact

Matthew Valle, Elon University, North Carolina USA
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ABSTRACT

AACSB Standards for Business Accreditation (<http://www.aacsb.edu/accreditation/business/standards/>) require evidence of continuous improvement through engagement, innovation, and impact. This article details the results of a faculty initiative to define, measure, and report scholarly impact. The committee took a multi-dimensional view of scholarly impact and used the guidance contained within AACSB Standards 2 and 15 to develop a comprehensive operational definition and (innovative) measurement system for scholarly impact. The proposed scoring model allows for quantitative and qualitative self-assessments of intellectual contribution impact, as well as mechanisms for maintenance of accreditation reporting.

Keywords: AACSB Standards, impact, intellectual contributions, scholarly activity

INTRODUCTION

The Martha and Spencer Love School of Business (LSB) at Elon University strives to attract, develop and maintain a gifted and capable faculty body that is deeply committed to enhancing our students and stakeholders' understanding of business and management. As such, our faculty embrace scholarly inquiry as a way to remain *engaged* with an evolving literature base and a constantly changing business environment. We embrace scholarly inquiry as a way to develop *innovative* teaching/learning methods and activities, and managerially relevant knowledge, to fulfill our educational and business outreach mission. We embrace scholarly inquiry by sharing scholarly innovations with others through the production of tangible, mission-focused outputs that have an *impact* on the continued teaching and practice of business and management.

Our business school encourages and supports the creation of a diverse faculty portfolio of high-quality intellectual contributions that builds on our university's distinctive focus on active and experiential learning as a way to transform business education, business students, and business organizations. Intellectual contributions are the foundation for innovation in the classroom and in the workplace, and measures of the impact of our intellectual contributions support the claim that our innovative scholarly explorations make a difference in the lives of our students and in the organizations in which we interact. Our business school supports the depth and breadth of faculty participation in scholarship because we believe that innovation can best be explored in an environment that values the widest possible range of traditional and non-traditional approaches to research, and in an environment that values the widest possible range of research outputs.

A focus on institutional mission is essential because that focus is necessary to guide the recruitment, hiring, deployment and support of faculty in departments within our school. Within our business school, *engagement*, *innovation* and *impact* are enhanced by

- processes which result in the recruitment and hiring of academically and professionally qualified faculty who have demonstrated the potential to sustain and enhance their own intellectual capital while supporting growth in the composite human and intellectual capital of the LSB and Elon University;
- processes which result in the deployment of intellectually engaged faculty within and across disciplinary areas in undergraduate and graduate business programs;
- and processes which support the goal of producing high-quality intellectual contributions that are consistent with our mission, expected outcomes, and strategies and that impact the teaching and practice of business and management.

In the fall of 2013 and spring of 2014, we formed a faculty committee to study the revised AACSB Standards for Business Accreditation (<http://www.aacsb.edu/accreditation/business/standards/>) and to develop a system of measuring and reporting faculty scholarship consistent with our mission, expected outcomes, and strategies. This report details the deliberations and results of that work.

PRODUCING HIGH-QUALITY INTELLECTUAL CONTRIBUTIONS – DEFINING AND MEASURING SCHOLARLY IMPACT

Criteria for advancement in business schools (Mudambi, Hannigan & Kline, 2012) have typically emphasized the production of research outputs in appropriate journals (Starbuck, 2005; Trieschmann, Dennis, Northcraft, & Niemi, 2000), and an increased emphasis on the concept of research “impact” by AACSB (AACSB International, 2008) has prodded more schools to analyze the relevance of their research (Adler & Harzing, 2009; Pearce & Huang, 2012). The rationale for this particular word choice, *impact*, can be understood with reference to the concept of legitimacy (Alajoutsijarvi, Juusola, & Siltaoja, 2015; Bailey, 2013; Rynes & Brown, 2011). Legitimacy refers to the perception that what an organization or group of people does is proper and appropriate (Rynes & Brown, 2011). Legitimacy ensures continued survival and often results in increased power and influence, and continued access to resources. Due to escalating concerns about the value of business education from a number of directions, AACSB continues to encourage business schools to strive for legitimacy and impact in scholarly activity. As such, we sought to define and measure the concept of scholarly impact in terms that would be seen as legitimate to our stakeholders.

Some activities, including traditional peer-reviewed scholarship, may have multiple impacts, while others may have limited impact. It is possible that the impact of an activity or intellectual contribution may not be known or identifiable for a number of years. It is also important to note that evidence that intellectual contribution outcomes have made a difference may result from a single outcome produced by one or more faculty members and/or students, a series or compilations of works, or collaborative work with colleagues at other institutions or with colleagues in professional practice. As such, we have developed a composite multi-factor impact measurement system that takes into account impact metrics from 4 impact domains – mission alignment impact, academic (scholarly) impact, teaching/instructional/curricular impact, and practice/community impact. See Appendix 1 (derived from AACSB Standards for Business Accreditation Standard 2) for a listing of impact metrics in support of documentation.

As with any system that attempts to quantify something that is difficult to measure, there are invariably questions about the use, and the potential for abuse, of such measures in administrative settings and in performance appraisal systems. It was our the intention to provide a process for the measurement of impact with regard to academic and professional engagement activities (intellectual contributions), but not add to, supplement, or provide additional information for faculty performance appraisal, promotion and tenure assessment, and/or any other faculty performance evaluation process extant at our university. The information gained from assessing and reporting impact was intended *solely* for management, reporting and compliance with AACSB maintenance of accreditation requirements only.

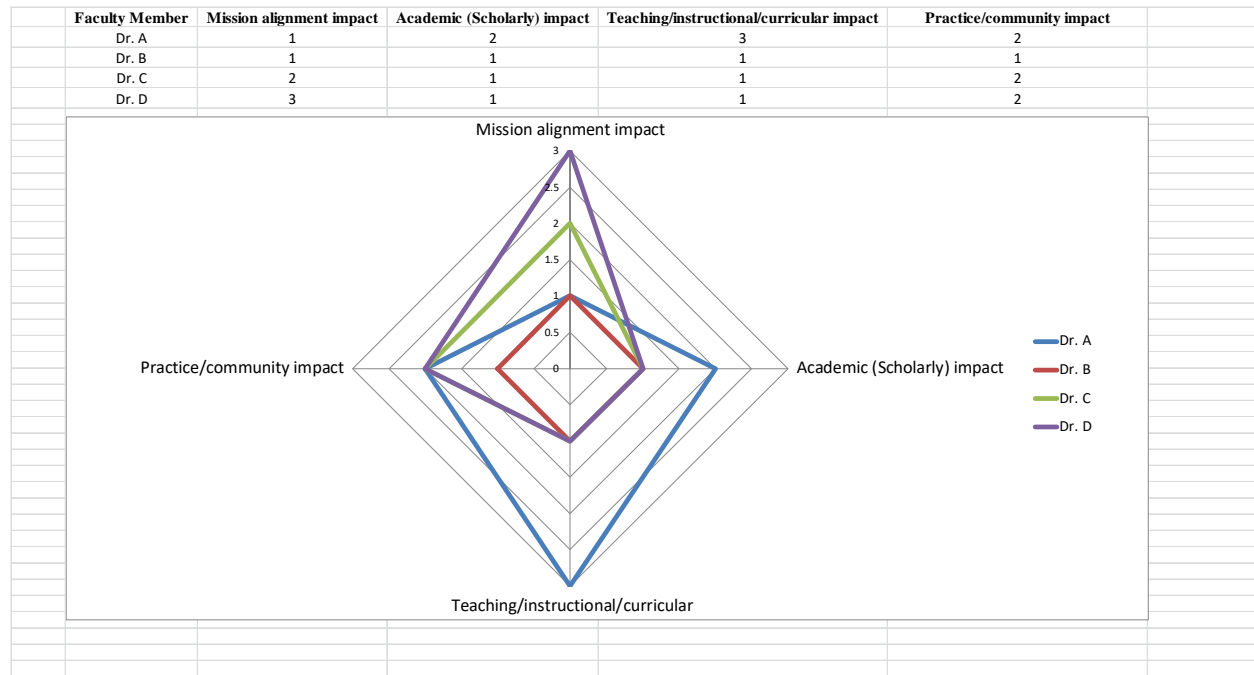
Our composite multi-factor impact measurement system includes qualitative descriptions and quantitative scales to assess intellectual contribution impact from 4 mission-related domains – mission alignment impact, academic (scholarly) impact, teaching/instructional/curricular impact, and practice/community impact. Faculty members self-assess the impact of their individual and combined intellectual contributions over a five-year period using qualitative assessment scales for each domain and score the impact of their intellectual contributions in each domain on a quantitative 1-3 assessment scale (1=some impact, 2=moderate impact, 3=high impact). See Appendix 2 for an example of a faculty impact assessment worksheet.

Consider the following example. Faculty member “Dr. A” has published 3 refereed journal articles in the past five years. All of the publications were in *appropriate* outlets, suitable to the mission of our school, and modest in impact (e.g., measured by mid-range acceptance rates, impact factors and/or citation counts). Dr. A might then rate her intellectual contributions as having “moderate impact” (a score of “2”) *in the Academic (Scholarly) impact domain* within the past five years. Dr. A may also use the information gained from her peer-reviewed scholarship to enhance the teaching of her coursework. She would include this information (along with other information related to the quality and impact of other teaching/instructional performance indicators) in her analysis of impact in the *Teaching/Instructional/Curricular impact domain*. Thus, some activities, like Dr. A’s peer-reviewed scholarship, may have impacts in multiple domains.

“Dr. D” may have created a noteworthy entrepreneurship program that has become a very visible feature of Elon’s commitment to active and engaged learning. As such, Dr. D might rate his intellectual contribution (the new academic program) as having “high impact” (a score of “3”) *in the Mission Alignment impact domain*. The Radar Chart shown as Figure 1 (below) displays the composite ratings of all of the faculty members (Dr. A through Dr. D) in a hypothetical department within our business school. The chart displays how the variety of intellectual

contributions, developed over the course of the past 5 years by faculty members within a department, serve to document impact across all 4 impact domains.

Figure 1. Radar Chart of Intellectual Contribution Impact by Impact Domain



The purpose of documenting intellectual contribution impact and displaying it in this way is to emphasize the intellectual contribution portfolio of individuals, departments, and our business school as a whole, and to show the domains in which impact is demonstrated. Rubrics for self-assessment within the 4 impact domains are provided to faculty members yearly so that they may keep a running list of academic and professional engagement activities (intellectual contributions) during each rolling 5-year AACSB reporting cycle. Definitions/qualitative descriptions of some, moderate and high impact are provided along with the rubrics (see Appendix 1 and Appendix 2). Combinations of multiple intellectual contributions within a domain may support a faculty member’s self-evaluation/rating of higher impact scores within that domain. For example, if Dr. A had produced 10 refereed journal articles in the past 5 years, with 2 articles receiving “Best Paper” awards, and Dr. A had been a member of two journal editorial boards... Dr. A’s determination of “high impact” in the *Academic impact domain* would most likely be substantively supported.

It is important for faculty understand that, as a business school faculty body, certain faculty members are going to have impacts in areas where other faculty are less productive. It is precisely this diversity of intellectual contribution activity and productivity that forms the starting point for discussions about the expected and appropriate impact for faculty members with different faculty qualifications (e.g., AACSB Standards for Business Accreditation Standard 15). It is *expected* that Instructional Practitioner (IP) faculty will excel in the Teaching/Instructional/Curricular impact domain, and the five-year AACSB reports should demonstrate substantial evidence of *high* impact intellectual contributions and activities in this domain. It is not expected that the IP faculty member will excel in the Academic (Scholarly) impact domain, where currency and relevance is most often demonstrated by the publication of manuscripts in peer-reviewed outlets. In this way, faculty will be more aware of the capabilities they bring to the school through their intellectual contributions. Faculty will also be more aware of the diversity of contributions by the school faculty as a whole, and on the impact the faculty portfolio makes on university mission and strategies. We do not aspire to have each faculty member demonstrate high impact in all 4 impact domains; on the contrary, the multidimensional impact rating approach allows faculty to apply their own specific strengths and skills to those areas that have the most mission impact, consistent with their academic preparation and professional engagement history. At present, our departments demonstrate a relative balance across all 4 impact domains, in line with our mission as an institution with a large undergraduate student population and limited masters’ programs, but it might be possible to use a radar chart like this to guide future hiring decisions. For example, if our strategy was to

highlight or develop a strength in one particular area, we might then hire faculty members with a focus in that area to supplement our highlighted strength. Conversely, if we were too heavy in one area, we might hire faculty members with complementary strengths in another area in order to achieve a better balance across our mission domains. As such, the radar chart can help us evaluate and develop supplementary and complementary fit (Muchinsky & Monahan, 1987).

We (as professional members of a faculty body) must resist the temptation to over-inflate our intellectual contributions and rate ourselves “high” in each mission domain. By removing any real or perceived linkage between individual impact self-assessment and school/university performance appraisal processes, we hope to eliminate much of the incentive for *impact inflation*. There may very well be individuals in our school who demonstrate high impact in multiple domains, but such should be cause for celebration and emulation, if possible. However, if your faculty duties are limited, by necessity, to certain mission domains (IP faculty members, for instance), there should be equal cause for celebration due to your intellectual contribution impacts, as well. The real value in the proposed system of impact assessment is in the potential for new connections and a deeper engagement between what we do as faculty (our intellectual contributions, in a variety of mission-related domains) and the changes or improvements we make in the lives of our students and stakeholders. It is tempting to see this system as just another method to keep score. However, it is more appropriate to see this system as an honest attempt to drive value creation activities for those individuals and organizations which count on the members of the Love School of Business to make a difference in the classroom and in organizations. From AACSB Standard 2: *Impact is concerned with the difference made or innovations fostered by intellectual contributions—e.g., what has been changed, accomplished, or improved.*

IMPLEMENTATION AND REPORTING

We have provided our faculty with the impact assessment guidance contained as Appendices 1 and 2, as well as completed “example” Faculty Impact Assessment Worksheets (not provided here – please contact the lead author for those examples), and have collected data over the past 3 years. Faculty report that the collection of evidence in support of their self-assessment ratings (from yearly self-reports and chair evaluations) is straightforward and takes, on average, less than 10 minutes each year. In order to assess the validity of the faculty self-ratings, we recently convened a panel of 3 faculty raters to assess agreement between faculty raters and between faculty raters and faculty self-ratings. Inter-rater agreement (between faculty raters) was very high, as was agreement between the faculty raters and individual faculty self-ratings. Department chairs have incorporated the summary information (e.g., reports by department) to guide their planning of professional development activities for faculty at different career stages and during different periods in the academic calendar. Most importantly, faculty now have a more informed understanding of how the composite portfolio of intellectual contributions impact our various stakeholders, and a better understanding of how they may plan their intellectual contribution activities for maximum impact across all mission domains.

CONCLUSION

As a complement to a well-developed system of assurance of learning assessment and reporting activities, this system of assessing and reporting scholarly activities provides an additional avenue for documenting engagement, innovation, and impact. This effort has forced us to articulate the value of our scholarly endeavors, and to soberly assess that value in light of our mission and the needs of our stakeholders and our institution. It has also allowed us to make more informed decisions about faculty development and resource allocations, and to plan for faculty recruitment and selection. Most importantly, it has allowed us to codify our unique culture of scholarship, and to detail the many ways in which our scholarly endeavors impact the teaching and practice of business.

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APPENDIX 1 - Impact Metrics in Support of Documentation Rubrics for Assessing and Scoring Intellectual Contributions within the 4 Impact Domains

It is not the purpose of this rubric/assessment guide to clearly and unambiguously specify the exact nature and quantity/quality of academic and professional engagement activities supporting determinations of impact within each mission domain. Such a task would be extremely difficult, if not operationally impossible. It would also be difficult, given the differing perspectives of a diverse faculty body within the LSB, to task a school-wide committee with *objectively* determining impact for each faculty member within each mission domain. Ultimately, the determination of impact in each mission domain must be made with reference to a combination of quantitative and qualitative factors, and this determination necessarily has to be a judgment call by individual faculty members. Such judgments can be meaningfully made by relying on current university processes and their associated artifacts for self-assessment and evaluation. As such, the assessment and reporting of impact adds little to the reporting and administrative burden of faculty. Faculty are, and should be, in the best position to support and defend their own determinations of impact in each mission domain by referencing readily available information sources. Primary source information on faculty academic and professional engagement activities is available from faculty yearly self-evaluation reports and departmental chair assessments. The number and types of engagement activities suitable for assessing impact can be found by referencing the intellectual contribution activities associated with the individual faculty qualification (e.g., SA, PA, SP, IP) for each faculty member. Additionally, faculty have data from work with school and university faculty committees, as well as reports and work products from internal faculty/staff bodies, external professional associations, and myriad other stakeholder groups who engage with LSB faculty on an ongoing basis. In short, while a rational, unequivocal numerical rating system is highly desirable, it is more likely that a qualitative/quantitative scoring model is the most feasible approach to impact measurement across the four impact domains.

As a guide, each rating of impact in this Appendix includes a *suggested* quantitative measure of outputs associated with an impact level (Low-Moderate-High). However, faculty are encouraged to adjust the rating/impact level to account for varying levels of qualitative impact. For example, if a faculty member published 3 refereed journal articles in a five-year period, such a record might engender a self-assessment of “Moderate Impact” in the Academic (Scholarly) impact domain. However, if those 3 articles were published in recognized “top tier” journal outlets in the discipline, a self-assessment of “High Impact” may be supported. It is not the goal of this rubric to provide prescriptive assessments of impact measures; it is our goal to provide benchmarks from which to assess and adjust individual determinations of impact across the 4 mission domains.

Mission Alignment Domain

Impact Domain	Some Impact	Moderate Impact	High Impact
Mission Alignment Impact (5 year period)	Some intellectual contribution activity impacting Mission Alignment Domain	Moderate intellectual contribution activity impacting Mission Alignment Domain	Substantial intellectual contribution activity impacting Mission Alignment Domain

High Impact - Faculty member can document > 5 substantive intellectual contribution activities in this domain

Moderate Impact - Faculty member can document 3 substantive intellectual contribution activities in this domain

Some Impact - Faculty member can document 1-2 substantive intellectual contribution activities in this domain

Academic and professional engagement activities supporting the faculty member's determination of impact in this domain include the following:

Alignment of intellectual contribution outcomes with themes or focus areas valued by the business school's mission (e.g., global development, entrepreneurship, innovation)

Percentage of intellectual contribution outcomes that align with one or more "mission-related" focus areas for research

Percentage of faculty with one or more intellectual contribution outcomes that align with one or more mission-related focus areas

Research awards and recognition that document alignment with one or more "mission-related" focus areas for research

Academic (Scholarly) Impact Domain

Impact Domain	Some Impact	Moderate Impact	High Impact
Academic (Scholarly) Impact (5 year period)	Some intellectual contribution activity impacting Academic Domain	Moderate intellectual contribution activity impacting Academic Domain	Substantial intellectual contribution activity impacting Academic Domain

High Impact - Faculty member can document > 5 substantive intellectual contribution activities in this domain

Moderate Impact - Faculty member can document 3 substantive intellectual contribution activities in this domain

Some Impact - Faculty member can document 1-2 substantive intellectual contribution activities in this domain

Academic and professional engagement activities supporting the faculty member's determination of impact in this domain include the following:

Publications in peer-review or editor-review journals

Citation counts

Download counts for electronic journals

Editorships, associate editorships, editorial board memberships, and/or invitations to act as journal reviewers for recognized, leading peer-review journals

Elections or appointments to leadership positions in academic and/or professional associations and societies

Recognitions for research (e.g., Best Paper Award), Fellow Status in an academic society, and other recognition by professional and/or academic societies for intellectual contribution outcomes

Invitations to participate in research conferences, scholarly programs, and/or international, national, or regional research forums

Inclusion of academic work (e.g., at textbook or journal article) in other professors' courses

Competitive grants awarded by major national and international agencies (e.g., NSF and NIH) or third-party funding for research projects

Patents awarded

Appointments as visiting professors or scholars in other schools

Teaching/Instructional/Curricular Impact Domain

Impact Domain	Some Impact	Moderate Impact	High Impact
Teaching/ Instructional/Curricular Impact (5 year period)	Some intellectual contribution activity impacting Teaching/ Instruction Domain	Modest intellectual contribution activity impacting Teaching/ Instruction Domain	Substantial intellectual contribution activity impacting Teaching/ Instruction Domain

High Impact - Faculty member can document > 5 substantive intellectual contribution activities in this domain

Moderate Impact - Faculty member can document 3 substantive intellectual contribution activities in this domain

Some Impact - Faculty member can document 1-2 substantive intellectual contribution activities in this domain

Academic and professional engagement activities supporting the faculty member's determination of impact in this domain include the following:

Grants for research that influence teaching/pedagogical practices, materials, etc.

Case studies of research leading to the adoption of new teaching/learning practices

Textbooks, teaching manuals, etc., that are adopted by other professors

Publications that focus on research methods and teaching

Research-based learning projects with companies, institutions, and/or non-profit organizations

Instructional software (by number of programs developed, number of users, etc.)

Case study development (by number of studies developed, number of users, etc.)

Mentorship of student research, including student research mentorship that leads to publications or formal presentations at academic or professional conferences

Documented improvements in learning outcomes that result from teaching innovations that incorporate research methods from learning/pedagogical research projects

Hiring/placement of students

Career success of graduates beyond initial placement

Placement of students in research-based graduate programs

Direct input from organizations that hire graduates regarding graduates' preparedness for jobs and the roles they play in advancing the organization

Movement of graduates into positions of leadership in for-profit, non-profit, and professional and service organizations

Practice/Community Impact Domain

Impact Domain	Some Impact	Moderate Impact	High Impact
Practice/ Community Impact (5 year period)	Some intellectual contribution activity impacting Practice/ Community Domain	Moderate intellectual contribution activity impacting Practice/ Community Domain	Substantial intellectual contribution activity impacting Practice/ Community Domain

High Impact - Faculty member can document > 5 substantive intellectual contribution activities in this domain

Moderate Impact - Faculty member can document 3 substantive intellectual contribution activities in this domain

Some Impact - Faculty member can document 1-2 substantive intellectual contribution activities in this domain

Academic and professional engagement activities supporting the faculty member's determination of impact in this domain include the following:

Media citations (e.g., number, distribution, and effect)

Requests from the practice community to utilize faculty expertise for consulting projects, broadcast forums, researcher-practitioner meetings, faculty/student consulting projects, etc.

Publications in practitioner journals or other venues aimed directly at improving management expertise and practice Consulting reports

Research income from various external sources such as industry and community/governmental agencies to support individual and collaborative research activities

Case studies based on research that has led to solutions to business problems

Adoption of new practices or operational approaches as a result of faculty scholarship

Presentations and workshops for business and management professionals (e.g., CPE)

Invitations for faculty to serve as experts on policy formulation, witnesses at legislative hearings, members of special interest groups/roundtables, etc.

Tools/methods developed for companies

Memberships on boards of directors of corporate and non-profit organizations

Involvement of faculty in executive education programs

Consulting activities of research active faculty that stem from participation in executive education activities

Inclusion of cases and other materials in degree programs that can be identified as resulting from executive education activity

Partnerships between the school and organizations that participate in executive education programs, which benefit the school's teaching, research, and other activities and programs

Involvement of executive education participants and their organizations in the teaching mission of the school (e.g., executive-in-residence program)

Linkage between organizations participating in executive education and student internships, as well as placement of graduates in entry-level positions

APPENDIX 2 – Faculty Impact Assessment Worksheet

Faculty Impact Assessment Worksheet

Name _____
 Rolling 5-year Period _____ to _____

Impact Domain	Self-Assessment Rating (circle/highlight one)	Evidence supporting self-assessment rating
Mission Alignment	Some – Moderate - High	[Cut-and-paste academic and professional engagement activities/intellectual contributions from yearly self-evaluation reports]
Academic (Scholarly)	Some – Moderate - High	[Cut-and-paste academic and professional engagement activities/intellectual contributions from yearly self-evaluation reports]
Teaching/Instructional/ Curricular	Some – Moderate - High	[Cut-and-paste academic and professional engagement activities/intellectual contributions from yearly self-evaluation reports]
Practice/ Community	Some – Moderate - High	[Cut-and-paste academic and professional engagement activities/intellectual contributions from yearly self-evaluation reports]

More Than Money: Business Strategies to Engage Millennials

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ABSTRACT

The overall disengagement of employees continues to climb while the workforce undergoes a paradigm shift as Baby Boomers retire and Millennials take over. Work conditions, not financial, must be provided which allow Millennials to succeed professionally and personally. Companies need to provide such things as a clear career path, strong coaching, mentoring and leadership, making the vision and mission statements drive the organization, on-going personal and professional development, and a semi-structured environment. As the workforce is experiencing a paradigm shift, it behooves us as academics to address not only what this means to the workforce but also to correct the deplorable disengagement issue. Academe must work in consort with business to identify and make the changes necessary to engage the Millennials in the workforce.

Keywords: millennials, engagement

INTRODUCTION

It is no secret that our workforce is changing rapidly. It now appears that the workforce is experiencing a paradigm shift. Currently, there are three generations in the work place. The Baby Boomers (born 1946-64) are now retiring in large numbers; Generation X (born 1965-79) and Generation Y or Millennials (born 1982-2004) are the makeup of today's workforce. According to a study by CAA Intel Group, 86 million Millennials will be in the work place by 2020 – representing a full 40% of the total work population. More than one in three American workers today are Millennials and in 2015, they surpassed Generation X to become the largest share of the American workforce. (Fry, 2015) Obviously, the makeup of the workforce is undergoing a major shift.

Yet, a stark reality today is that overall employees of all three generations are not engaged in the workforce. According to a Gallup survey, from 2000-2015, only 32% of employees in the US were engaged in the workplace. The sad statistic is that 50.8% of US employees were not engaged while 17.2% were actively disengaged (Adkins, January 2016) Employee engagement is the emotional commitment an employee has to the organization and its goals. (Kruse, 2012) Employee engagement is not a measure of how happy an employee is at work, rather, it is how much the employee feels invested in and motivated by the job. Engagement can often be seen in the amount of discretionary effort workers exert on the job.

Millennials will be approximately 75% of the workforce by 2020. (PWC, 2011) Today, there are more 26 year olds in the US than any other age. (Mogan, 2016) Due to greatly outnumbering the Gen Xers in the workplace, and with the increasing retirement of the Baby Boomers, the Millennial generation is taking on more roles in business. Yet, stereotypes have emerged that Millennials are lazy, self-centered, and have unrealistic expectations for job titles and pay in the workplace. Many companies have turned their focus to programs aimed at their Millennials in an effort to build engagement and increase retention. And still, Millennials have emerged as the job hopping generation, (Adkins, May 2016) supporting the 2016 Gallup report indicating that over 70% of Millennials are not engaged at work. Academia needs to assist with business in addressing the current situation and to assist businesses to make the necessary changes to provide engagement opportunities for the Millennial generation.

The companies that don't realize and adapt to the generational changes are rapidly losing employees due to disengagement. Managers are left trying to figure out why employees – most especially Millennials - are leaving and what they can do to keep them. It isn't as simple as studying the culture and understanding what motivates the younger generation. The challenge is how to find a balance between the generations so that the workplace is harmonious and can work together and remain engaged. The question becomes how must the current business scene change to not only recognize the newest generations entrance, but to capitalize on their strengths and new found perspective while engaging them in changing the way we teach business. This is where responsibility should lie with

higher education institutions. We need to change the way we educate and engage with the new generation of students and future employees. When the business world experiences changes, the immediate impact should be felt and addressed by academia. It is critical higher education institutions and programs lead the change and are open to refining not only the way we teach, but the actual way we engage with the Millennial generation. Our study will discuss strategies business schools should/could implement to address Millennial engagement issues.

OUR STUDY

Our study involved focus groups of individuals from both Generation X and Y. We concentrated on asking individuals and focus groups about job engagement and motivation, decision making, communication, and leadership. Many people shared ideas or thoughts in other areas as a result of their answers. The quotes included are from the focus groups.

Millennials are different from previous generations and in a number of ways – some say an infinite number of ways. Millennials are bringing a new perception of what the business world should be like and how the relationship between the employer/management and employee should be structured. The average tenure of a Millennial is two years. (Fromm, 2015) While two years may seem like a short amount of time to a Gen Xer or Baby Boomer, it may be just enough time for a Millennial to absorb their surroundings and make a decision on whether or not the position, manager, or company satisfies their needs. *“We are used to watching TV on demand, Netflix or binge watching an entire series when we want, so waiting for a promotion might be challenging.”* Because of the Millennial generation’s entrance into the workforce, we see some dramatic shifts.

Who is a Millennial?

“We like technology and innovation. We get bored easily. We want to have the next best idea. We love our lives outside of work. We are not like our parents or their parents. We do things differently. We have different priorities. Managers must adjust to us, because we are here and we will be here longer than they will.” This is how a Millennial in a focus group described himself and his generation.

Howe and Strauss are credited with coining the term “Millennial” and in their book *Generations: The History of America’s Future, 1584-2069*, they describe a Millennial as someone born between 1982 and 2004. (Rouse) Although opinions differ about the specific age range, there is general consensus that Millennials are the generation born in the last twenty years of the twentieth century.

The following captures overall the Millennial generation (Goldman Sachs, 2016)

They are the only generation that has lived totally in the digital age and, as such, have collected a huge network of friends through internet based relationships.

They have witnessed the largest recession since the Great Depression, watching the adults around them suffer job loss, losing homes to foreclosure, and experiencing the disappearance of 401K’s and pensions.

They are the children of the highest divorce rates and most single parent homes in history.

They have lived in the super media infused age of news where they witnessed 911, Columbine and other school shootings, and natural disasters and terrorist attacks.

They are the children of the 2001 ‘No Child Left Behind’ initiative.

They are the largest generation. There are more Millennials than any other generation in history, approximately 91 million.

They have the highest unemployment rate and the lowest income of all generations before them, while also holding the largest amount of student debt.

There is a certain stigma that has developed referring to Millennials as lazy and lacking in a work ethic that prior generations portrayed. While there are definitely examples of 20-year-olds with a poor work ethic, the stereotype should not be applied to all young people in the work place. Millennials can and are excelling in the work place. From our study, we have identified certain characteristics that an organization may choose to develop in order to engage Millennials.

Mission and Vision

Motivating Millennials starts with portraying the company values, vision and mission clearly throughout the entire organization. This should apply to all people within organizations, regardless of the average employee age, but it is especially important to companies with a strong Millennial presence. Millennials want to work with purpose and to make a difference within the organization and to the world. (Watkins, January 2015)

Renjen (Renjen, 2016) offered three factors for consideration to organizations to ‘earn the loyalty of their Millennial professionals.’ The first factor was to create a culture of purpose, next, establish values to have a long term success, and finally, utilization of people’s strengths and abilities. *“I was severely underutilized in a position and ended up leaving the company because I was bored. I think this is something that ties into having a clear vision. With a clear vision, everyone in the company understands where they need to go and can assign the right tasks to people. Without a clear vision, management will not be sure what tasks to assign and will then assign mundane tasks in order for their employees to be doing something. These mundane tasks generally do not lead to employee development but to boredom and the urge to search for another company that has the possibility of being more fulfilling.”*

It is important that work environments provide satisfaction to Millennials existential needs. The generation wants to give back to the community and the world in meaningful ways rather than focusing merely on profit making. *“If a company wants to attract me, their organizational culture must match my values. The values, culture and perception of a company play an important role in how I feel or think about a company – whether it be to work for them or buy from them.”* Our focus groups also made mention of the importance of offering Millennials volunteer opportunities, internships and business based projects while in college. Perhaps, colleges and businesses should work together to design these type of high impact learning experiences for students that can then open work opportunities in the future for the students.

Millennials tend to value knowing what they are working toward. In general, they like to understand the reason why they are doing things and what the final outcome should be. When the company vision is clear, they not only work towards it, but they can also apply creativity in finding ways to reach the goal. It is the responsibility of upper management to make the vision clear and should be a major priority and emphasis at all times.

Learning

Millennials are also motivated by learning. Constant learning and change keeps them interested and encourages engagement. A survey led by Adecco states that 68% of Millennials are looking for professional/leadership education. (Rouse, 2015) Likewise, a study by the University of North Carolina found nearly 2/3 of the Millennials say that the most influential factor in their current job is the opportunity for personal growth. (Nickell, 2014) They are looking for the next best thing and they want to improve themselves constantly to reach the top. *“To motivate Millennials, you need to offer us growth, because we are not satisfied until we move onto the next job.”* Here is another opportunity for colleges and universities to work in consultation with local businesses providing on the job learning and growth opportunities.

Millennials who continue to learn new things in the work place by job sharing, cross training, and development activities can experience great benefits. *“I love to learn new things at work. I am definitely aiming to become more and more of an asset to the company and the best way to do that is to learn a lot.”* Another Millennial commented *“the more I learn, the more useful I am. Because my tenure cannot be an advantage at this point in time, knowledge is my biggest asset to advancing. I don’t want to be stuck in the same position forever.”*

Many Generation Y’s enjoy learning by associating with other individuals. In a study by Bentley University, it was found that Millennials like to learn new skills through in-person methods including face-to-face training, third party events and guidance from co-workers. (Hyder, 2013) This isn’t to say that online modules don’t work, but one should not assume that a tech savvy group doesn’t value personal interaction. *“I especially enjoy learning from others in the workplace where I can ask questions and enjoy the compadre.”*

Communication

For the most part, Millennials enjoy social interaction with co-workers, managers, and also suppliers and customers. (Gasca, 2016) Yet, communication is viewed in many ways differently by Generation Y. Growing up in the world

of Facebook and Twitter has had an impact on Millennials that no other generation could even imagine. Any 20-something today has spent the last 5-10 years of their life constantly engaging in social aspects of life. Millennials are social in two vastly different worlds. One of these worlds is real while the other world is entirely virtual using social media sites such as Facebook, Instagram, Twitter and Snapchat. Millennials have an app for everything they desire in a fast paced and changing world. Most young adults are not comfortable just being alone in the peace and quiet. They want to be part of something and communicate with others. *“I am generally a quiet kid and keep to myself, but I do love the fact that everyone in the finance department does know me and I know them. This has helped me a ton and made showing up to work that much better. I love working with others in teams and learning from them and teaching them things. It does motivate me to come to work with a good attitude and contribute quality work to the group.”*

Communication is the key to improving the attitude, understanding, and direction of Millennials. With the progress of technology, communication no longer has to be (nor should it be) completely face-to-face. Facebook and Twitter have been the biggest drivers of change in communication patterns. *“I enjoy being able to quickly type a message and share it with the world. It gives me instant feedback on whatever topic is on my mind and resolve it within a moment of posting.”* The Millennial worker wants communication to be quick, more instantaneous, and shared among many. Their primary form of communication is chat or text and, because of access to these forms of communication, individuals are available 24-hours a day on their technology. They get their news, movies, and books via the internet and that is where they may seek to learn and grow on the job.

Yet, having actual personal interactions is also important. Communication needs to be two-way as Millennials want to be heard. They want to feel important to the organization and that requires a relationship and communication with leaders of the company. They want managers and executives to promote honesty and integrity going both ways. And, they want their leaders to provide and teach them the ‘why’ of what they are doing. *“At my company, executives have made themselves accessible to all employees. We regularly have ‘town hall meetings’ which has allowed me to understand what they are trying to achieve and the vision they have for the company. Hearing that explained from actual people was way better than reading a quote on a website. All managers should be personal with employee and allow employees to be personal with them. It motivates employees to truly do their best to help out others in the company.”*

Having learned to communicate using technology, often Millennials are unaware of their nonverbal cues which has often contributed to miscommunication between friends, coworkers, and managers. *“At times, I must admit, I forget that my words only account for a small part of communication.”* College classes in communication and management should address the new communication technologies as well as discussion and understanding of the impact – both negative and positive – such technologies present. The learning should definitely be addressed while the individual is in college and in a learning environment.

Millennials electronic literacy can be leveraged for communication in general. They are the first cohort to grow up with computers and cell phones in their homes. They have been with technology for much, if not all, of their lives. While most Millennials prefer to email and text over other communication mediums, happy mediums are becoming more popular that bridge the gap between efficiency and effective relationship building. For example, Skype and telepresence meetings allow face-to-face conversations from the convenience of one’s office.

Though the Web plays a supporting role in getting and communicating information, Millennials may also use what has been referred to as a ‘Millennial Advisory Board’ composed of parents and other family members, friends, coworkers, school advisors, professional specialists like wedding planners and realtors, and their partners or spouses.” (Albritton, 2017) This is the group the individuals will rely on regularly for assistance and advice as decisions are made and the future is approached.

Teamwork

Having grown up in a world where they can instantly reach out to anyone, Millennials are used to working in teams and expect to make friends with people at work. Generation Y has grown up in the world of collaboration, a world where you can reach out instantly to anyone and virtually see them. Collaboration and teamwork go hand-in-hand. This generation truly believes that teams can accomplish more and have witnessed the success of teams. *“When I first started working, I was mocked by my colleagues for signing up for too many extra-curricular activities/committees at work – but quickly learned that this was an easy way to get exposure and get ahead in the company.”* As Millennials jump at the opportunity to work on teams, they are networking, marketing themselves,

and getting exposure to help them with their intrinsic satisfaction and career growth. Colleges and universities do offer a multitude of team experiences. What, perhaps, needs to be improved is the actual teaching of what teamwork involves. The actual experience of working on a team needs to be expanded to foster additional understanding of the dynamics of various team efforts.

Generation Y has often been dubbed the ‘everybody gets a trophy’ generation. They are a generation in which everyone either played a sport, were in a band or orchestra, or took part in dance recitals. They learned early in life to recognize everyone’s contributions in a group setting and how to work together to achieve success. Understanding this view can be difficult for the Baby Boomers and Gen Xer’s who were raised in a generally more competitive environment. While it’s been recognized that collaborative thinking often breeds greater success than an individual approach, earlier generations seek a greater level of personal recognition, whereas Millennials are content to enjoy success together as long as the greater goal is achieved.

As such, Millennials approach tasks from a team perspective, even when a team has not been defined. An insightful example came from a member of a focus group. *“I held an experiment about two years ago as part of a seminar that I was taking on understanding the generational gap. In this experiment, I had a Millennial intern on one side and a seasoned employee on the other. I asked each team to come up with a strategic plan on how we could make improvements on our current maintenance work management system in order to reduce inefficiencies. I gave them 20 minutes to brainstorm the ideas and then they were to get back together and see me the ideas. As the teams went on their way, I noticed that the millennial immediately picked up an electronic device and started texting acquaintances and posed the question online to them. After a few minutes, their inbox was filled with suggestions and ideas from hundreds of people. The Millennial gathered all the ideas and responded to everyone that had sent in suggestions. He then emailed me the list and still had 10 minutes to spare so they continued chatting on social media. The Boomer was different in the fact they went off on their own to figure it out themselves. They went straight to the technical library and started physically researching the information. The Boomer then walked over to a fellow coworker that was also a Boomer and began talking about the task. After about 15 minutes, the Boomer finally emerged from behind the desk and was ready to discuss. I asked the Millennial to pitch to me what they had researched. The next words that came out of the mouth of the Millennial made me realize a major difference. When the Millennial was giving me ideas, they kept saying WE came up or WE suggest. The Millennial gathered answers as a group and then presented those ideas as such. The Boomer, on the other hand, pitched the idea to me and kept saying I. The interesting thing about it was they both came up with similar ideas but by very different methods.”*

Diversity

Millennials also expect teams to have diverse representation. The generation is very respectful and forward thinking about diversity. They look at diversity as something to blend together experiences, culture, perspective, and backgrounds. Diversity to a Millennial is not merely a racial or gender divide. They have grown up with representations of other races and backgrounds portrayed in the media and popular culture. They will not notice differences per se. Millennials view diversity as a strength resulting in many different viewpoints and solutions to the same problem. Working on diverse teams also offers the Millennial a learning experience they can make use of in their future undertakings. *“We don’t care if our coworkers or boss is a woman or someone from a different racial background; we just want to work with bright people that advance our careers.”*

Wilkie (Willkie, 2015) pointed out that it may be important for Millennials managers to be more aware of diversity. Their early exposure to diversity doesn’t mean they will automatically approach the hiring or promotions process in a manner that embraces different races, genders, cultures, religions, or sexual preferences. They will overall be inclusive but may need to be more aware of the varied differences to assure an organization has wide representation. It behooves higher education to continually address issues of diversity throughout the Millennials’ educational experience which allows the transfer of understanding to the workplace.

Feedback

Millennials like to get immediate feedback on their thoughts and performance and this is exactly what they get by working in a team and collaborating through technology. Millennials don’t want annual reviews; they want ongoing conversations. Reviewing performance once or twice a year does not work for them. They want constant feedback. Millennials don’t so much want to fix their weaknesses; they want to develop their strengths. *“It’s not just my job, it’s my life.” “In my profession, I do manage Millennials and it is my personal experience that they expect feedback*

often. *However, they need assignments that create continuous learning and allowing them to solve important problems for the company.*”

It has been hypothesized that the reason the generation needs constant and consistent feedback is due to the hyper-focus on performance they were accustomed to during their school years. For example, No Child Left Behind was introduced into the public schools in 2001 which forced funding to be tied to test results. It is at that time that American education shifted from a learning focus to a performance based focus. As a result of this shift, instructors increased the frequency of feedback to ensure that students could correctly answer test questions based on the content they were being taught. (Thompson, 2012) *“Providing regular feedback is especially crucial for us, because we are constantly seeking feedback (good and bad) so that we can remain motivated and develop ourselves.”*

Flexibility

Millennials require flexibility on the job. Flexibility has multiple aspects to it, such as putting an end to the classic 9 to 5 job, decision making, telecommuting, and innovation. Flexibility in the workplace is becoming more of the norm than an actual incentive. The Insurance Education Foundation ran a study in 2016. 4 out of 5 of the millennial respondents said that they would rather have more vacation time and the ability to work from home than increased pay. On the other hand, Gen Xer’s took the same survey and 1 out of 5 came back with the same results. This shows a stark difference regarding flexibility in the workplace and has implications going forward.

Though they require flexibility to get things done, they also require structure and boundaries due to the fact they were often hyper-scheduled by (overbearing) adults during their childhood years. Overall, as a group Generation Y appears to be less tolerant of boredom than any other generation. They will need structure in their job duties and assignments much like they had in school when they juggled schools, sports, music, and other activities. The major difference is that they will want flexibility from the employer once a duty or assignment is given.

Flexibility also comes in the form of telecommuting. Growing up with cell phones and laptops have strongly formed the lifestyle of Millennials. This accessibility has encouraged the creation of telecommuting. *“If you told me I could have one day a week where I didn’t have to wake up at 5:30 and drive an hour to work, I would be ecstatic. Working from home would allow me to wake up at 8, eat breakfast, watch TV, make a nice lunch, get some laundry done, and be home before I would on a normal day. With that said, I do not believe I would be nearly as productive with the many distractions that are at home. But for morale purposes, I believe it would be worth it to a company to allow it in a moderate amount.”*

Flexibility in decision making can also be a strong asset for the engaging a Millennial. When a Millennial has the power to make their own decisions and are supported by their managers, they can apply innovation and take risks. Innovation and risk taking are also strong characteristics of Millennials. *“I love the freedom to improve processes and make my life easier whenever possible. I also like the idea of having the freedom to innovate and impact the company in a positive way with an idea that was my own. Something that I actually did actually made a difference.”*

The overall decision making process will look very different from past generations. As discussed earlier, they have been reared to work in group settings and to value input from everyone. *“Our generation grew up with the words ‘Google it’, that is what we know and that is what we are going to use. Digital media reverberates throughout the decision making process. What we see or how we interpret the world is based largely upon our online experience.”* They need to be allowed to integrate the use of information technologies and computer mediated communication as aides in decision making. While they may not have historically been seen as the most effective form of decision making in the past, utilizing instant messaging and other technology mediums is quickly becoming a preferred method of communication in the workplace. *“I often find myself calling team meetings via technology to talk through scenarios, collaboration on decision making, and to build consensus.”*

Encouraging risk taking is another motivating factor for many Millennials. Millennials should be involved in decision making and the consideration of risk factors. *“I could conduct the necessary research and pursue certain risks that I believe could be beneficial to the company. Then, I would present my case to upper management and they would make the final call. That would be the freedom I would prefer and would incorporate if it were my call. I would not tell anybody they couldn’t take risks, but I wouldn’t let them take any big risk alone.”*

Leadership

When it comes to leadership and management styles, Millennials want a mentor and a coach, not a manager. The generation wants an open door relationship with an experienced professional who will encourage them to reach their full potential. *“When we ask questions like why, which other generations taught us to do, it’s not that we are being disrespectful. It’s because we do our best work when we see the purpose behind it and we are looking for someone to coach us to understand the purpose. So if you want to get the most out of Millennials, it’s paramount that you have managers that understand the best way to lead is by being a good role model and coaching employees.”*

They want to be treated like adults and trusted. Millennials are “used to loving parents who have scheduled their lives around activities and events of their children. These young adults have ideas and opinions and don’t take kindly to having their thoughts ignored. After all, they had the best listening, most child-centric audience in history.” (Tips for Managing Millennials) Generation Y also looks to others such as parents, other family members, friends, co-workers, school advisors, partners or spouses for coaching and mentoring. One Millennial in the focus groups referred to such a group as her ‘Millennial Advisory Board.’

Work environment. Millennials want an enjoyable or fun work environment. They read about companies like Google, Zappos and tech startups and get discouraged when their work environment does not compare. They are easily excited by the little things such as their boss spontaneously letting them leave an hour early, bringing in food, or planning a fun activity together. *“We are more productive and engaged when we are happy. We appreciate company events, luncheons, social gatherings, fun contests.”*

They are interested in the overall office layout. They are interested in flexible work stations and open areas for small meetings. The workspace design can often attract the Millennial to an organization and adds to the overall corporate culture Generation Y is interested in being a part of. Millennials often organize their space to meet their goals. (Brandt, 2014) *“My office cube regularly has visitors. I have a huge collection of magnets from all over the world on my overhead shelves, my cube walls are lined with printed canvases of my photography, and it is all compete with a huge candy bowl. My mentality is that work is my home away from home so I might as well enjoy my living quarters; but I have also found that it benefits me socially at work. All sorts of people notice my cube and stop and talk with me – I’ve formed a lot of friendships this way with other departments which has helped with networking and even talking out projects I’m working on or issues I am facing.”*

Fun work environments also are known for boosting or driving innovation, creativity, and collaboration. 73% of US Millennials consider themselves to be creative (Bergh, 2015) and when asked what creativity meant to them, the word ‘innovation/new’ ranked #1. Having grown up in a world which experienced a lot of societal change, many educated Millennials tend to be innovative and creative. As such, there is a high enthusiasm for being in environments that facilitate innovative independence. *“I am part of the social media team at work and I asked a fellow younger coworker what he would do to improve our social media presence. He immediately said we should do funny videos with our employees that highlight our product and service. These videos would be more organic and engage our customers better than another print ad. It is also possible that a video may go viral which would really enhance the company’s exposure. This would be something creative that he would love to work on and come up with and applies perfectly to how Millennials can use their creativity in the workplace.”*

Ethics

Generation Y is the first to study business ethics in college, with plenty of examples such as Enron and WorldCom to learn from. Millennials care about the environment, and this can be seen in the increase of companies who publish sustainability reports (81% of Fortune 500 companies in 2015). (npr, 2016) They strongly feel that an organization’s success should not be measured by profits, but should include a larger purpose. In one study, 49% of the Millennial participants had rejected an assignment at work due to ethics and 56% would not work for a company with questionable values. (Yakowicz.) As Millennials become a more significant percentage of the economy, companies need to appeal to their need for social responsibility if they want to hire and/or sell to this generation. They constantly share stories on social media platforms of companies who are not socially responsible. *“Just this last month on Facebook, I’ve seen lists of companies who test on animals, horrific videos of the treatment of dairy cows and a ‘how it is made’ video on gummy bears that will prevent me from ever eating gummy candy again.”*

Work/life balance. Finally, work/life balance is an expectation of Millennials. They appreciate perks such as flextime, unlimited PTO, and telecommuting. The generation does not want to dedicate all of their time to their career. *“I have worked way too many weekends already, thinking to myself that this is supposed to be the best time of my life.”* Millennials don’t have the attitude of ‘work, work, work’. They combine work with fun and fun with work. Because Millennials are so attached digitally, there is a blurred line between work and home. They also don’t believe you have to work a certain number of hours and in a particular location to be viewed as productive or ‘doing your job’. They want to enjoy life and place high importance on life outside of the workplace. The 40 hour workweek is more than enough for Millennials to handle right now. *“Forcing us to work more than 40 hours is detrimental to morale.”*

A Few Success Stories of Engagement

“One way to modernize and increase employee engagement is that leaders in business and human resources need to raise employee engagement from a human resource program to a core business strategy.” (Bersin, 2016) There are many stories of how companies – both large and small – are attempting to attract, retain, and most especially, engage the millennial generation. Likewise, the organizations must not just focus on Millennials but should seek ways to reduce intergenerational problems while more effectively integrating Millennials within the workforce.

In 2012, General Electric formed a team of 21 Millennials from various GE business areas. The team was named Global New Directions and was given three months to ‘attract, develop, and retain the talent of the future.’ (Peters, 2012) The team presented a list of key recommendations that were later implemented by GE such as the development of a new performance management system that allowed just-in-time feedback and coaching. Rather than rely on the best practices of other organizations, GE decided to address their generational issues by using an internal research team to focus more specifically on what might be successful for GE.

Northrop Grumman also created a group based program designed to help develop and engage new employees. The program, called ConnectNIG, used volunteer teams to organize social networking, community outreach, and professional development activities among 26 geographic regions. According to (Rikleen, 2016), the effort addressed the new employees needs of acquiring relevant career planning knowledge, aided in achieving their personal success and business results, and most especially, provided an opportunity for the new hires to establish networks outside of their particular work area. Executives see the effort as successful in recognizing different people’s interest in new projects, obtaining more and more immediate feedback on initiatives, and establishing networked relationships throughout the company.

Marriott provides “Evenings of Engagement” Dialogues which are hosted by senior leaders in Marriot’s central geographical area and open to high-potential younger managers. The goal is to provide the managers with an opportunity to network with senior leaders, offer an opportunity for the younger mangers to discuss aspirations, and allow both the Millennial manager and senior leaders to share methods on achieving career goals. (Rikleen, 2016)

Stories and ideas for successfully engaging all employees should be widely shared. Successfully working with Millennials is an imperative for our country in order to promote overall growth and sustainability. Often, our egos and past success lead us to believe we have all the answers or we should not share our successes for fear they will be used by other companies. This thinking is no longer acceptable. All companies need to gather intelligent people from multiple perspectives and to include Millennials. If your company is not hearing what Millennials are thinking, you are missing the whole picture and the hope of the future. Obviously, Millennials are not the miracle pill, but without designing your work place to recognize the Generation’s goals, motivations, engagement practices and being opened to listening to and often implementing their suggestions, businesses will suffer greatly.

CONCLUSION

As Baby Boomers continue to retire and Generation Y enters in larger numbers, a monumental shift in the labor market is taking place. Concurrently, we have witnessed the downward slide of all workers being engaged in the workplace. Companies cannot allow this slide to continue nor to get steeper.

The growing percentage of disengaged workers should also be addressed immediately by colleges and universities. Internships and experiences with business leaders should be a priority. Bringing more business personnel onto campus and participating in classes, lectures, volunteer experiences, etc. will open communication and understanding of and for Millennials.

Management overall is starting to change, but to cater more to Millennials, we must change faster or risk having either an older workforce or a workforce that is disengaged and not made up of the best employees possible. The problem for most companies is that today's workforce and work environment is drastically different from the past. Today, more research into how best to engage the overall workforce as well as engaging students while in college is paramount.

Companies hiring Millennials must provide certain work conditions to allow Millennials to succeed professionally and personally. Companies need to provide such things as a clear career path, strong coaching and leadership, ongoing personal and professional development, and a semi-structured environment. Companies must be flexible, provide training and educational advancement. This is again an area where colleges and universities can be actively involved and not only help businesses to relate to Millennials but to more fully offer necessary courses, training, and volunteer opportunities that open the chance for engagement at all levels – worker, business, and college experience. Millennials crave increased workplace responsibility and rely on the mentoring from more experienced employees. The company vision and mission must be front and center. As the workforce is experiencing a paradigm shift, it behooves us to address not only what this means to the workforce and academia, but also to correct the deplorable disengagement issue. We believe, as has been identified in the literature and throughout the comments we gathered from our focus groups, that changing the workplace environment to engage Millennials in the workplace holds the key to success overall in the future.

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Re-Designing the MBA Experience: Enhancing Student Professional Development through Innovative Value-Added Co-Curricular Student Services

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ABSTRACT

The business world paradigm of constant change challenges business schools to form an innovative nexus by preparing students for the business leadership of the future. The balance of academic and professional engagement is ever more important as employers place more weight on soft skills among their new hires. Business programs must be innovative in their approaches to providing students with opportunities to develop soft skills that help them succeed in the increasingly diverse and demanding workplace requirements. This paper presents the development of the Value-Added Co-Curricular Student Services innovation offered to MBA students in a state supported business school in California.

Key Words

Innovation, Engagement, Impact, AACSB Standards, Co-Curricular Innovation, Professional Development, Soft-Skills, Leadership, Career Development, Communication, Collaboration, Value-Added Student Services

INTRODUCTION

Changing times require agility and relevance in business education as well as in business practices. The constantly changing business environment calls for business educators to provide quality programs that are relevant to the evolving needs of the industry in order to produce innovative leaders who are equipped to help organizations through the fast paced, technologically challenged, and globally competitive business environment. It is imperative that business schools provide a balance of academic and professional development programs in a timely manner.

In the context of growing diversity-coupled with a constantly changing business environment, business educators should strive to be relevant by addressing the needs of the business community through academic and professional engagement students according to their college’s mission. With the new accreditation standard AACSB also encourages an appropriate intersection of academic and professional engagement, challenges business schools to ‘innovate’, and inspires educators to pursue continuous improvement in educational programs and other mission-based activities of the business school (AACSB, 2017).

Consistent with the view that a quality business program is aligned with business practices, business schools are encouraged to pay attention to providing students with professional development opportunities and give more weight to teaching the ‘soft skills’ going forward (AACSB, 2017; Ghannadian, 2013). The Oxford Dictionary defines soft-skills as “personal attributes that enable someone to interact effectively with other people.” In contrast to hard-skills, which are tangible and directly related to occupation, soft-skills are intangible and consists of a combination of interpersonal skills, communication skills, personal qualities, and attitudes. In the context of business education, hard-skills may include functional business knowledge and business problem solving skills and soft-skills, leadership, team building, communication skills, etc. Soft-skills are difficult to measure and hard to obtain as they relate to innate personal qualities reflecting culturally rooted upbringing of individuals. Nevertheless, soft-skills are critically important for business graduates in order for them to succeed in an increasingly diverse work environment (Lee, 2006; Sherman, 2011; Walker e. al., 2011; GMAC, 2014). The growing importance of teaching soft-skills, coupled with the persisting needs of employers indicate that business educators must engage in developing personal and professional qualities and skills. The reported gap between the importance and the success in teaching students the necessary ‘soft-skills’ indicates that this may be an area of need for innovation in business education (Lee and Benza, 2015).

The emphasis on ‘professional engagement’ opens a wide variety of curricular, co-curricular, and extra-curricular activities that students can take in order to experience and strengthen professional engagement during their academic

careers in various business programs. This may call for a shift towards innovative approaches that provide the right type and amount of professional engagement programs that offer flexibility in helping students of diverse backgrounds develop the desired skills. For example, students' needs for oral communication workshops may vary depending on a number of student characteristics such as language skills, personality, confidence, and experience. Some students may need more practices and more individual coaching than the others. The varying degree of acculturation may also be a factor determining the amount of practice necessary before a student develop confidence in public speaking. These additional needs cannot be met in the academic curriculum only for the reason that repeated feedback and practice opportunities are limited in core courses in the academic program. However, additional training opportunities can be provided as value-added services through co-curricular activities and workshops with a purpose to augment the standardized exposures in the core curriculum, which is required of all students. These value-added services can be offered as optional activities that students can choose to participate as needed. They may include but are not limited to workshops, seminars, boot camps, and other activities designed to develop and polish professional skills. They may be offered at no cost to students or at the cost that cover the operating expenses depending on the financial situation of the institution.

The purpose of this paper is two-fold: to report on a journey of an MBA program, which engaged in innovating student services efforts by providing a series of Value-Added Co-curricular Student Services, and to discuss how the student services program led to further innovation and impact on students, curriculum, and other programs.

Background

Areas of MBA Curricular Innovation

As mentioned in the previous section, business programs need to innovate in order to deliver educational experiences that prepare students for the changing requirements of the industry. Educators have sought sources of innovation in various aspects of business programs. A historical look at the MBA programs revealed that the content of MBA core curriculum had remained relatively unchanged between 2005 and 2013, and that MBA program innovation has taken place mostly in its structure, timing, integration, flexibility, and co-curricular activities (Elliott and Fox, 2015).

Of the most notable type of innovation is the Co-Curricular Innovation which includes a variety of activities, workshops, and seminars used to innovate MBA experiences providing personal and professional development opportunities outside of classrooms. The Co-Curricular Innovation is acknowledged as the most fertile soil for quick, nimble and truly unique innovation due to the fact that there is less bureaucracy in co-curricular activities innovation. For instance, workshops designed to enhance personal and professional skills do not need to go through the lengthy curriculum approval process before they can be made available to a group of students. As such, an innovative and/or effective content and pedagogy can be implemented as they are developed, benefiting students in time for their job interviews before graduation. Yet, the impact of personal and professional development programs can be equally as profound, if not more, than the academics (Elliott and Fox, 2015).

Motivation for CSUEB's Co-Curricular Innovation

As previously mentioned, business programs need to do a better job in developing soft skills that employers value. This new emphasis on soft skills and intersecting academic engagement with professional engagement poses challenges and opportunities for a business program to be creative and flexible in offering opportunities for students of various background to effectively develop soft skills. The diverse student body as well as different core course instruction adds to the source of development gap and variation that needs to be addressed by the flexibility of the co-curricular programs, which can be offered as add-ons to different students as needed. Consistent with the aforementioned reason for Co-Curricular Innovation, CSUEB's MBA program looked into a flexible way to augment students' MBA learning experiences by providing additional opportunities for students to further develop and improve soft skills learned from classroom as value-added student services, which are optional but open to all graduate students.

The California State University, East Bay (CSUEB) is known to be one of the nation's most diverse higher education institutions. The profile of the University's MBA students reflects this much celebrated diversity, showing roughly equal representation of men and women in the program with the average age of thirty two. Approximately seventy percent of students have an average of six years of work experience. Nineteen different ethnic groups are represented in the four hundred total MBA student population including African American, Indian, Chinese,

European, Filipino, Indonesian, Japanese, Korean, Middle Eastern, Mongolian, Pakistani, Russian, Taiwanese, Thai, Vietnamese, and others (<http://www.csueastbay.edu/cbe/mba-options/student-profile.html>) .

Reflecting the diverse backgrounds, CSUEB MBA students display varying degree of academic and professional development needs, which make it extremely difficult, if not impossible, to address them all in the classroom through the core curriculum. In addition to diversity in students, instructors use different pedagogy in their approach to teaching/developing soft skills in their classrooms, which adds to the variation in MBA students' overall learning experiences. As noted previously, the lengthy and bureaucratic curriculum development process makes it difficult to incorporate effective soft skills pedagogy into the required core curriculum in such a way that ensures consistent delivery in a timely manner. The limitation of bureaucratic curriculum process coupled with the variations in students and instructors contributes to the sources of the gap between and among the importance, the outcomes, and the timely access to the opportunity to develop and enhance professional skills. In an effort to address these gaps, the CSUEB College of Business and Economics has been offering the Value-Added Co-Curricular Student Services (VACCSS) to MBA students so that students can develop and improve their professional skills as needed in the area of their concerns, with the desired frequency in a timely manner, before they complete the program.

Listed in the following are a few motivating factors that pointed to the CSUEB's MBA Co-Curricular innovation as Value-Added student services:

Access: To make impactful learning experiences accessible to all MBA students both in topics and in pedagogy. Innovative teaching practices can be made available to all interested students in the form of professional development workshops.

Flexibility: To provide professional development opportunities to students in the areas of their needs. Students are motivated to build skill sets to fill their needs in a flexible, personalized, and engaging environment.

Continuous Improvement: To provide students an individual opportunity to close the loop in the Assurance of Learning Process. The flexible nature offers a channel for reinforcing student learning outcomes before students leave the program.

Timeliness: To facilitate timely introduction of the most needed areas of professional development on demand without having to impose on faculty with additional content or a new soft skill development pedagogy. In addition, the new content and pedagogy can be introduced as they are developed because the co-curricular student service workshops are not subjected to the University's curriculum procedure.

Student Service: To facilitate community of learning and professional development through enhanced student services.

Relationship Building: To connect students with the College's Administration and Graduate Programs Office.

The services are organized by the College's Graduate Programs Office as part of student services. The director of the program identifies the needs, plans workshop sessions, identifies instructors, works with instructors to develop sessions, and oversees the execution of workshops. The sources of the workshop the College's advisory board members. The workshops are offered on Saturdays from 8:00 a.m. to 4:30 p.m. Two staff coordinators provide support through the process of event planning, communication, administration, and evaluation. Participants are provided both breakfast and lunch in all full day workshops. All value-added services workshops are funded by the College and offered to College's graduate students at no cost to them. The College's administrative leadership view this as an opportunity to communicate their commitment to student success.

The following section describes a series of Value-Added Co-Curricular Student Services (VACCSS) introduced to CSUEB MBA students and discusses the benefits of each services to students, faculty, and the program.

Innovation, Engagement, and Impact of Value-Added Co-Curricular Student Services Offered

In search of a specific topic of VACCSS activities, several sources provided valuable insights. The sources that contributed to determining workshop topics include the Program Outcomes Assessment data, student suggestions, employer input, and best practice instructions. The CSUEB College of Business and Economics introduced a series of VACCSS workshops from Fall 2013 to Spring 2017. They include the Leadership Communication Bootcamp I, Innovative Leadership and Design Thinking, Personal Branding and Social Media Networking, and Advanced Leadership Communication II. Participant feedback was obtained from each workshop offered in order to gauge the effectiveness of the VACCSS activity. The feedback instrument measured the level of satisfaction, the best takeaways, and other suggestions including interested workshop topics and areas for improvements. Reflecting the results of participant satisfaction survey, the summary of VACCSS activities are documented and presented in the

framework of innovation, engagement, and impact, following a brief description of each workshop in the next section.

Leadership Communication Bootcamp I

The CSUEB College of Business and Economics introduced its first Value-Added Co-Curricular Student Service in Fall 2013 with the MBA Leadership Communication Boot Camp. The primary purpose of this workshop was to provide MBA students an opportunity to improve on 'Oral Communication' skills which had been identified as a persisting area of improvement by the program assessment until Spring 2013. In addition, it was observed that students responded exceptionally well to the workshop type pedagogy of coaching and mentoring. The interactive communication skill building exercise, "Lead Through Inspiring Others," has been offered to MBA students on Saturdays as a full day immersion experience during Fall quarter since Fall 2013. Building upon the understanding of leadership communication principles, students are immersed in hands-on exercises to develop and enhance their communication skills. The purposes of the boot camp are to provide the opportunity to break the barrier in communication and to offer additional opportunity to practice the tools learned. A sample agenda for the boot camp include the following:

Authentic Leadership: Communication Principles; What Employees Want; Purpose of Theatre; Actor's Skills

About Me: What I want you to know about me is; My Communication Goal is; What's Holding me Back; My Legacy

The Tempest: Be Not Afear'd; The Isle is Full of Noises; Sounds and Sweet Airs; That Give Delight and Hurt Not

Story Telling for Leaders: Video; Story Telling Skills

Theatre Skills: Paired Walks; Discussions; Presentation

The session begins with a lecture and overview founded upon the theme of inspiring leadership and presence (Duarte, 2010; Halpern and Lubar, 2004). Student participants are exposed to instructions and case discussions, and walk through techniques and exercises designed to build eye contact, positive body language, theatre skills, active listening and inspiring story-telling. The Communication Boot Camp focuses on behavioral learning and resembles the interactive workshops that practitioners attend to strengthen their professional development. Participants are required to move around throughout the workshop and as such, the workshop requires a large, open space with flexible repositionable classroom furniture.

Throughout the session, students were mentored as a group, split into small groups, and coached individually. Three coaches were present to work with students. Table 1 presents a summary of engagement and impact of various workshops. As shown in the table, over 200 students participated in the Leadership Communication Boot Camp. The students' feedback on the boot camp experience was excellent (rating of 4.81 on a five point scale with 5 being "very satisfied"). Almost all participating students indicated appreciation for improvement in their skills and confidence in public speaking, listening and inspiring/connecting with others. The pedagogy used in the boot camp has been adopted in the MBA core course on Managerial Communication, since Fall 2014. The continuing success of the course led to development of a new MBA core course, Leadership Communication in Organizations, during the curriculum reform in the Quarter to Semester (Q to S) conversion process. The new course will take effect in Fall 2018.

Innovative Leadership and Design Thinking Workshop

Inspired by impactful student experiences in one of the MBA elective courses in Fall 2014, the College introduced the new workshop on "Leading to Innovate," in Winter 2015. The workshop engaged students through the Design Thinking process and helped them build innovative leadership skills. Use of the Design Thinking approach as the pedagogy to instill creativity not only accomplished the goal of teaching innovation skills but also offered the benefit of learning how to create mutual dependency for productive collaboration (Brown, 2008; 2015; Wagner, 2012). This Design Thinking workshop is offered once a year. The hands-on one day (Saturday) workshop includes in its agenda activities such as The Intrigue of Design Thinking, Marshmallow Project, Fun Exercise, RT Model, Wallet Project, Silly Cow Exercise, Ready Set Design, etc.

Table 1: Summary of Innovation, Engagement, and Impact of the Value Added Co-Curricular Student Services at CSUEB

Innovation		Engagement	Impact	
Workshop Title	Offerings	Attendance	Overall Satisfaction	Best Takeaways
Leadership Communication Bootcamp I	First offered in Fall 2013; offered once in the beginning of the Fall or Spring Quarter of each academic year to present	205	4.81	Connection made with peers; Listening, Connecting, and Story-telling; Confidence in public speaking; Confidence working with diverse cultural group; Positive energy; Body language, eye contact, and voice command; Presentation skills.
Innovative Leadership through Design Thinking	Launched in Winter 2015; offered in Winter Quarter	55	4.85	Empathy for human centered design; Team building - learning to collaborate; Design Thinking principles and process; New perspective on 'failing', fail early fail often; Rapid prototyping; Networking
Advanced Leadership Communication Bootcamp II	Launched in Spring 2017	27	4.91	Trust building; PERMA; Connecting with others; Communication skills - listening; Communication - expressing myself; Inspirational leadership; Leadership skills.
Personal Branding and Social Media Networking	Launched in Spring 2014; offered in Spring quarter	123	4.85	Confidence in job search; How to use Social Media (SM) to brand myself; How to manage my SM; How to use SM to look for a job; Updated resume; Optimized LinkedIn profile; Using SM tools to boost my online presence; Feedback on my resume; How to brand myself.

The workshop is noted to be of high value with 4.85 out of 5 mark in overall satisfaction. One notable valuable outcome of the workshop was reported to be learning to build 'empathy', appreciate 'rapid prototyping', engage in the process of relevant innovation, and to collaborate in so doing. Inspired by student suggestions, courses in marketing and entrepreneurship have adopted Design Thinking as a pedagogy to help students engage in collaborative exercises and facilitate the use of Design Thinking as a process to innovate. In addition, per the curriculum reform of the Quarter to Semester conversion, a couple of new courses in Management have been developed incorporating the topic of Design Thinking, effective Fall 2018.

Personal Branding and Social Media Networking

In Spring 2014, the College began offering one day workshop on Personal Branding through Social Networking, which was designed to help MBA students jump-start their future career path. The goal was to help students develop their personal professional brand and to deploy their social media networking strategy. The deliverables of the workshop were the development of their personal brand profile and its launch in their new or revised LinkedIn profile. The agenda of this action packed workshop included: The Importance of Networking; One-on-One Resume Reviews; Defining YOUR Online Brand; Creating a Perfect "Digital Handshake" on LinkedIn; Networking on LinkedIn; Creating and Protecting Your Online Personal Brand and E-Reputation; and "Make it Happen!"

Participants leave with a complete LinkedIn profile and feedback for a polished resume. This career development workshop is offered once a year. Students' responses to this workshop has been phenomenal. Participants highly appreciate the tangible outcomes of the workshop that give them more confidence in their pursuit of personal branding and professional networking through social media. As shown in the Table 2, the demand for this workshop has been growing and it opens doors to other on- and in- demand career development workshops such as 'Negotiating for Salary', 'Professional Networking', and 'Conflict Resolution', etc. The College has launched a new Career Development Center, which has been carrying on some of the popular career development workshop topics in their new service to students. In terms of its impact on the curricular development, it validated the importance and the relevance of a new MBA core course on "Negotiation", which will take effect in Fall 2018.

Advanced Leadership Communication—Boot Camp II

In Spring 2017, encouraged by the pedagogy used in one of the MBA core courses, Executive Leadership, the College's Graduate Programs Office launched a new advanced level of Communication Boot Camp designed to help students build skills for effective leadership such as motivating, persuading, coaching, and developing others. This workshop is considered a continuation of The Leadership Communication Boot Camp I. This workshop can be used to train the trainers (i.e., coaches). The potential impact of this workshop can be that it would enable the College to scale the 'coaching' pedagogy as we envision expanding the effective workshop methods to other areas including undergraduate business majors, other non-business students, alumni, and external constituents in the community at large. It may further enable the College to engage various constituents and to make a notable impact in the diverse community of our service.

CONCLUSION

The Impact of the Value-Added Co-Curricular Student Services (VACCSS)

In total, the VACCSS generated over 400 cases of engaged participation in a series of professional development workshops since its first launch in Fall 2013. This service was offered to students at no additional cost as an expression of the College's commitment to student success. One of the most important benefits has been that the VACCSS helped CBE to reinforce our efforts to create an innovative and engaged learning environment, to communicate the culture of student-centeredness, and to connect the students with the College administration. It should be noted that all students participated in the VACCSS activities showed a very high level of satisfaction with and appreciation for the College administration as well as faculty and staff. For example, the recent Princeton Review survey of 'Student Says' reflects on the students' appreciation of this service offered by the College administration.

In addition, the VACCSS provided a channel for the MBA program to help students strengthen the areas that needed to be reinforced, catering to students with need for additional practice opportunities. Furthermore, the flexible nature of the VACCSS opens doors to a wide variety of developmental topics and areas that are desired by students, many of which are also desired highly by employers. Table 2 presents a summary of student suggestions and a list of desired topics for future VACCSS innovation. It is encouraging to note that participating students demand more of the same types of workshops for their continuous development. Additionally, students would like more topics added such as 'Networking', 'Negotiating for Salary and Benefits', 'Excel', 'Conflict Resolution', 'Influencing Others', 'Interviewing', and 'Presentation', etc.

Furthermore, because of the flexibility and the low barriers to introduction and attendance, the VACCSS facilitates the diffusion of innovative teaching and learning to instructors as well as to students. It availed the impactful learning experience to a large number of students in a short time. Moreover, the VACCSS have a potential to scale its access to different types and even greater number of constituents. For example, the Communication Boot Camp and its innovative pedagogy have also been expanded to and made available to undergraduate students in the form of the 'Jump-Start' workshop, which is a two full day workshop offered to newly joining undergraduate students. In addition, many non-business major students have expressed their desire to attend and benefit from the workshops and courses that use effective workshop style pedagogy, which are offered by the College.

As to its impact on curriculum innovation, the success stories of VACCSS facilitate buy-in of faculty in the process of curriculum revision and encourages the consideration of introducing or adopting innovative instructional approaches and pedagogies. The VACCSS may be used as a channel to connect valued student services with

classrooms by serving as an incubator for developing and assuring impactful instructional contents and methods. Furthermore, when aligned with the required curriculum, co-curricular activities can be considered effective “closing of the loop” actions in the process of Assurance of Learning (AACSB, 2013).

Table 2: Summary of Student Suggestions for Future Development

Innovation		Suggestions for Future	
Workshop	Offerings	Suggested future workshops	Comments/Suggestions
Leadership Communication Bootcamp I	First offered in Fall 2013; offered once in the beginning of the Fall or Spring Quarter of each academic year since Fall 2013	Networking; Presentation; leadership training; Career development; Job search; resume; Job interview skills; Power Point, Excel, Data Visualization, Graphics; Other soft skills; Time management and organization skills; Teamwork	Great start to the quarter; Perfect timing at the beginning; More of the same workshop; More opportunities to practice.
Innovative Leadership through Design Thinking	Launched in Winter 2015; offered in Winter Quarter	Leadership; Coaching; People management; Networking	More opportunities to practice Design Thinking; Should be a required MBA core; Excellent tool for creating dependency in teamwork facilitating collaboration; A must for teambuilding exercise
Advanced Leadership Communication Bootcamp II	Launched in Spring 2017	Conflict Resolution; Excel; Growing self-confidence; Leadership-influencing others.	More opportunities to practice; more exercises for coaching and influencing.
Personal Branding and Social Media Networking	Launched in Spring 2014; offered in Spring quarter	Networking; Social Media Marketing; Excel; Presentation; Writing; Power Point presentation; Negotiating for salary and Benefits; Interviewing; Career Development Topics - interview , career advice/strategy.	More/deeper engagement in personal branding; Should be offered more often (e.g., every 4 months); Smaller session size would be more desirable for more individual attention from the coaches.

Externally, the VACCSS innovation enabled the CSUEB College of Business and Economics participate in the AACSB’s call for “Innovation that Inspire” in 2015. The CSUEB VACCSS is presented as one of 350 programs that responded to this call. In addition, the practice of Co-Curricular innovation was recognized in the CEO magazine, helping the CSUEB MBA program placed among the “Tier 1” programs per the ranking of the Europe based magazine targeted to business practitioners. In closing, the student service innovation experience reported has been rewarding to both the students and the College. Business education programs are encouraged to engage in Co-curricular innovation activities in the form of Value-Added Student Services. The student service channel can and should be as an active participant in delivering quality business education that offers a relevant balance of academic and professional development.

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Service Learning, Project Management and Professional Development

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ABSTRACT

Much has been said about service learning and its value as a pedagogical strategy. However, very little has been said about its implementation in the computer science curriculum, particularly in the lower-level classroom. This article discusses a semester-long service learning project that was implemented in a freshman-level project management course. Through the development of a website for a local non-profit organization, students were able to apply lecture content while developing professional skills that are applicable for the workplace.

Keywords: service learning; project management; volunteerism; collaboration

INTRODUCTION

When a search for the ideal job candidate is being conducted, what are two areas of consideration that typically rank highly? In most cases, they are education and experience. This puts the recent college graduate at a disadvantage, as they have yet to gain real-world experience in a professional field. Thus, the urgency for institutions of higher education to provide their students with legitimate experience for their resumes remains quite high. The options for doing this might include internships, clinical sessions, club participation, and the integration of service learning experiences into the classroom.

A two-year college located in eastern Pennsylvania offers a series of computer science courses within its School of Computer Science and the Arts. One of these courses, titled "Introduction to Project Management," is a freshman-level course that is required for students enrolled in the Computer Specialist degree program; the Geographic Information Systems certificate program; and the Computer Game and Simulation Development degree programs. Additionally, it is open to the general student population as an elective option, and is offered in both a 100% face-to-face format and a blended distance education format. Since the course has no prerequisites, first-semester freshman often take this course without having taken any other computer courses. During the fall 2015 semester, the students in this course engaged in a semester-long, client-based service project that provided students with a novel setting to apply project management principles while developing their own professional skills.

REVIEW OF THE LITERATURE

Professor Brian Nejme of Messiah College defines service learning as "a pedagogical model that actively integrates community service with learning outcomes in a credit-bearing academic course or cocurricular project" (2012, p. xvii). Over the past fifteen years, a substantial amount of research has been conducted in the areas of service learning, volunteerism, and experiential education. Very little of this research, however, focuses in on how service learning can be applied toward the computer science curriculum (Sanderson, 2003). Despite this apparent gap in the literature, the value of service learning in technologically oriented courses has been actualized and continues to be integrated into undergraduate and graduate coursework.

A large percentage of the literature published on service learning in computer science communicates the benefits of this pedagogical style as proven through successfully implemented projects. Research has shown that service learning has been integrated into computer science and engineering courses since the early 1990s (ACM, 1991, in Martin, 2000). In a very short amount of time, several universities across the country had developed courses that focused exclusively on service learning in computer science (Sanderson, 2003). As the discipline of computer science evolved from its roots in data processing, it was realized that there were more skills that were crucial to this field than technological competencies. Research has shown that service learning experiences, including client-based projects (Marsden, 1994), will help students to develop resume content (Sanderson & Vollmar, 2000), helping students to make contributions to society (Schahczenski, 2002), and develop a sensitivity toward the diversity of various populations (Traynor & McKenna, 2003). The integration of service learning also functions as an adaptation to the current cohort of students, which Seiter (2009) describes as a "civic-minded generation" (p. 1). Further, Seiter points out that student retention in computer science courses will benefit from the integration of service learning activities (Ibid.).

Much of the published literature in this area presents service learning projects in upper-level courses (Gotterbarn, 1992; Sanderson & Vollmar, 2000; Schahczenski, 2002; Sanderson, 2003; Tan, 2005). Siena College professors Mary Anne Egan and Mathew Johnson (2010) recognize that very few freshman-level courses are integrating service learning into the curriculum and "...we need to insert this pedagogical approach as early into the curriculum as possible." (p.8). The integration of service learning into lower-level courses has proven to be a successful pedagogical strategy. Traynor and McKenna (2003) describe a successful project where students were required to volunteer twenty hours of service throughout the semester. Egan and Johnson (2010) explain that the integration of a service learning project into an introductory course had positive effects on enrollment in upper-level courses, particularly in regard to women students enrolling and declaring computer science as their major.

Today, it is widely understood that service learning is a highly effective pedagogical model that can be integrated into computer science courses. It has been proven that service learning can be beneficial to both the upper-level "capstone" courses and the introductory-level computing courses. While most of the published examples seem to highlight successful projects in upper-level coursework, I must concur with Egan and Johnson (2010) that the earlier in the curriculum that students can be exposed to service learning opportunities, the better served they will be throughout their education.

COURSE FORMAT

The course met once a week for two hours and forty-five minutes over a sixteen-week semester. Seventeen students were enrolled, three of which were female and fourteen males. Approximately 65% of the students enrolled (N=11) were freshman and the remaining 35% (N=6) were sophomores. More than half of the students enrolled in the course were majoring in Computer Game and Simulation Development with an emphasis in programming, while others were studying digital arts and web development.

The curriculum was, in essence, divided into two major components. The first component provided students with an understanding of the various managerial, strategic, and professional skills that are needed for the successful execution of a project. In describing these concepts in correlation to the *Project Management Institute's* framework, concepts would be presented in a general fashion that was correlated to the service learning project at various points throughout the lecture and discussions. A great deal of time was spent developing proficiencies in various types of analysis, such as SWOT report writing, quality assurance, and the effective management of resources.

The second major component of the course focused on the development of software proficiency in relation to project management. Using *Microsoft Project*, students spent a fairly extensive amount of time each week preparing reports and gaining a general familiarity and proficiency with the program. The notion of thorough, quality documentation was stressed throughout the semester as a means of demonstrating the importance of understanding how to use the software.

The final course grade was determined using the following elements: laboratory assignments (15%), career development projects (25%), a grant writing exercise (10%), and the service learning project (50%).

The goal of the service learning project was to enable real-world application of the project management concepts discussed in class. After reviewing the course roster, I quickly realized that all of the students enrolled in the course are studying technology. Thus, it seemed necessary to implement a service learning project that was technological in nature. According to Hefferman (2001), the experience would be classified as "discipline-based service learning," in that it the project was closely tied to the students' field of study. Further, since the course focused on project management, copious parallels to the curriculum were discussed throughout the semester. Professor Kathy Schwalbe, who is the author of our course's textbook, specifically acknowledges service learning by articulating the value of working with a real client and stakeholders (Schwalbe, 2013). With the help of the college's career development staff, my course was partnered with a local non-profit organization that served to preserve the history of the area. This organization was selected because they did not have an online presence and were looking to develop a website to advertise their events and services. Further, the notion of working with a non-profit organization was appealing, as described by University of Montana professor Celia Schahczenski:

“collaborations with the nonprofit sector have a greater chance of success, since the nonprofit sector and academia share commonalities such as being service, rather than product, oriented and working toward long-term goals that are difficult to measure” (2002, p. F3G-8).

This project, which was designed using what Wiggins and McTighe (2001) describe as a “backwards design,” began with a specific end goal, which was to design a website for the non-profit organization. In essence, the students were engaged in problem-based service learning (Hefferman, 2001), in that they were functioning as a team of consultants for the organization who were “experts” in web design and functionality. As Fish (2011) points out, a semester-long project will contribute to the “understanding of project management concepts, tools and techniques as well as student professional development in project planning, writing and oral presentation” (p. 33). Given the diverse yet closely related nature of the students’ areas of interest, this cohesion came somewhat naturally in that many students expressed strength in one area, yet unfamiliarity with other areas. In an effort to point out the value in each student’s expertise, various managerial units were established that aligned to the *Project Management Body of Knowledge* (PMI, 2013). Utilizing this structure allowed not only for further application of course concepts, but for complete immersion within them.

During the first class meeting, which I structured as a business meeting, the project was broached to the students and project requirements were discussed. From that very first discussion, students expressed rapt enthusiasm toward the project and quickly began interjecting their own ideas and possible areas of contribution. As an “icebreaker” exercise, I asked students to introduce themselves and name three interests, strengths, or areas of interest in terms of project management. In addition to allowing students to develop familiarity with one another, it helped me to see where and how each student could contribute to the project in the long-term. One week later, I invited the executive director of the non-profit organization to our class meeting where the students eagerly welcomed her; many of the students had already placed their ideas into written form (without my asking them to do so) and were professionally yet cordially presenting their ideas to her. It was clear from the beginning that students’ enthusiasm toward a real-world project was strong.

Using the *Project Management Body of Knowledge* (PMI, 2013), which was discussed as part of the course’s lecture component, an organizational structure was established as a group. This enabled students to reinforce their understanding of each of the phases of project management as well as develop a sense of control over their project. We classified these responsibilities as “managerial units,” in which these critical functions were carried out. Many students also expressed interest in taking part in the design and development of the website. Since the course was not design-oriented, I did not require students to do any creative work. However, I offered the option for those who wished to do so, and thus, the students created their own groups which were titled “creative units” to carry out the creative functions of the website. Figure 1 illustrates the breakdown of responsibilities. All students were required to participate in at least one managerial unit, and they were allowed to decide on which units they wanted to participate in.

Division of Responsibilities	
Managerial Units	Creative Units
<i>Based on PMBOK principles.</i>	<i>Based upon student delegation.</i>
Project Reporting Integration and Procurement Scope Management Time Management Quality Assurance Human Resources	Data Gathering Media Writing Design Development Videography

Figure 1: The division of student responsibilities.

Throughout the span of the project, each unit was required to submit a weekly memo to the scope management unit that detailed their progress, any breakthroughs or recent developments, as well as any challenges or roadblocks they might have encountered. The scope management unit would then submit a “master memo” to the professor that gave a class-wide status update on the project’s direction. Many of the specialized reports such as Gantt Charts

were generated with *Microsoft Project*, while much of the project memoranda was created using *Google Docs*, to allow for ample collaboration and centralized storage. Also, students were required to deliver short, focused presentations at various points in the semester that discussed SWOT analyses, pinpointed potential risks, and provided status reports on behalf of their unit. In doing this, students were able to gain practice articulating their thoughts verbally, as well as reflecting on the project's progress.

At various points throughout the semester, the executive director of the non-profit organization was invited to class meetings. On such occasions, students would present status updates on the development of the website, seek clarification on content for the site, and review various print materials supplied by the Society.

As the semester progressed, students were acquainted with various personnel topics as they related to project management, specifically the writing of a job description and the development of a performance appraisal instrument that measured a team member's performance against their job description. Within the last two weeks of the semester, each unit coordinator was asked to provide a written evaluation of each student within their unit. These evaluations were then reviewed by the professor who wrote a final performance appraisal of each student with grade information included. These students met with the professor to discuss their progress, as well as discuss areas of concern raised by the other students. While the feedback provided by students did not directly affect grading, it acquainted the students with the performance appraisal process as it is used in the corporate sector.

At the conclusion of the project, a banquet-like exhibition was held. At this event, which was attended by college administrators and the non-profit organization's Board of Directors, students presented their contributions to the website and reflected upon the experience. This event served as a mechanism for developing public speaking skills while providing an excellent opportunity for reflection.

FINDINGS

Reflection

One of the most important components of the service learning pedagogical style is the opportunity for reflection. This concept is defined by Bringle and Hatcher (1999) as "the intentional consideration of an experience in light of particular learning objectives" (p. 83). Reflection need not be a monkish activity that is done exclusively in a private setting. In an effort to help students to continue the notion of collaboration and group-wide articulation of ideas, varied styles of reflection were encouraged throughout the semester. Closely following Cairn and Coble's (1993) suggestions, the following methods of reflection were employed:

Spoken Reflection. On a weekly basis, students worked in groups in an effort to fulfill the various managerial and creative responsibilities. Further, students frequently met one-on-one with the professor to provide status updates, explain frustrations or problems, and provide insights on group progress. This is in addition to various large-group discussions and connections being made to the project during the lecture component of the course.

Written Reflection. In its very nature, project management requires a substantial amount of reflection through the necessary documentation and reporting that must be maintained. Throughout the semester, students provided reflection through the various reports, analyses, and charts that were developed using *Microsoft Project*. In addition to this, students also prepared weekly memos, status reports, and emails to the professor.

Training. Since the students enrolled in the course had related but separate areas of specialty, they would frequently provide each other with training in various areas of technology. These included web coding, photo editing, use of *Google Docs*, and document formatting. These experiences, while often informal, provided students with a chance to "replay" their understanding of the concepts aloud, often through tactile as well as audible learning channels.

Celebration. Rather than assigning a written exam, the final assessment for the course was a formal exhibition of the project (Knapp, 2008; Tan, 2005). Through formal presentations, students were able to articulate their thoughts on the entire experience of service learning while gaining practice in ceremonial-style public address.

Throughout the project, I too would participate in reflective activities which I would include students in, as to silently express the value of reflection through demonstration. I did this through short "wrap-up" discussions at the end of class, frequent email messages to the class, and communicating the project to the campus community.

Toward the end of the project, I engaged the campus' student newspaper to write a story about the class project and invited students to participate in the discussions with the reporter. This allowed not only for an additional opportunity for reflection but also recognition for such a diligent class effort.

The service learning project was embraced positively by students throughout the semester. While there was an overall appreciation for this approach, the reasons for such appreciation varied. Through student reflection, I was able to glean various "themes" in terms of student benefits from the service learning project.

The following passages articulate student perceptions of the service learning experience:

It was enlightening because had to not only form design groups but also managerial groups. Because everybody here has different talents, we wanted to assert their talents but also teach them something else. That's a fundamental part of everything. It's not just about you being able to do what you like but also doing what you don't like, because that's a part of life.

I'm really glad that I got a chance to meet everybody in the class because that's something that you don't see in every classroom. I've been in a lot of other classrooms and sometimes you meet the guy next to you and that's it. Here I was able to interact with every single person and got to meet some wonderful people.

This student reflects upon the reflection process:

Writing weekly memos helped our project in communicating with each other, which was very important because we only met once a week for a couple of hours together on the project. So, having these memos was very important in helping us communicate, seeing where each of the groups were on the project, and it helped us achieve our goals and meet our deadlines in a timely and reasonable manner.

The following passages include student reflections on their own personal growth:

I am really proud to be a part of this wonderful group because it has made me grow as a person and made me improve myself overall.

This project helped everyone develop some sort of strength with working as a team. Now, not everyone is as shy as they were before.

The biggest thing we learned was the importance of communication. We had a lot of roadblocks with that but we overcame all of them and came out with a quite beautiful product.

These three passages articulate student interest in history and historiography gained from the service learning project:

It was an eye-opener because of the wonderful history that we have around here, and it made me more curious to learn about our city as well as be able to preserve it for the future.

One thing that I enjoyed about the project, besides working with my fellow classmates, was having the pleasure of interviewing [the Society's curator], because I've never interviewed anybody before. It was usually me being interviewed for a job. So, that was interesting.

Throughout the project it was quite interesting to get to know the Historical Society, from the history of the [facility] itself to the museum they have set up over in [the location]. It is a very beautiful place and it was a great learning experience learning about the history of the place itself and the wonderful people that work there.

Satisfaction of Outcomes

The service learning project proved to be an excellent means for satisfying outcomes at both the course level and the programmatic level.

The following are course level learning outcomes listed in the master course outline:

"Apply project management tools and techniques to a variety of projects." Through the service learning experience, students were given a liberal amount of freedom to apply the various concepts presented in lecture and their textbooks in a manner that they believed was the most effective.

“Initiate, plan, and execute projects using best practices techniques.” The students were responsible for all stages of the project, from execution to closing, and were expected to apply the PMI framework throughout the process. Mastery of these techniques was measured through frequent written correspondence, reports generated in *Microsoft Project*, and through informal meetings with the professor.

“Monitor, control, and close projects effectively.” Students were expected to clearly and thoroughly document all stages of the project, including errors and problems that were encountered. Because the project was a client-based experience, the students respected deadlines and were very clear in voicing and resolving problems along the way.

“Learn to use Microsoft Project software to automate project planning and analysis.” A project of such a scope allowed for extensive use of *Microsoft Project*, as well as ongoing practice and repetitive use of the software, which trained the students in its implementation.

The main programmatic outcome that is fulfilled through the service learning project was the ability to **“work effectively with others in a team environment”** (Catalog, p. 80). The experience of completing this project resembled that of a corporate office, with each unit functioning very much like a department. Students had to interact professionally within their units, as well as with other units, in order to efficiently meet upcoming deadlines. Since the entire class was functioning to complete the same goal, what resulted was a strong sense of collegiality, mutual support, and respect among colleagues.

ALTERNATE METHODS OF INTEGRATION

This project was successful in large part due to the structure and size of the course. One might ask how this project could be executed in a larger class section, or perhaps in a situation where the class meeting times were shorter. Could a project of this description be successful in a fifty minute class? The answer is yes. In a situation where students meet for less time but more frequently throughout the week, an added emphasis can be placed on time management and goal setting. Students would be expected to set clear, measurable goals for each class meeting and then be held accountable for meeting those goals. It would also lead to more realistic and detailed correspondence regarding the progress of the project, in that a fuller timeline would be present.

In situations where the class size is large, perhaps in a lecture hall setting, the project could still be executed successfully. In this situation, the various “units” would function as large departments within a fictitious company. Further, the instructor may wish to provide a “class company name” or other form of fake branding to add a sense of unified identity. Much of the project work would be done outside of the classroom, and a heavier reliance on correspondence would be necessary. The benefit of such an approach would be that it would help students to see the importance of documentation of a project at all phases, as they may not have the convenience of face-to-face communication with classmates in another unit. Class time could be utilized in part as a “check in” period, where a representative from each unit addresses the class with status updates, challenges, and other pertinent information. Depending upon the size of the course, this could also provide added training in public speaking.

CONCLUSION

The service learning project was intended to provide students with a means of applying the principles of the PMI Framework toward a real-world situation. In doing so, it was successful in multiple ways. First and foremost, it helped students to develop a sense of appreciation toward service and volunteerism in general. There was a drastic increase in student appreciation for the area’s non-profit agencies. Secondly, it helped develop student confidence in teamwork, problem solving, and collaboration. They were able to gain practice in assuming leadership positions and articulating their ideas and viewpoints to large and small groups. Thirdly, the project helped students to utilize technology in a manner that resembles of the workplace. Everyone in the class served a different purpose, all of which were interconnected and valuable. Finally, this experience provided students with a “tangible” experience that they can place on their resumes and will aid them in beginning their careers. While much of the literature published about service learning in the computer science classrooms present these experiences as pivotal to the upper-level classes, I must assert that students need these experiences as early in their education as possible. By helping freshman to develop these professional competencies, they will then be able to make optimal use of their time in college and continue their education with a broader appreciation for service and a professional attitude toward collaboration and teamwork.

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Applied Learning Through Student-Led Microfinance Programs

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ABSTRACT

The objective of this paper is to provide guidance that will assist in the development of an applied learning program in social entrepreneurship for undergraduate students. Providing students an opportunity to apply the business skills and knowledge they have acquired from their business education is a key element of the program. A general overview of recommendations on how to establish, implement and sustain a student-led microfinance program is provided. Within these boundaries, the effectiveness of a program offering assistance beyond a simple financial investment is analyzed. This paper serves as a valuable guide to universities that may consider developing a student-led microfinance program and discusses the overall positive impact to the university, students, and surrounding community. Properly implemented, such a program can provide a unique, highly visible, and innovative addition to a university's applied learning offerings.

Keywords: microfinance, applied learning, entrepreneurship, business skills

INTRODUCTION

Microfinance presents a unique applied learning opportunity for all participants. It can be an especially powerful tool when implemented within a university environment with the purpose of serving a local community. The objective of this paper is to provide guidance that will assist in the development of an applied program in social entrepreneurship for undergraduate students.

Microfinance, developed by Muhammad Yunus in 1976, is a form of a banking that is used to financially support individuals who lack the required resources, but do have strong aspirations of starting a small business (Rahman, 2010). However, due to difficult circumstances, these highly motivated entrepreneurs often lack the resources and the necessary capital to do so. Typically, normal bank loans are not available to these individuals. Ultimately, microfinance provides these under-resourced individuals access to capital with lower cost and favorable terms.

The overall concept of microfinance is based on the notion that an individual will need a dollar in order to earn a dollar (Sloan 2013). By providing struggling individuals with the necessary capital to fund entrepreneurial ideas, microfinance sets out to battle the generational poverty that defines so many communities and countries across the world. A common example of how microfinance is successfully implemented is the story of a seamstress, who was unable to turn a profit due to the high overhead of renting a sewing machine. With a microfinance loan of just \$27 and 0% interest, this woman was able to purchase a sewing machine. Within one year, this woman had made enough money to repay the loan and support her family and within five years, this woman was supporting her whole community (Martin and Osberg, 2007). Microfinance provides avenues and resources to essentially help people help themselves.

While microfinance has benefited millions of individuals throughout our world, it is not often implemented within the United States. Carr and Tong (2002) state that the lack of microfinance within the United States can be attributed to the highly concentrated markets and the significant amounts of capital required just to open a business for operation.

A student-led microfinance program can help address the challenges faced by struggling, inexperienced entrepreneurs who reside in underserved communities. Such a program can provide a unique, highly visible, and innovative addition to a university's applied learning offerings. While a microfinance initiative can be implemented in many different forms within an academic environment, the formation of a student-led microfinance club may provide the greatest ongoing benefit to all participants. Properly structured, this approach can:

Reinforce students' understanding of what they have learned in their classes, while experiencing real world application of the concepts;
Provide invaluable resources of knowledge, skills, encouragement, and funding to deserving individuals;

Promote an understanding of civic responsibility within the student population;
Significantly enhance university/community partnerships.

This paper discusses a method to successfully implement an applied learning activity based on a sustainable student-led microfinance program.

LITERATURE REVIEW AND THEORY

Carr and Tong (2002) found that the majority of businesses fail within the first two years of operations. Further analysis by Barr (2015) suggests that this low success rate can be attributed to a wide variety of factors, many of which focus around the entrepreneurs' lack of access to capital and business acumen.

Financing is a challenge everywhere in the world. However, in the United States, pure financing is not enough to support and sustain a business. It is a much more competitive environment and the entrepreneurs need to meet additional requirements related to licensing, and regulation, which make it a financial drain for an entrepreneur to establish even the beginning foundation for a profitable business. Crain and Hopkins (2001) find that small businesses, defined as firms employing fewer than 20 employees, bear the largest burden of federal regulations.

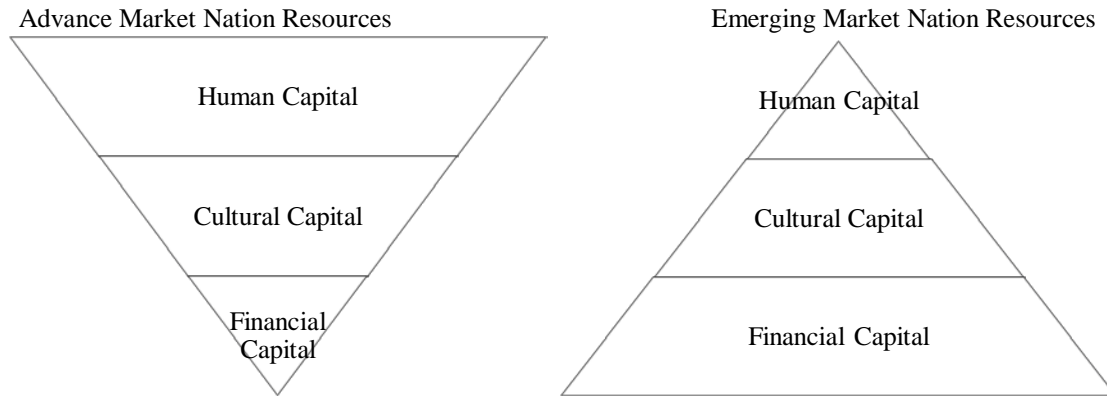
The microfinance model is targeted at the communities in need of additional resources. Jensen (2009) finds that many of these lower income communities are characterized by generational poverty, which is defined as being in "poverty for at least two generations." In addition, many residents of these underserved communities have a survival-like mentality and an ideology that they are not able to break free from their current situation. Therefore, it is important to help provide the knowledge, support and resources that are often lacking in these communities. Ashe (2000) found that one of the greatest benefits of microfinance in the United States is the continuous learning and feedback that entrepreneurs receive through the process.

It is our belief that the model of entrepreneurship differs in developed countries and developing countries. Busenitz, Gomez and Spencer (2000) find that entrepreneurs can develop a competitive advantage based on their country's institutional profile of regulatory, cognitive and normative dimensions. Lingelbach, de la Vina and Asel (2005) identify the distinctions of entrepreneurship between emerging market and advanced market nations. In other words, a country's culture and level of economic development can affect its business systems.

Kim, Aldrich and Keister (2006) identify three categories of resources that are essential to pursuing start-up ventures: financial, human and cultural. They find that within the United States, neither financial nor cultural capital resources are a singularly necessary condition for a successful startup. However, human capital, especially in the forms of education and managerial experience, can provide entrepreneurs with a significant competitive advantage. Therefore, the approach to microfinance within the United States must differ from the approach toward underdeveloped and developing countries.

More specifically, it is our hypothesis that the culture and economic development of a country will change the importance of the categories defined by Kim, Aldrich and Keister (2006). In more advanced economies, the competitive environment rewards more education and experience making human capital most important. Whereas financial markets are very well developed in these countries and capital is easier to acquire. In emerging market economies, financial capital is most important because financial markets are less developed and capital is much more difficult to acquire. However, human capital is less crucial in less developed countries since the market is typically less competitive and most entrepreneurs already know their craft, they just need the financial means to perform it. Therefore, this results in a top down structure for advanced-market nations and a bottom up structure for less developed markets.

Figure 1: Structure of Resources



The microfinance model provides an opportunity for many individuals to break free from the generational poverty that defines their community and to serve as a positive example to other individuals in these uncondusive environments. Litzky, Godshalk and Walton-Bongers (2009) recognized the benefits of the implementation of this model through an institution of higher learning as it creates partnerships between the university, its students and the community.

METHODOLOGY AND IMPLEMENTATION

The development of a microfinance program provides an applied learning opportunity in which members are exposed to real life business scenarios, experience true entrepreneurialism, and are provided with the opportunity to give back to their community. In response to this unique opportunity, the Microfinance Club of a major private university in the Los Angeles area allocated a portion of its funds to initiate a local micro-lending endeavor in South-Central Los Angeles in conjunction with a well-known inner city urban community center. The initial funding for the program was provided by a supportive alumnus of the university.

The methodology behind this initiative was founded on the belief that in order to fully empower entrepreneurs, resources beyond financial funding must be made available. A willingness to also provide entrepreneurs with a complete set of tools needed to become successful is essential to ensuring a positive result. Through this endeavor, the university provided participating entrepreneurs with additional, personalized assistance in the form of consultation, resources, supplies and other forms of direct, individual support. Due to the dynamic nature of these needs, this project involved collaboration of the University Microfinance Club, the Community Center, and a capstone Service Leadership class from the business college to support the efforts and boost the success of small businesses.

The participants and their roles in the program are shown in the table below:

Table 1: Student-Led Microfinance Program Participants

Participant	Role	Source
Entrepreneur	Present an accepted proposal to participate in the program. Work with the students to develop and execute a successful business plan. Prepare and present a business needs assessment to support needed funding.	Identified and nominated by local community organizations.
Students	Work closely with entrepreneurs to develop a successful business plan. Serve as a readily available resource to provide advice, guidance and encouragement on business related issues.	Members of the University Microfinance Club and/or the Capstone Service Leadership Class.
Faculty Advisor	Establish a strong working relationship with a local community organization. Work closely with students to evaluate entrepreneur proposals, manage funds, anticipate and resolve issues. Provide ongoing oversight, advice and guidance to the student-led team.	Microfinance club advisor and/or Service Leadership Class Instructor
Community Organization	A well-established organization within the community that has strong ties and familiarity with the youth and young adults in the community. Assists in the identification and nomination of deserving entrepreneurs in need of financial and human capital assistance to start their own business.	
Donor of funds	Provides initial funding of the program to allow the student-led operation to make small loans to selected entrepreneurs.	May be University alumnus, local business or interested patron.

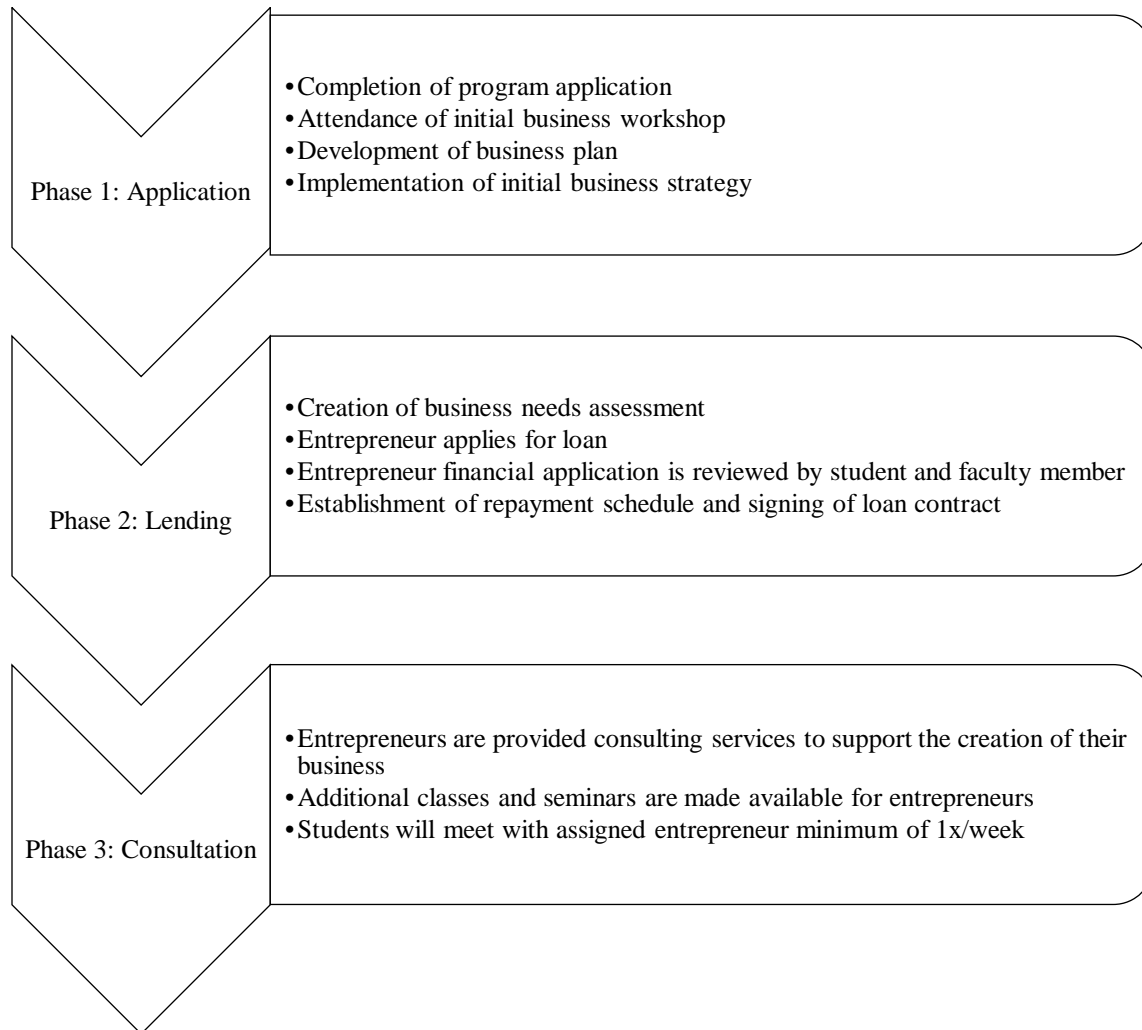
The process consisted of three distinct phases:

Application Phase

Lending Phase

Consultation Phase

Figure 2: Microfinance Program Phases



The direct, personalized involvement of students to provide business-oriented assistance is a unique element of this program. The innovative approach allows students to gain real world experience through this opportunity to apply newly acquired knowledge and skills, while also providing valuable support to the otherwise struggling entrepreneurs.

For the duration of the program, each entrepreneur is supported by a minimum of two students. The students assigned to each entrepreneur will setup a structured schedule to follow up on the progress of this business and provide any assistance that is necessary to ensure the success of the business endeavor. Each student is expected to dedicate a minimum of one hour per week and a mandatory, direct-contact bi-weekly check-in to ensure the entrepreneur has all of the necessary support he or she needs.

Application phase

The application phase requires that each potential entrepreneur complete an application that provides student consultants the information needed to effectively assist in the creation of a business plan that exhibits the qualities

required for business profitability and success. The application includes the basic structure of the entrepreneurs' business plan.

The purpose of the application phase is to not only create the foundation of the entrepreneur's business plan, but also a way to identify applicants that are serious and committed to following through in the event they are granted a microloan. For this reason, it is critically important to the process that the application itself takes a substantial amount of time and effort to complete.

Throughout the application phase, students will have the opportunity to review the application and provide the entrepreneur with feedback and suggestions for improvement. This phase invites both the students and the entrepreneur to collaborate as a group in an effort to build the foundation for their future business.

Initial workshop

Upon acceptance of the application, a workshop is hosted, in which students are able to assist each entrepreneur with his or her unique business needs. The overarching goal of this workshop is to have each entrepreneur leave the session with an initial business plan that will be drawn from the application information.

Each business plan will include:

- An executive summary (including a mission statement and description of the business)
- A market overview (including demographics, competitors and cyclical considerations)
- A financial plan (including the repayment terms of the microloan and anticipated sources of revenue)
- A marketing proposal (including methods for promotion and advertising)
- A management strategy (including a plan for managing the growth of the business)
- A legal assessment (including the identification of permits, licenses or registrations that are required)

Prior to the workshop, each student should be assigned to one entrepreneur. From this point forward, the students will be working directly with that entrepreneur to assist in identifying and addressing specific business needs. Experience has found that assigning at least two students per entrepreneur, each from different education backgrounds, has proven to be most beneficial to ensuring the entrepreneur's success.

In addition, it is important that the students use the initial workshop as an opportunity to establish a business relationship schedule with the entrepreneur that is a mutually agreed commitment for a specified period of time (suggestion is 3-6 months).

Follow up

After the initial workshop, each entrepreneur is given time to implement the strategies and ideas discussed at this meeting. As part of the finalized business plan, each entrepreneur is also asked to create a timeline for success. This timeline will include goals of achievement, milestones for success, and methods to ensure the microloan, if issued, is paid back on time and in entirety. This provides each entrepreneur an opportunity to track his or her progress and to stay on course to build and maintain a profitable business.

Lending phase

Once the application and the entrepreneur's business plan has been approved, he or she will have the opportunity to create a Business Needs Assessment Plan, in which they will identify the specific items needed, and associated costs to start their business. The Business Needs Assessment will be reviewed and approved by the assigned students and faculty advisor. In addition, the students and faculty advisor will analyze from a financial perspective the likelihood of the entrepreneur paying back the full amount of the loan on time.

Lastly, the students should work with the faculty advisor to determine the terms of the loan that are most favorable for the entrepreneur being able to pay back the loan in entirety. Throughout this program, participants must keep in mind that they are working with the entrepreneur, not against them; however, also understanding that this is a "social business" not a handout.

Once the entrepreneur has been approved for financial support, the faculty advisor and assigned students will use the loan amount to make necessary business purchases for the entrepreneur.

It is highly recommended that the microfinance program purchases the necessary items for the entrepreneur, rather than provide the entrepreneur the loan in a form of cash or check. This ensures that all funds are tracked and accounted for throughout the process. In previous instances where the money was given directly to the entrepreneur for use, it was more difficult to help the entrepreneur create and maintain a budget, track expenses, and in result, repay the loan on time in entirety.

Repayment period

The repayment period will be determined on an individual basis depending on the content of the entrepreneurial endeavor and current financial situation. These details will be outlined in the loan contract.

It is important that the loan repayment schedule be broken into small, incremental amounts throughout the life of the loan, rather than one large lump sum at the end. Requesting small repayment amounts at the beginning of the repayment plan reduces the risk of the entrepreneur missing payments, provides consistency, and continually gives the entrepreneur the incentive to keep their business on track. Figure 3 displays a 12-month proposed repayment plan for a \$500 loan.

Figure 3: Repayment Plan

Proposed Repayment Schedule (12-Month \$500 Loan)			
Month 1	\$5	Month 7	\$45
Month 2	\$5	Month 8	\$55
Month 3	\$10	Month 9	\$60
Month 4	\$15	Month 10	\$70
Month 5	\$25	Month 11	\$75
Month 6	\$35	Month 12	\$100
Grand Total			\$500

Consultation phase

While the lending component of the microfinance program is highly important, providing the entrepreneur with business and legal consultation is critical to their success. The University Microfinance Club, in collaboration with the Service Leadership class, created a program to provide entrepreneurs with the consultation and information necessary to pursue their business ventures. Throughout this initiative, students analyze potential markets, projects and local resources for the personalized consultation with clients to establish and improve their entrepreneurial enterprises. Consulting may take several forms including, but not limited to: finance, marketing, management and research. In addition to consultation support, the students will essentially act as “cheerleaders”, coaches, and colleagues to bounce ideas off of and work toward the same end goal.

Throughout the consultation phase, it is also recommended that the participating students contact university professors to donate time to hold classes and office hours for any remaining questions the students or entrepreneur may have. It is also helpful to ask university professors to host business or law classes for the entrepreneurs to attend and ask questions specific to their business strategy. Potential seminars or classes to host for the entrepreneurs include, but are not limited to, the following:

- Overview of Small Business Laws and Regulations
- Development of a Strong Brand Image
- Budgeting and Financial Management
- Project Management
- Website Development
- Product and Pricing Strategy Development

In addition to these added sessions, providing business examples and templates such as sample business plans, project plans, and expense trackers have proven to be highly beneficial to the entrepreneur.

RESULTS

The process described in this paper was developed and necessarily modified over a period of time to achieve the desired results for the entrepreneurs, the students and the university. Following are two notable successes that are representative of the outcomes that can be expected. In each case providing an initial financial boost of less than \$1,000 in equipment and supplies along with a strong cast of supportive business students allowed the entrepreneurs to succeed.

Entrepreneur #1

Entrepreneur #1 is from South-Central Los Angeles and has lived his whole life exposed to the harsh realities that define his community. Prior to developing the desire to start his own business, Entrepreneur #1 sold drugs, was part of a gang, and was eventually arrested. Given a second chance by the University Microfinance Program, Entrepreneur #1 was provided with the necessary resources to support his dream of selling faith-based apparel, with the sole purpose of serving as a positive example to the young men and women in his surrounding community. The support, encouragement, and guidance provided through the program made a very visible and positive difference in this man's life. The "human capital", as defined by Kim, Aldrich and Keister (2006), that was provided by students participating in the University Microfinance Program was proven to be an essential component of the success achieved by Entrepreneur #1.

Entrepreneur #2

Entrepreneur #2 is also from South-Central Los Angeles and spent his adolescent years tagging buildings with graffiti. In efforts to turn his passion for art and photography into a positive example, Entrepreneur #2 worked with the University Microfinance Program to begin a business that provides photographic services to real estate agents. Entrepreneur #2 hopes that his story will serve as a positive example to the young adults in his life and show them that they can make a better life for themselves.

In a relatively short amount of time, the University Microfinance Program was able to provide the necessary financial and, most importantly, human capital resources to help these two individuals break free from the harsh realities of their communities. They were able to begin their own business that would help provide the financial support needed to make a better life for themselves and their families.

Student participants

While a student-led microfinance program has a profound effect on the entrepreneur, it also makes a positive impact on the students. By working directly with the entrepreneurs, the students are not only able to apply the teachings from university classes, but also are able to directly witness the impact that their positive contributions have on underserved communities. Throughout their participation in the University Microfinance Program, students continually expressed how this program acts as a two-way street of learning. They displayed genuine excitement about being able to apply their business knowledge and skills into real-world business scenarios. The student-led microfinance program embodies the concept of applied learning.

CONCLUSIONS AND RECOMMENDATIONS

In order to implement a student led microfinance program, a university should first establish a microfinance club or a microfinance class within the school. This program can be implemented through a class project or a volunteer club organization. It is important that whichever route is chosen to initiate this endeavor, the students and student leader participants are sincerely interested and committed to the program and to the entrepreneurs' success.

In addition to the establishment of the microfinance program, it is important that the microfinance faculty leader establish a relationship with a local community organization that will help identify aspiring entrepreneurs in need of financial and business acumen support. The identified local community organization will not only take part in sourcing participants to the program, but also reconfirm decisions with approval or disapproval opinions of applicants. Their first-hand knowledge of and experience with applicants is invaluable to the process.

The establishment of a student-led microfinance program has proven to be beneficial to the participating students, the entrepreneurs' and their surrounding community, and the university. By participating in this innovative program, students gain significant real world experience and are provided the opportunity to apply the concepts they have learned in the classroom. In addition, the community and entrepreneurs gain a sense of empowerment and gain

access to resources critical to their success. Lastly, the school enhances its reputation within the community and can be recognized for its contribution.

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Kristine Hilliard has served as the Director of Microfinance and Entrepreneurship at the Al Wooten Jr. Heritage Center. She has been directly involved in the creation and promotion of numerous service-learning and social entrepreneurship activities within the Los Angeles area.

A Link to the Market Place: Integrating Practitioners in Graduate Healthcare Management Education

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ABSTRACT

Growth in the healthcare sector has prompted an increase in the number of professional graduate programs in healthcare management. These degrees include MHA, MPH in management or MBA with a concentration in healthcare. A common challenge is to find an optimal mix between providing theoretical knowledge and building applied skills sets valued by employers. The former provides students with the foundations for decision-making and the latter relates to the application of knowledge. Practitioner faculty can provide a useful link with industry to create relevant and contemporary educational programs. This paper reviews important issues in transitioning practitioners into academia. We review areas where practitioner faculty can strengthen competency achievement and discuss best practices for successful recruitment and retention of practitioner faculty. We discuss mechanisms for identifying needs in the healthcare sector and conclude with a discussion on challenges for transitioning professionals into academia and mechanisms for recruitment and retention of experienced professionals as faculty.

Keywords: practitioner faculty, faculty retention, Baldrige

BACKGROUND

Evolving business and management education programs are emphasizing specific competencies to provide students with practical skills. The Association to Advance Collegiate Schools of Business (AACSB), for example, is urging programs to focus on real world business situations (Gellman, 2016). This trend is likely in response to input from employers, considered important customers of collegiate school programs. One implication of AACSB revised guiding principles is to relax expectations for faculty appointments and increase teaching appointments of practitioners, adjunct professors, and lecturers. In the case of programs in health care administration, the trend of integrating the business of healthcare into the curriculum appears to follow the B-school direction. Indeed, the theme of the Association of University Programs in Health Administration (AUPHA) 2016 Annual Meeting was "Value Added: Integrating Practice and Academia in the Classroom" ("Home - AUPHA Annual Meeting," n.d.). A common challenge of this shift is to find an optimal mix between providing sufficient theoretical knowledge and building strong applied skill sets, particularly in the area of healthcare management. While the former provides students with the foundations for decision making, the latter relates to the useful application of knowledge. Faculty-led approaches for enriching the classroom can include a combination of lectures, case studies, guest speakers, and even co-teaching with practitioners. Each technique poses its own benefits and challenges to create balanced healthcare management programs (HMPs).

The U.S. healthcare sector is undergoing significant changes shifting focus towards value-based medicine, population health, and cost controls. Given this dynamic landscape, it is clear that educational institutions will require sound approaches to meet evolving needs in healthcare. Practitioner faculty, with experience and key connections in the healthcare sector, can provide a useful link to industry for the creation of relevant and effective educational programs. In this paper, we discuss several issues regarding the fluid transition of incoming practitioners into the world of academia. In particular we:

- Identify specific areas in educational programs where practitioner faculty can strengthen competency achievement as well as facilitating complex higher level learning.
- Discuss mechanisms for identifying and translating the healthcare sector's unique needs to the specific market experiences that would fulfill them.
- Recommend best practices for successful recruitment and improvement of the practitioner's first year career transition.

We approach these points from the perspective of university healthcare management programs. We focus on relating the needs of a program's "customers", students and employers, to the experience a practitioner brings to the classroom setting.

ROLE OF PRACTITIONER FACULTY

Strengthening competency achievement and complex learning

Current healthcare management programs are moving towards emphasizing competency-based education (CBE) (Dominguez, Garcia, & LaFrance, 2013). This approach stresses mastery of technical and leadership skills, rather than the attainment of broad academic knowledge themes. The goal is to provide graduates with applied knowledge and skills to meet the needs of a rapidly changing healthcare environment in general and the demands for improved productivity in particular (Jones, Jorissen, & Bewley, 2016). While each degree-granting institution selects individual program competencies, many graduate healthcare programs accredited by the Commission on the Accreditation of Healthcare Management Education (CAHME) rely on the model developed by the National Center for Healthcare Leadership ("National Center for Healthcare Leadership Competency Model," n.d.). This model details 26 competencies classified around three domains: (1) Execution, (2) Transformation, and (3) People. Similarly, the Healthcare Leadership Alliance has defined the following competencies: (1) communication and relationship management, (2) professionalism, (3) leadership, (4) knowledge of the healthcare system, and (5) business skills and knowledge (Stefl, 2008). The CBE scope not only serves as a tool for educators to identify skills in high demand in the marketplace, but from the perspective of a healthcare manager it helps define roles, expectations, and performance targets for employees within an institution (Garman & Johnson, 2006). It also helps identify existing and future human resource needs based on projected skills gaps required for a possible expansion, or restructuring of a hospital operation.

Given the trend towards CBE, the role of a practitioner in the classroom is crucial in two ways. First, practitioners have the advantage of maintaining a constant link to industry and can articulate and prioritize competencies of relevance in the workplace. Second, practitioners can also facilitate learning of complex concepts by illustrating applications in real situations. However, a practitioner can also play an important role given a student's learning style. Studies indicate that most students learn through a combination of reflective observation, experiencing a challenge, and abstract conceptualization, constructing a hypothesis to explain the challenge (Rahmati Najarkolai, Karbasi, Mosayebi, & Kashmiri, 2015). It is during the reflective phase of a student's learning process that practitioners can contribute the most value in the classroom. In conclusion, practitioner involvement in healthcare management education has two general benefits, achieving the goals a CBE-based graduate program and maximizing a student's learning potential.

Practitioner-educator continuum

It is important to recognize that there is a tradeoff between industry experience and academic theoretical expertise. This situation is illustrated in Figure 1, which presents the practitioner-educator continuum. On the bottom portion of Figure 1 we find different stages, or roles, of academic engagement starting from a guest lecture and progressing to a full-time faculty appointment. The stages listed along this continuum might not necessarily follow a linear pattern of an individual's involvement in teaching. In fact, these stages should be considered roles that individuals can take in their involvement in teaching, and at varying degrees of time commitment. The bottom axis also illustrates an increasing degree of academic, or theoretical, pursuit with each different role. Further, higher level of academic engagement results in higher degree of subject specialization, or theoretical immersion, as shown with the rightward increasing dashed-line function in Figure 1. The drawback, however, is that higher theoretical immersion results in a separation from the professional world. Time commitments for teaching and conducting research, necessary activities to progress in a purely academic environment, create a reduction in contemporary market experience. This is a typical situation, for example, with the case of executives transitioning into full-time education. The level of academic commitment that comes with a faculty appointment reduces time available to maintain market network and real time knowledge of emerging business issues. Given the tradeoff between theoretical immersion and contemporary market experience, it is important for planners of competency-based curriculum to consider the combination of a practitioner with an academician as way of providing effective educational programs. Furthermore, it is possible to consider that an optimal mix of practitioner and educator involvement might exist to maximize a student's learning experience.

Practitioner expertise

Practitioners can help bridge theoretical and applied knowledge. In the area of healthcare finance, for example, a practitioner has the advantage of illustrating the challenges and issues faced in the use of data for trend analysis. Given the diversity of approaches surrounding revenue cycle management, guest speakers can clearly articulate challenges of balancing reimbursements, expenses and cash flows. Other important topics in healthcare finance include, understanding uses of bundled payments and institutional budgeting, and emphasizing foundational computer skills such as the use of spreadsheets. At the overall healthcare management level, practitioners bring to the classroom the experience of interpreting data summaries such as scorecard results. Most importantly, practitioners can highlight the importance of foundational business skills such as innovative thinking, time management, and interdisciplinary, cross-functional, group decision making for finding optimal solutions to business problems.

Reaching complex learning levels

In the process of teaching complex concepts, practitioners also provide an important contribution. Their real-world experience provides first-hand examples to illustrate the application of complex ideas and concepts. For example, the topics of real options in net present value evaluations and risk profiling in population health and healthcare finance are concepts gaining importance under the current reimbursement models, particularly in accountable care organizations (ACOs). However, a limited number of specialists have both the theoretical and business background to apply these topics in the hospital setting. Practitioners can play a significant role in facilitating learning of these concepts by using illustrative real case studies from their own work experience.

HEALTHCARE SECTOR'S UNIQUE NEEDS

HMPs need to find novel mechanisms for incorporating employer (i.e. corporate partners) expectations into the classroom setting to provide students with required skills to meet the needs of the healthcare sector industry. This represents a special challenge since the healthcare sector is unique in its constant changing landscape, growing importance in the country's economy, and need to serve a segmenting population. Specifically, HMPs need to understand that while students are the only primary customer, employers, who recruit HMP graduates, are indirect "consumers" of healthcare management educational programs. The goals of these two customer groups appear related, but have essential differences held together by the needs for individual professional growth and organizational sustainability. Table 1 provides a general summary of student and employer goals from the perspective of a healthcare management program. Note, however, that this is a generalization and specifying needs can be complicated depending in the degree of diversity in the student body (e.g., age, work experience, and background) and variation of employer types.

Translating key market experiences into sound HMP curricula

The revised AACSB standards encourage schools to enhance ties with companies who will employ their future graduates in an attempt to be "co-creators of knowledge" with their corporate partners, with an emphasis on developing applied research and contemporary skills (Gellman, 2016). One well-tested model for assessing the needs of customers is found in the Malcolm Baldrige National Quality Award (MBNQA), which has now been awarded for more than a quarter of a century. Created by the Malcolm Baldrige National Quality Improvement Act of 1987, the award functions to stimulate quality and improvement, first in manufacturing, and now in other market sectors including healthcare and education. Specific performance and measurement criteria act as guidelines in the evaluation of improvement and achievement of the highest levels of quality. These criteria have evolved into seven interrelated categories that focus on critical aspects of performance. One of these key seven categories concerns understanding the needs of the customer for mutual long term market success and engagement (*2015–2016 Baldrige Excellence Framework (Education) / NIST, n.d.*). This includes being able to demonstrate responses to strategic questions, which for the case of healthcare management academic programs could include:

How do you seek actionable feedback from students and other customers (i.e. employers) on the quality and relevance of your educational program?

How do your listening methods vary across the stages of the relationship between academic organization and customers (students and employers)?

How you do proactively capture customer stated, unstated, and anticipated expectations and requirements?

Established methods for obtaining this information about the key needs of program customers include survey data, well-constructed advisory boards, focus groups, listening posts in social media like blogs and on line forums, data available from other social media, and marketing information. Another source is complaint data related to student

enrollment and engagement decisions, as well as employer hiring decisions. This should include data from all stages of involvement with students, including pre-student, student, and post-graduation as well as with employers in the pre-hire, internship, and post hiring phases.

Beyond students, engaging employers as key customers is a new concept in healthcare education that requires novel approaches. These partnerships ideally blend the academic organization's core competencies with a partner's complimentary sector specific strengths and capabilities to create a new strategic advantage that can deliver mutual value and results. This includes utilizing them as a resource for practitioner faculty in a variety of ways discussed earlier, and adapting program offerings based on data gathered from employer customers. This increases engagement and commitment to the educational program and future service offerings. Ways to engage employers include:

Identifying industry needs and building strategic relationships with healthcare administrators and
Adapting program offerings to meet evolving market requirements and exceed educational expectations.
Once HMPs have attracted appropriate practitioner faculty from employer customers, the next concern is to engage the practitioner faculty in the success of the program, while also meeting the practitioner's needs.

PRACTITIONER'S FIRST YEAR CAREER TRANSITION

Faculty development for the practitioner has attracted little attention in higher education, particularly related to successfully integrating new practitioner faculty before faculty orientation. Academic appointment for faculty practitioners can vary from informal, voluntary unpaid, to a formal position, as part-time adjunct faculty or full time faculty (Lyons & Burnstad, 2007). In the event of a full time appointment, the practitioner may need to research the distinctions between faculty appointment types and ranks to understand the specific expectations of each position. For instance, if the appointment is different than a traditional academic type, the practitioner may have a robust teaching load compared to a colleague on tenure track. Spelling out this difference at the outset forestalls misunderstandings later in the semester. A practitioner hire also needs to be aware of any expectations beyond classroom teaching or managing internships, such as participating in faculty committees, student recruitment activities, and program development. Further, the practitioner transitioning directly from health care practice would expect to work on twelve-month cycles. However, appointment lengths, regardless of appointment type, vary considerably by institution. No doubt, the most restrictive hurdle in recruiting practitioner faculty is the issue of compensation. There can be large differences between academic institutions and the nonacademic healthcare sector. For example, average cash compensation for a hospital CFO is estimated at \$266,000; \$287,600 for a Vice President of Revenue Cycle, and \$112,700 for Manager/Director titles average (Health Care Financial Management Association, 2015). This contrasts with average faculty salaries in health administration which range between \$94,985 for assistant professors, \$118,787 for associate professors, to \$165,455 for professors (Menachemi, DelliFraine, Lemark, & Halverson, 2016).

Emerging best practices for successful recruitment

Most universities provide new faculty orientation programs which typically consist of short sessions, of one or two days duration, aimed at both adjunct and full time faculty and occur before the start of the semester. While these programs are important in the enculturation of new faculty, these could be described as "crash" courses insufficient for creating rapid and effective institutional integration of new faculty. Instead, extended orientation programs, richer in content, might prove better (Diaz et al., 2009). For a practitioner who may be more at home in a "corporate" environment, an extended, in-depth, introduction to academic norms is essential. One important recommendation includes matching a new practitioner faculty with a mentor; ideally another practitioner faculty who has been in the institution at least one year.

The issue of institutional cultural differences is important to consider when transitioning from the industry sector to academia. Higher education institutions tend to have significant differences in organizational culture and norms compared to those found in a healthcare setting, and there may be little or no overlap in the fundamentals of the organization cultures. The university culture has been described as an "organized anarchy" with an organizational culture characterized by "unclear technology and fluid participation" (Cohen, March, & Olsen, 1972). Other researchers have observed that in this organizational culture, randomness replaces rational, predictable decision-making (Denhardt & Denhardt, 2009). In contrast, rational decision-making and predictable outcomes are foundational for health care organizations, which struggle with revenue and cost targets. A variety of higher education norms can pose transitional hurdles for first year practitioner faculty. Concepts such as shared governance, appointment letters, and tenure and promotion criteria contrast sharply with a healthcare organization

best described through a clear organizational chart, crisply written job descriptions, and clear-cut promotion criteria. A fundamental understanding of accreditation and competency-based education, unnecessary for traditionally prepared faculty, can prepare the practitioner for such varied tasks as creating learning objectives in a course syllabus, participating in curriculum assessment, and responding to accreditation requirements.

Administrative basics of higher education and program operations must be outlined explicitly to ensure successful first year transition for the practitioner faculty. Practitioner faculty, depending on their previous role in health care, may have had dedicated administrative support as well as an “expense account”. Clarifying administrative support expectations and institutional policy and procedures for travel and reimbursement is best handled one-on-one by the HMP program director at the time of formal negotiations with the entering practitioner faculty. In the same discussion, it is useful to clarify expectations for office hours and guidelines for communication with students. In all cases, it is relevant to explain the need for written documentation such as using the university email system as a channel for providing a legal record of communication with students or other faculty members.

If an orientation on pedagogy basics is not a component of an institution’s new faculty orientation, the first year practitioner faculty will benefit from a tutorial on current practices in higher education. A healthcare professional transitioning into the classroom will be aware of workplace regulations, but may be unaware of university policies regarding classroom management and the need to disclose them in the course syllabus. Further, if the program does not specify a text for the course, the practitioner may benefit from a review of preferred academic publishers of textbooks and an explanation of procedures for using instructor resources. If the university has a center for teaching and learning, the practitioner faculty must be connected with the appropriate support personnel for classroom management. Providing a copy of a document describing course evaluation procedures, before the semester begins, will facilitate the practitioner’s understanding of the nature and importance of feedback. Posting online a copy of the course evaluation procedures is highly recommended.

How do “Professors of Practice” fit in the traditional academic hierarchy?

There is a great deal of ambiguity around how to reward faculty for practice-oriented scholarship. This includes not only recognizing the value that practitioners bring to the classroom, but the potential contribution that highly experienced healthcare managers can make towards applied research (e.g., identifying emergent healthcare management issues, or securing funding from industry). Clearly, number of publications, years of teaching, and funding received from traditionally respected sources (e.g., National Institute of Health, National Science Foundation) are metrics applied for evaluating a career academic. These, however, do not necessarily apply to a practitioner faculty who has had considerably fewer years teaching, a limited number of articles published, and less time to create the relationships that facilitates creating a research portfolio. Aday and Quill (Aday & Quill, 2000) have proposed a framework for assessing such scholarship in schools of public health, but this is an area that needs to be expanded with further assessment and research. Given the need to adapt to the rapidly changing healthcare landscape, practitioner faculty can play an important role in transforming “Practice Oriented Scholarship” into the “Scholarship of Application and Discovery” as part of the graduate healthcare programs of the future. The issue of compensation, however, remains a relevant question for retaining an effective and sustainable team of practitioner faculty.

CONCLUSIONS

This article highlights challenges for transitioning professionals into academia, mechanisms for recruitment and retention of experienced professionals as faculty, and creative approaches for defining curricula that can prepare students for future success in healthcare management. Current healthcare management programs are shifting towards competency-based education, which considers mastery of technical and leadership skills, rather than the attainment of broad academic knowledge themes. In this context, practitioners play a significant role in helping articulate industry needs and maximize a student’s learning potential. The practitioner-educator continuum helps illustrate the tradeoffs between theoretical immersion and connection with the healthcare management market. Thus, it is possible to consider that an optimum mix of practitioner and educator might exist which could very well maximize a student’s learning experience.

Healthcare management academic programs have two broad “customer” groups, students and employers. The challenge is to implement mechanisms to identify the needs of each group and translate these into effective educational programs. A model for needs assessment is the Malcolm Baldrige National Quality Award (MBNQA), which focuses on applying quality criteria while emphasizing understanding the needs of the customer for mutual long term market success and engagement.

In the transition from industry to academia, it is important to highlight distinctions between the higher education culture and the healthcare industry culture. Similarly, it is critical to that HMPs have a process in place that can help incoming practitioner faculty adapt and succeed in the classroom environment. One challenge for retaining valuable practitioner faculty is finding appropriate evaluation and compensation methods that can recognize professional experience and contributions to research. This topic is an emerging issue and requires further research.

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Figure 1: The Practitioner-Educator Continuum, Tradeoff between Market Experience and Theoretical Immersion

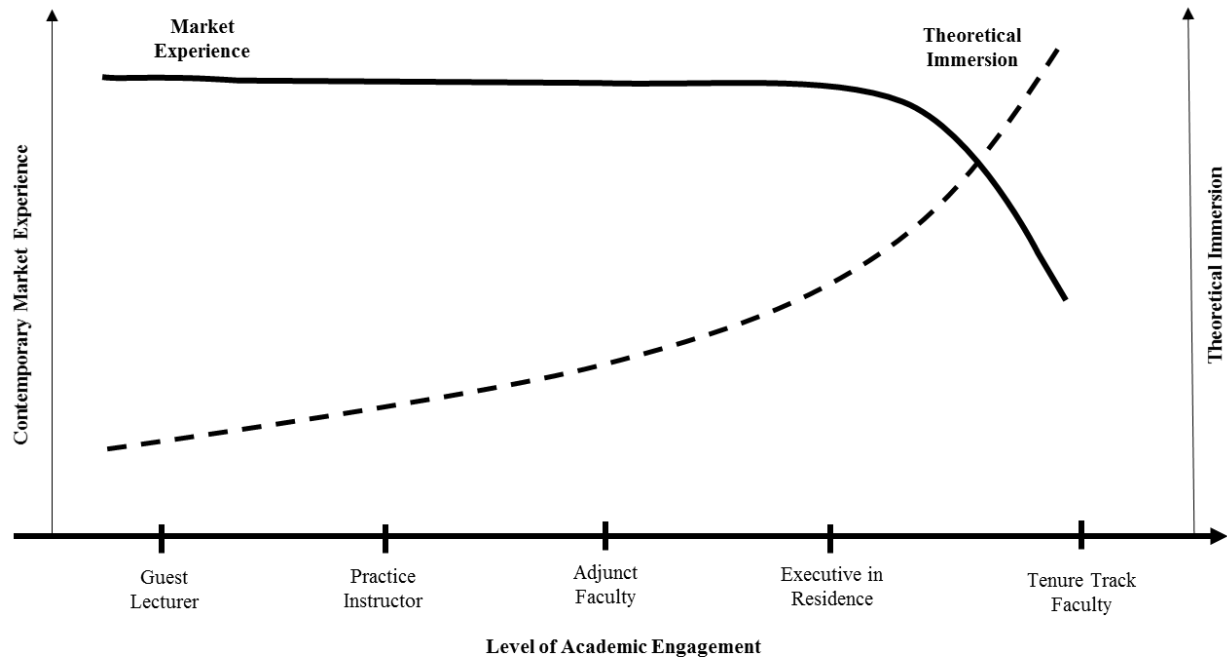


Table 1: The Convergent Goals of the HMP* and Its Two “Customer” Groups

Goals of the Healthcare Management Program	
Anticipate and incorporate into curriculum changes and needs in the market, in real time	
Student Goals	Employer Goals
Increased achievement, including upwardly mobile employment	Maintain current and planned operational and financial sustainability levels
Exceed, proficiency standards for the profession	Meet market demands in an environment of disruptive events (e.g., economic, technologic, regulatory, social)
Innovative educational programs that appeal and adapt to the adult learner	Managing for innovation (meaningful change)

*Healthcare Management Program

Professional Experience of Faculty in the Accounting Classroom

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ABSTRACT

This article discusses professional experience of faculty as an added value factor in the education of business accounting majors. Ideas are presented on how to incorporate faculty professional experience into course instruction to enhance the accounting curriculum. Certainly, the predominant and appropriate focus of most accounting coursework is teaching theory and application of accounting concepts and rules. It is important to keep in mind however, most accounting students have the goal to get a job (and have a successful career) in a professional organization typically a CPA firm. Therefore, if students can be provided real world practice insights on succeeding in their accounting career that would be valuable for soon to be accounting alumni.

Keywords: accounting education, faculty professional experience, classroom/program tools, student career success

INTRODUCTION

A general background would be helpful to better understand the current faculty environment for many college accounting programs. For the schools of business which have Association to Advance Collegiate Schools of Business International (AACSB) accreditation (“highest standard of achievement for business schools internationally for less than 5% of 13,000 business programs” AACSB, 2013), there are various requirements the school (including the accounting program) must meet to attain and maintain accreditation. One critical requirement for AACSB accreditation is to maintain a scholarly academic (SA) faculty. In particular, for the AACSB business accreditation 2013 standard, “Normally, at least 90 percent of faculty resources are Scholarly Academics (SA), Practice Academics (PA), Scholarly Practitioners (SP), or Instructional Practitioners (IP). Normally, at least 40 percent of faculty resources are Scholarly Academics (SA). And at least 60 percent of faculty resources are Scholarly Academics (SA), Practice Academics (PA), or Scholarly Practitioners (SP).” (AACSB, 2017). AACSB standards are quite complex and the insights provided here is an overview of relevant issues.

Some have found the 2013 standards more friendly to practitioners e.g. with IP category, however the 40% SA requirement looms for accreditation (Krom et al 2014; see also Abdelsamad et al 2015). Another take - “...defined high visibility as attending professional meetings and having research articles accepted for publication rather than quality teaching or students’ career success after graduation.” (Taylor, et al, 2009). The AACSB standards also requires faculty to have professional interactions to support educational objectives (Arlinghaus, 2002). SA status generally requires a Ph.D. in business typically with no professional experience requirement. This article will focus on the subset of accounting faculty as part of the total business faculty.

Often the Ph.D. accounting faculty member (usually in a tenure track position) has significant academic research credentials but with little if any professional or public accounting experience. The standard indicates, the other 60% (or less) of the faculty should be professionally qualified (e.g. PA, IP, SP), which implies a professional experience component. So it would suggest, an accredited AACSB business school or accounting program, should have a combination of academics (SA – Ph.D.s) and professionally experienced faculty (PA, SP or IP hereafter sometimes collectively referred to as PQ).

If in fact the accounting majors are receiving proper well-rounded course instruction on the various accounting concepts and rules, what else is really needed for the accounting major/graduate to succeed in their accounting career? The key part of that question is “to succeed in their accounting career.” Assuming part of an accounting program’s mission is to have *successful* accounting graduates, then arguably, there are other educational aspects that should be considered for students. An important foundation to this article is understanding that accounting is considered a “profession” (in U.S., based on coordinated roles of government with state licensing of CPA’s and professional organizations like AICPA and FASB; Lee, 1995). Therefore accounting education is ...”*professional education*...encompassing three broad spheres of professional preparation: technical knowledge, practice skills, and, of critical importance, normative purpose and professional identity.” (Wilkerson, 2010). An important issue explored here is whether it is optimal to have the professional experience factor reside primarily if not solely with the PQ faculty and their course instruction versus having professional experience cross also into the SA faculty and their coursework for fuller integration. Also, “professional experience in the classroom” as used here implies that the

professional experience factor is actually used or integrated in classroom instruction by faculty. In other words, just because the instructor has professional experience in their background does not in and of itself really provide an enhancement to students unless the insights of professional experience are integrated into course instruction. This article discusses some current potential opportunities and provides insights as to how the faculty professional experience component can be enhanced to add value to students' accounting education. By way of personal disclosure, I, the author, spent many years in public accounting practice and industry before entering academia.

PREVIOUS RESEARCH

The academic research has looked at the issue of professional experience in the context of academically qualified accounting faculty publication requirements and shortages (Arlinghaus, 2008, Boyle et al., 2011 – see also ACAP 2008; Plumlee et al., 2006; Ruff et al. 2009; Trapnell et al., 2009). Another article (Geary et al., 2010) analyzes a more direct approach in dealing with faculty shortages via a Partner Teaches Program (PTP) with a public accounting firm that had joined with faculty in classroom instruction; student evaluation results showed an added value of PTP instructors' practical experience as quite high. See also, Schneider et al 2012, which analyses the use of non-tenure-track (NTT) positions and related issues in dealing with Ph.D. shortage in accounting education. In recognition of the chronic shortage of Ph.D.s in accounting education, the AACSB has taken action through certain training initiatives with professionals seeking college teaching jobs (e.g. AACSB Bridge program). Note professional and practical experience is used interchangeably in this context.

In another article (Boyle et al., 2011), accounting practitioners' perception of academia was surveyed, with some interesting insights. One Ph.D. candidate surveyed, a CPA practitioner, reflects the general divergence of opinion between academia and accounting practitioners on the value of accounting practice experience for instructors, saying:

“The world of academia does not place much value on professional experience and teaching...my CPA and practice credentials do not count for anything in this environment [*Ph.D. program*]. It can be frustrating to start your career over again from scratch. I do not know why the system is built this way, but our students and profession should demand change.” [*added*]

The results of the article's survey of accounting practitioners (includes accountants, mostly CPAs, working in public accounting or industry, with a mean experience of 14 years) shows that they believe the most important credential of an accounting professor to be an effective teacher is having significant accounting experience (at least 7.7 years of practical experience) by 29% and being a CPA, 28%. Only 6% of the group said being a Ph.D. was important (note: percentages used as an estimate of total comments by the survey group). In a companion article by Boyle et al. (2013), they found from a survey of Institute of Management Accountants (IMA) members, that practitioners would provide moderately high value to new non-traditional doctoral accounting programs (to address shortage of qualified accounting faculty). Also in Noland et al. (2013), non-traditional doctoral alternatives to the traditional Ph.D. route are explored for accounting practitioners considering academia. Lee (1995) adds to this discussion by tracing the “professionalization” of accountancy (e.g. CPA licensed status) and its effect on accounting education and standards (e.g. AICPA), including the progression of accounting education from part-time practitioner teachers to a “profession of full-time teachers and researchers.”

Mounce (et al., 2004) found based on an empirical analysis of accounting students' perceptions, that accounting professors with relevant practical experience were perceived of significantly higher quality than professors without such experience (although about in the middle of importance of the various faculty attributes students rated). I am sure many accounting professors would dispute that student evaluations universally support those findings (e.g. with some Ph.D.s faculty getting higher evaluation scores than professionally experienced faculty). In Johnson (2014), one finding was “Participants in this study perceived faculty members with practical work experience to be more helpful and influential than those with purely academic credentials.” Interestingly, participants made clear and consistent distinctions between the qualifications of faculty members and their degree of influence on their career success.” A question arises as to whether it can be shown empirically that accounting graduates are indeed more successful with greater professional experience influence in their accounting education.

Another article (White et al., 2008) discussed the evolution of the AACSB on increasing the importance of professionally experienced faculty while maintaining its premier global brand versus competition like the Association of Collegiate Business Schools and Programs (ACBSP). To add some broader perspective to this topic,

in another article (Slocombe et al., 2011), a survey of an AACSB university school of business students, found most students gave higher evaluations to professors they liked and who used humor (professional experience of instructors was not a student survey factor).

It is also instructive to review the Pathway Commission report (2012) which was a major comprehensive collaborative study effort of the American Accounting Association (AAA) and the American Institute of Certified Public Accountants (AICPA): considered by many academics as the premier academic and professional accounting organizations respectively. The study's focus was the future of accounting education and to make recommendations for improvement. One of the significant (and the first) recommendations of the report centered on better coordination and collaboration of accounting academia and practicing professionals stated as: "Integrate professionally oriented faculty more fully into significant aspects of accounting education, programs, and research." Black (2012) reviewed the history of accounting education analysis prior to the Pathway Commission report. The article indicates that academic and practitioner convergence has been a long-term accounting education aspiration and in part states:

"The overall objective of the Accounting Education Change Commission (AECC 1990) was to foster changes in the academic preparation of accountants with the goal of improving their capabilities for successful professional careers in practice..." "However, among the recommendations of the AAA Committee on Masters Programs in Accounting [circa 1970] was a clear statement that the CPA certificate (with practical experience) should be considered necessary for those teaching courses more directly related to public accounting (Boyd et al. 1970), and a recognition that the CPA certificate as well as responsible business and accounting experience enhanced the qualifications of accounting educators." [added]

Wilkerson Jr. (2010), an accounting professor, discusses an even higher responsibility that accounting educators have over and above the business school academy. He suggests that accounting as a profession (like medicine or law) must provide an educational formula that includes practice-based scholarship, "professional identity" teaching and a series of apprenticeships (like medicine or nursing with clinical experience learning). McGee (1986) adds, "The accounting profession is the only profession that has the (research-oriented) Ph.D. as the terminal degree rather than a practice-oriented doctorate. This situation does not serve the practitioner or the client." McGee suggests further "Specific recommendations: 1. Take accounting education out of the hands of business educators (AACSB) and place it into the custody of the accounting profession, as is done with legal, medical and other professional programs." (McGee, 1986). The practical realities for an accredited program are the required emphasis on time-consuming (peer reviewed) research leading to publications – this has been found to reduce available time for professional activities (Arlinghaus, 2008).

SUGGESTIONS FOR PROFESSIONAL EXPERIENCE INTEGRATION

The above research generally supports the premise of this article, which is that professional accounting experience of faculty can enhance the value of the accounting majors' education. In other words, the above research found that the key stakeholders: accounting practitioners (employers who hire accounting majors), accounting academia (education providers) and accounting students (the customers) generally agree that practical or professional experience of faculty provides an enhancement of an accounting education.

Before going further, to be clear this article is not intended to be critical of any business school's accreditation, accounting program or components: Ph.D.s, professionally experienced faculty and the AACSB and equivalent accreditation standards – are all important components of an excellent overall accounting program. Granted there are less demanding alternatives (e.g. other types of accreditation) for business schools that do not have AACSB accreditation. But keep in mind there is clear support for the AACSB standard as being the premier accreditation for accounting programs. Krom et al (2014) states: many accounting firms recruit at AACSB-accredited schools (see same for corporate recruiters (Miles et al 2015); also that according to *U.S. News* or *Bloomberg Businessweek*, the most prestigious accounting programs are AACSB-accredited. In Hunt (2015) he refers to research that showed that for AACSB-accredited schools, there are higher CPA exam pass rates and passing the CPA exam with fewer attempts.

Each accounting program typically has a variety of different features (e.g. use of PQ faculty, discipline-based SA research) likely adapted over the years to provide its students a competitive accounting education. This article's goal is to offer some thoughts on how a school of business or accounting program could perhaps enhance the

effectiveness of their program with some new faculty approaches or techniques to help develop the practical accounting experience of their accounting students in preparation for their accounting careers.

It is probably appropriate here to attempt to define just what is professional or practical experience of faculty. Working in a professional accounting environment (in public accounting or industry) encompasses several different educational aspects: how to apply accounting concepts and rules to unique real world client scenarios; how to understand and apply new concepts often more advanced than college level coursework, on an efficient and timely budgeted basis (and progressively supervising other staff) and using interpersonal skills in dealing with peers, supervisors and clients (all different for each client assignment). Perhaps the most valuable aspect of professional experience is perfecting one's accounting and business skills through practice and working with successful professionals, with the goal of becoming a successful career accounting professional.

It is clear there is long standing consensus that professional experience and accounting education need to be integrated. Now let's focus the discussion on how accounting programs can supplement practical experience for students based on the current faculty environment. Using a hypothetical accounting program with AACSB business accreditation (therefore with various requirements for example, for SA faculty to publish peer reviewed academic articles), with say 50% Ph.D.s SA faculty and 50% PQ faculty, we will explore some possibilities. This scenario further assumes that both SA and PQ faculty are instructors for the same proportion for teaching accounting coursework. This scenario would further imply that about 50% of the accounting courses do not provide students with practical experience at least from the instructors' background, and 50% do. So how using this hypothetical accounting program scenario, could the accounting education program be enhanced with practical experience? The professional/practical experience of an accounting faculty member (whether tenured professor or instructor) can provide enhanced value factors to the courses they teach in various ways (collectively referred to here as "beyond the textbooks" an expression with varied origins).

Practical or professional accounting experience as used in this article can include a variety of work experiences in accounting. It could include work experience (e.g. accounting, tax) from public accounting (e.g. CPA firms: small sole practitioner to Big 4 firms), industry (e.g. handling bookkeeping for a small business to, working in a controller's department of a Fortune 500 company) or government (e.g. federal, state or local agencies). Types and levels of work experiences for different disciplines of accounting are relevant, in no small part due to the specialization required in our global economy. The major disciplines of public accounting generally are: assurance/auditing, taxation and consulting (e.g. appraisal/valuation, information systems, forensic accounting). There are also numerous specialties within these disciplines, for example for taxation: federal income tax, state and local tax, indirect taxes (e.g. customs, duties), international tax, transfer pricing, employee benefits and estate and gift tax. It is my belief that types and specialties of practical experience are important and should ideally be matched to specific related coursework. For example, a Taxation I course (based on AICPA Model Tax Curriculum with a business entities focus) would be best suited for an instructor who had significant tax experience (e.g. tax manager or higher level) from a national accounting firm (with clients from closely held businesses to Fortune 500 public companies). Because most accounting students will likely start their career in a public accounting firm (but may later work in industry), faculty practical experience would probably be best from the public accounting/CPA sector (or ideally from both CPA firm and industry).

Here are some examples of how accounting faculty with professional experience can provide added value in the classroom:

Give practical explanatory examples (including e.g. challenging client situations or crafted case studies) they have encountered in practice, to students as part of lectures, group discussions, on various accounting concepts and rules. This would help students better recognize these issues in a real world practice environment.

Introduce recent topical technical areas encountered in practical situations into coursework (e.g. new accounting regulatory issues applied to a real world example).

Modify assignments (including clients reactions experienced) to more likely project scenarios they will see in accounting practice (e.g. select more common types of client tax returns, like F1120 – Corporate Income Tax returns versus less popular type entities).

Explain certain successful practice behaviors to apply to their projects (e.g. explain meeting likely time budgets they will be given in practice and reality of being able to bill clients, to complete selected projects likely more generous class time budgets).

Emphasize the importance of self-learning, working independently as well as with peers on teams, etc. which are some key elements of success in accounting practice.

Ethical issues encountered in practice (e.g. AICPA practice standards); provide real world examples.

Role-play with students as CPAs and instructor as client in various scenarios.

Offer practical insights on competitive environment of public accounting or industry (e.g. working with peers from other accounting schools), that could help accounting students succeed in their careers. This is also mutually beneficial for schools to graduate accounting students who do well in their careers – get their CPA certification, get promoted, become partners or executives in industry. Provide honest insights on determining when (and why) it might be best to look for career alternatives outside of public accounting.

To be sure most accounting students want to be able to pass the challenging Uniform CPA exam so coursework should include information that will help them (many textbook now include CPA topic hints). Being a licensed CPA is virtually mandatory in CPA firms. Also for students who will be focusing on industry careers, perhaps the CMA alternative route and exam could similarly be addressed in coursework.

For instructors (i.e. SA - 50% in the hypothetical) that do not have practical accounting experience themselves (or not recent experience), they can consider using these alternative techniques:

Meet with accounting practitioners and talk with them about what are the key factors they look for in recruiting successful staff accountants. Then incorporate this information into course plans. Often school career advisors also have this information.

Use real world case studies or business articles (e.g. Wall Street Journal) to demonstrate course accounting concepts. Bring in guest speakers from accounting firms or industry to talk with students perhaps about their practical experiences with subject matter of the lecture or course; also consider having a practitioner do an “open forum” to allow students to ask a variety of questions.

Co-teaching some courses (or parts thereof) with practitioners (or adjunct faculty).

Some research activity (that faculty will get academic credit) on real world accounting issues including targeted professional journals or current accounting related stories (and use in classroom lectures).

Be involved with a state or national CPA accounting society (e.g. AICPA) to gather new ideas for classroom use.

Become licensed and or certified in accounting (e.g. CPA, CMA).

The accounting department or program in conjunction with the business school can also consider:

First of all, accounting departments should best match an instructor’s professional experience (e.g. tax) and the nature of the coursework (e.g. taxation courses versus management accounting).

Offering public accounting and industry accounting internships by discipline (e.g. tax, assurance) and remind students on necessity for recruiting purposes*.

Offer accounting career services with designated personnel (e.g. to secure many accounting recruiters and job opportunities for students, e.g. CPA firms, industry, government).

Active student accounting organizations (e.g. BAP) to host a variety of career oriented student events and to provide networking opportunities.*

Careful review of how the school (and or accounting program) is meeting the AACSB - SA requirement. Find out if other school’s/AACSB interpretation of standards (e.g. for SA status) could perhaps provide more leverage of instructors with professional experience. Also look to use adjunct instructors with specialized professional experience to enhance the variety of courses offered to students. Further, carefully evaluate if percentage time required for intellectual contribution by faculty could be adjusted so to allow an increased allocation of professional interaction time.

Hiring of non-traditional accounting doctoral graduates typically with years of practitioner experience that could meet AQ standards.

In conjunction with No. 5 and 6, review the policy of the school/accounting program for offering tenure track positions to non-Ph.D.s who could also provide SA status (e.g. DBAs, LLM – tax – with professional experience, JDs) to be competitive with other AACSB schools.

Have an open discussion on teaching among both SA/Ph.D. and PQ professional faculty. Exchange thoughts openly on different teaching techniques used and what has been found to be effective. This type of discussion would hopefully lead to a sharing of ideas, including use of professional experience in the classroom. Perhaps, reviewing some academic articles on professional experience, or practitioner articles or the Pathway Commission report could be used as a tool to stimulate a constructive discussion.

Support faculty with expense reimbursement to participate in practitioner organizations, conferences and continuing education and the pursuit of and cost of professional licensing or certification (e.g. CPA, CMA).

Have regular department faculty meetings with practitioner representatives from CPA firms and industry to discuss current accounting issues and possible practical research topics.

Incentivize faculty by providing credit (e.g. research contributions) for publication in professional/practitioner journals.

You may also want to visit the AAA Pathways discussion page (e.g. tax careers) for other perspectives.

Of course in the real world of managing an accounting program, resources (e.g. time, funds) are limited and many elements are in competition for those resources. This includes in particular, faculty time, which typically must be allocated between teaching, research and school or department service activities. As pointed out in an article (Arlinghaus, 2008), an accounting program's requirement for faculty intellectual contributions will cause less time allocated to professional interactions or practical experience (to be in compliance with AACSB standards). Therefore, each accounting program must determine the best balance of necessary elements to make their program competitive and most effective for their students.

CONCLUSION

Although accredited (e.g. AACSB) schools of business provide a professional experience component for their accounting programs, different approaches are discussed in this article that could enhance faculty professional experience in the classroom, which could provide added benefits to accounting students. This article discusses the mutual aspirations of practitioners and academia on the need to have increased faculty practical experience for future accounting students. Although this article focuses on practical experience for accounting education, these findings could have similar applicability to any professional educational curriculum.

*My school has successfully utilized these and other techniques.

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A Detailed Look at the Development and Execution of a Junior Year Case Competition

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ABSTRACT

The use of case studies is an effective tool for not only teaching business concepts, but developing a wide range of professional skills as well. Case studies offer students the opportunity to enhance their presentation, writing, teaming, critical thinking, and time management skills. When used as part of a case competition, the case study also offers the opportunity for networking with business executives. This paper provides a detailed look at one school's development and execution of a mandatory junior year case competition that plays a key role in developing such skills. Such a competition is part of an integrated four-year backpack-to-briefcase program.

Keywords: case study, professional development, case competition

INTRODUCTION

Business schools, in general, do an adequate job of preparing its students for the technical demands associated with a variety of professions. However, most schools do not focus as much on the professional development needs of its students. As such, there is a need to include professional development activities as part of the business school program (Bisoux 2002), (Moore 2007), (Dvorak 2007), (Rubin 2009), (Korn 2011), (Wiseman 2013), (Murray 2014), (Hardy 2014), and (Mind Tools 2015).

Professional development activities are designed to help students successfully navigate from being a student to being a business professional, from carrying a backpack to carrying a briefcase. Such activities could include choosing the right major, exposure to a variety of business careers, professional writing and presenting, creating a resume, effective interviewing, professional etiquette, networking, and teamwork.

This paper provides a brief summary of an integrated, four-year professional development program at a BusinessWeek top-ranked undergraduate business school. The paper will then focus on the third-year of the program, a mandatory case competition, including details on the development and execution of such a competition.

THE VILLANOVA SCHOOL OF BUSINESS BACKPACK TO BRIEFCASE PROGRAM

In response to the need to enhance the soft skills of its undergraduate students, and armed with the knowledge gained from the experiences of other schools such as South Carolina State (Jamison 2010) and Oakland University (Majeske 2009) which have attempted to integrate professional development into the business school curriculum, the Villanova School of Business (VSB) developed an integrated professional development program known as Backpack to Briefcase (B2B) (Borden, 2015).

B2B is an innovative program, integrating professional development into the core business curriculum throughout a student's four year academic program. B2B augments students' participation in traditional academic courses, providing holistic preparation for success and leadership as business professionals. Integrating career and professional development concepts into the VSB curriculum fosters a thoughtful approach to preparing for life after graduation. B2B is administered by the Clay Center at VSB, in collaboration with VSB faculty. The Clay Center staff plays a key support role within the business school, serving as advisers to students on a variety of issues such as course selection, internship opportunities, and other administrative matters.

Each year of the B2B program, students are presented with opportunities to learn and develop professionally. Table 1 provides a summary of what each year of the program entails.

Table 1: Outline of B2B Program

<p>Freshman Year: Assessing the Environment <i>(required; embedded in Business Dynamics course (fall semester) plus 1-credit, stand-alone course (spring semester))</i></p>	<p>Professional Development Component Each semester, students participate in and reflect on professional development activities related to exploration of majors, college planning, career exploration and professional skill building. Critical written communication techniques are developed. Additionally, each student crafts a professional resume and participates in a networking etiquette workshop, “The Art of Mixing and Mingling.”</p>
<p>Sophomore Year: Defining and Implementing Your Strategy <i>(required 1-credit, stand-alone course)</i></p>	<p>Professional Development Seminar In the fall or spring semester, VSB sophomores participate in a one-credit seminar focusing on interviewing skills, the internship/job search process, ethics, networking, business etiquette, etc. Throughout the semester, opportunities to interact with alumni/employers are presented.</p>
<p>Junior Year: Gaining a Competitive Edge <i>(required 1-credit, stand-alone course)</i></p>	<p>Case Competition In the fall or spring semester, VSB juniors participate in an internal case competition. Written and verbal communication skills, business research methods, analytical skills, team dynamics, and leadership are integrated throughout the competition.</p>
<p>Senior Year: Capitalizing on Your Investment <i>(voluntary)</i></p>	<p>VU Seniors Program VSB partners with the university-wide VU Seniors Program - a series of social, professional, and spiritual activities designed to unify the senior class while preparing them for life after graduation.</p>

This paper will take an in-depth look at the junior year case competition, including the planning and execution of the competition.

WHY A CASE COMPETITION?

Bruner (1999) provides an overview of the many benefits of using the cases at both the graduate and undergraduate level, along with useful tips for educators contemplating the case method approach.

Prior research studies support the positive learning outcomes associated with case study competitions (Menna, 2010), (Corner, 2006). Maier-Lytle (2010) notes that case study competitions ‘. . . provide competitors with opportunities to gain specialized knowledge, improve communication skills, develop a sense of teamwork, and heighten their chances in the job market’.

Galloway (2013) argues that case study competitions constitute an ideal pedagogical strategy for achieving the objective of equipping graduates with the knowledge and skills that are increasingly needed and valued by business in an effective and efficient manner, with resulting benefits for both students and employers.

Kunselman (2004) notes that the case study method helps students develop problem-solving, critical reasoning and analytical skills, all of which help prepare students to make better decisions and become better students and ultimately better employees. The authors also note that case competitions in particular provide an opportunity for students to work in self-directed teams, a situation they will likely encounter after graduation.

The use of case studies can also be beneficial from an accreditation perspective. Credle (2009) suggests that the combination of case analysis training, followed by a case competition, develops important student competencies and skills and that the data gathered from such activity outcomes can be used to assess the quality of the educational delivery system of the school.

Stone (1981) offers additional benefits associated with a case competition. The use of judges from industry assists in the reinforcement of the interchange between universities and industry, as well as potential financial support of the project. Such judges are often impressed with the seriousness, effort, and ability of the students. Including faculty in the competition may foster an interchange of ideas and techniques regarding pedagogy and research.

Given the many benefits of cases, and case competitions in particular, it was decided that the capstone phase of the Backpack to Briefcase program would be a junior year case competition.

VSB3000: A MANDATORY JUNIOR YEAR CASE COMPETITION

VSB 3000, the third phase of the VSB B2B program, requires all students to participate in a team-based case competition in either the fall or spring semester of their junior year. Students are assigned into teams and challenged to analyze and solve a case. There are three rounds of competition. Winners will advance from each round and ultimately to the final where a winning team will be selected. In addition, students prepare and submit individual executive summaries that describes their solutions.

Preparation for Case Competition

To prepare for the competition, students register for a one-credit course that prepares them for the competition. The focus of the class meetings are as follows:

Case Analysis: Over a few sessions, an approach to case analysis is discussed and practiced. Case analysis is an important skill for upper level classes and leads to better analysis and decision making. Instructors focus on tools and techniques that can be used in case analysis and problem solving. An actual case is analyzed in class as a hands on application.

PowerPoint: This session is designed to improve students' ability to craft a business friendly, professional quality PowerPoint deck.

Presentation Skills: In this session, the important elements of delivering a professional presentation are reviewed. In addition to general presentation skills, a particular emphasis is put on presenting as part of a team.

Professional Business Writing: The goal of this session is to hone students' writing skills, particularly as it relates to producing effective business documents. An executive summary is required from the students at the end of the course and this session prepares them to do this.

In-Class Presentation: This session is designed to allow students to do a low stakes "dry run" in class before the actual competition. Students are assigned to teams and challenged to develop a presentation based on the case that was previously discussed in class.

Also, given that networking is one of the goals of the program, students are required to submit a resume. Those resumes are put into a digital book which is distributed to the competition judges.

The Competition

The Bartley briefCASE Challenge kicks off on a Wednesday and continues through the end of the day on Saturday; students need to be available during this time to work with their teams. While there will be inevitable class conflicts between Wednesday and Friday, students are asked to keep their schedules open otherwise to be available for working with their teams. Instructions and rules for the competition are handed out at the kickoff in addition to being posted online. It is during the kickoff that students learn who their teammates are and what case they will be working on.

Prior to the kickoff, students are sorted by major and then randomly assigned to teams. Each team is targeted to have 4-5 students. Each team should end up with some diversity in the majors of the students.

On the day of the competition, there are three rounds.

Preliminary round: Teams are divided between 12 different judging rooms with 4 teams presenting in each room. The 12 top performing teams from this round advance on to the...

Semifinal round: Teams are divided between 4 different with 3 teams in each room. The top four performing teams advance on to the...

Final round: The four teams left standing present to a judging panel who picks a winner and a runner up.

The winning team receives \$500 for each team member. The team that finishes in second place receive \$250 for each team member. The team members of the other two finalist teams receive \$100 a piece.

Each presentation can be no longer than 15 minutes followed by 10 minutes of Q&A. Each team member is required to have a speaking role in the presentation. Teams receive feedback from the judging panels at each round in the competition.

The judges consist of members of the various business school advisory boards, faculty, and friends of VSB. This offers the judges an excellent opportunity to reconnect or remain connected with VSB and to get to know the students. After each round, a social event is held to encourage networking between the students and the judges.

Please see Appendix A for a detailed schedule of the course and the competition.

Executive Summary

The last part of this course is for each student to write an executive summary of his or her team's solution to the challenge. This document should represent individual student's work and is not intended to be a collaborative team project. Students submit their assignments through Blackboard on or before the posted deadline.

A prompt and rubric are included with the materials handed out at the competition kickoff and posted on Blackboard. See Appendix B for a copy of the rubric.

Peer Evaluation

Since the focus of this experience is the team competition, it is expected that all team members will contribute roughly equal effort and that all members will receive the same grade for their team's performance. At the end of the competition, each team will evaluate the contributions of each member of the group, using a customized version of TeamHelper.

TeamHelper consists of seven instruments and guides that can be used individually or collectively at each stage of the team process. It includes:

The Instructor's Overview and Team Effectiveness Presentation provide information on how to create and structure a dynamic team development experience for students.

The Team Charter Guide offers advice on how to create a working agreement for the team that spells out expectations, norms and roles for team members.

The Team Personal Styles Inventory (T-PSI) gives students insight into their own personal styles of behavior and how they can be most effective with that style in their teams.

The Team Feedback Survey (TFS) enables individuals to understand how their own self-perception compares with the perceptions of their teammates on two critical categories of team-related behavior.

The Feedback Review Session (FRS) provides a framework to do a self-managed peer review of team process and individual contribution and effectiveness.

The Individual Contribution Scale (ICS) provides instructors with an assessment of the contributions of all team members.

Articles & Reference Materials offer information related to the development of team effectiveness.

Professors obtain access to the TeamHelper set of products by first registering and then setting up its usage. Students then register through the TeamHelper web site, and are charged \$4.95 for a two-year license. Students will be able to access their TeamHelper accounts for an unlimited number of courses within that 2-year time period (from the [TeamHelper](#) web site).

The key component of TeamHelper that is used for the case competition is the Team Feedback Survey, which enables each student to complete a self-assessment and receive feedback from other team members on a set of behaviors. In addition to the survey, students identify top strengths and development areas for each team member in an open-ended response section. To be considered complete, feedback must be complete for all team members

including themselves and it must be professional, balanced, and constructive. See Appendix C for a sample report (courtesy of TeamHelper).

The results of this feedback are evaluated and if appropriate, individual grades are adjusted. Students who don't engage and participate may end up with a failing grade for this course even if their team performs well if they did not adequately contribute to the team effort.

Grading

The course grade is based on the following components and allocations:

In Class Presentation	10 %
Resume Submission, Participation, and Attendance	5 %
Team Case Analysis & Presentation (shared team grade)	65 %
TeamHelper (potential deductions – see above)	TBD
Executive Summary (individual grade)	<u>20 %</u>
TOTAL	100 %

CONCLUSIONS

There is a need for business schools to meet both the academic and professional needs of its students. While the majority of schools do an acceptable job developing the academic skills of its students, the same cannot be said for developing their professional skills.

This paper looked at one such program, the Backpack to Briefcase (B2B) program at Villanova University's School of Business, and in particular its junior year case competition. The paper includes an overview of the B2B program, as well as the details of the junior year case competition. It is hoped that faculty and administrators will find the information useful in developing professional development programs at their schools.

One benefit of the case competition worth noting is that it allows us to evaluate all of our students reasonably consistently. Given that all students have to be part of a team presentation and turn in an individual executive summary, we can evaluate all of them on their presentation and writing skills using the same prompt and rubrics at roughly the same point in their college career. Such evaluations can be useful for accreditation purposes.

Appendix A: Schedule for VSB3000, Fall 2017

<i>Date</i>	<i>Topic/Activity</i>	<i>What's Due</i>	
<i>Class Sessions</i>			
Aug 28	Course Overview, Case Analysis		
Sept 4	NO CLASS – LABOR DAY		
Sep 11	Building A Business Case	Assigned Reading	
Sep 18	Case Discussion	Read and Prepare Case	
Sep 25	Preparing a PowerPoint – Nick Maglio		
Oct 2	Delivering a Presentation – Tom DeMarco		
Oct 9	NO CLASS – FALL BREAK		
Oct 16	Presentations/Feedback	Team Presentations	
Oct 23	Presentations/Feedback	Team Presentations	
Oct 30	Business Writing – Cathy Toner		
Nov 1 – 4	<i>Bartley briefCASE Challenge</i>	See below	
Nov 6	Debrief		
<i>Other Important Dates</i>			
Oct 4	Resume	Resume made “visible” in Handshake by 11:59 PM	
Oct 20	WX Deadline for this class	Please note that it is before the normal WX date!	
Nov 8	TeamHelper	Feedback due for teammates by 11:59 PM	
Nov 10	Executive Summary Help Session	Writing coaches available between 2:30 to 4:30 PM in Bartley 1063	
Nov 15	Executive Summary	Documents due - Blackboard dropbox by 11:59 PM	
<i>The Bartley briefCASE Challenge</i>			
<i>Date</i>	<i>Time</i>	<i>Location</i>	<i>Event</i>
Nov 1	5:30 – 6:00 PM	Driscoll 132	The Bartley briefCASE Challenge Kickoff
Nov 1 – 4			Team Analysis and Presentation Preparation
Nov 4	9:30 AM – noon noon – 1:00 PM 1:30 – 3:30 PM 3:30 – 4:30 PM 5:00 – 7:40 PM 7:40 – 8:00 PM	Bartley Classrooms Curley Exchange Bartley Classrooms Nydick Fam Com Bartley 1010 Nydick Fam Com	Preliminary Competition Round Luncheon for judges and all competitors Semifinal Competition Round Reception for judges and semifinalists Final Competition Round Award Ceremony & Reception

BARTLEY BRIEFCASE CHALLENGE
VILLANOVA SCHOOL OF BUSINESS
EXECUTIVE SUMMARY RUBRIC

STUDENT NAME: _____

THESIS DEVELOPMENT/INTRO/CONTENT

- 0-1 point: Position is vague and illogical and lacks thesis and supporting details; little evidence of appropriate content. Document fails to adequately communicate a position or rationale.
- 2 points: Paper takes an apparent position supported by adequate detail and/or source material; some vagueness; material is appropriate but may lack a clear connection to purpose.
- 3 points: Paper takes a clear position supported by logical detail; all key points are addressed; material is clear, relevant, and accurate.

Points: _____

CLARITY & COHESION

- 0-1 point: Sentence structure and word choice make reading and understanding difficult.
- 2 points: Sentence structure and word choice sometimes interfere with clarity.
- 3 points: Sentences are structured and words are chosen effectively to communicate ideas clearly.

Points: _____

ORGANIZATION

- 0-1 point: Organization is unclear; paragraphs are incoherent or underdeveloped; transitions are missing; sequence of ideas is difficult to follow. Document lacks formatting options that would appropriately cue the reader.
- 2 points: Organization is generally clear; the sequence of ideas may be difficult to follow; some duplication of ideas or information may be present
- 3 points: Organization is logical; paragraphs are unified and coherent; transitions are effective; easy to follow sequence of ideas; little or no duplication of ideas or information. Bullet lists, headings, and other formatting options are employed to assist in reviewing the document.

Points: _____

SPELLING, GRAMMAR, SYNTAX, PUNCTUATION

- 0-1 point: Writing contains numerous errors in spelling and/or grammar.
- 2 points: Writing contains few errors in spelling and grammar.
- 3 points: Paper follows normal conventions of spelling and grammar and has been carefully proofread; virtually no errors.

Points: _____

Total Points: _____ /12 possible points

Signature: _____

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Teaching Oral Communication Skills: An Example of an Inspiring Communication Course Using Interactive Workshop Style Pedagogy

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ABSTRACT

Communication skills are known to be the most important skills that all business students must acquire before they graduate. Of the most desired communication skills, oral and listening skills are ranked highest by employers of new graduates. While most business programs include a required course that teach and develop communication skills, very little has been reported about effective course content and pedagogy in teaching oral and listening skills. This paper presents an MBA core communication course experience in which the interactive workshop style pedagogy has generated a transformative learning experience while effectively teaching oral and listening skills.

Keywords

Communication Skills, Oral Communication, Presentation, Listening, Soft Skills, Self-Awareness, Empathy, Open-mindedness, Engaged Learning, Interactive Learning, Workshop Style, Communication Feedback, Communication Pedagogy

INTRODUCTION

The purpose of business education is to equip students with knowledge and skills that help them succeed in the workplaces they join after graduation. Of the important skills that business students should acquire, communication skills have been noted to come before others such as leadership, critical thinking, strategic thinking, and research. As such, most business programs regard communication skills as one of the key, if not the most, important skills that all MBA students should develop before graduation.

The importance of communication skills in work places has been well-documented over the years (Lee, 2006; Walker et al., 2011; Heffernan et al., 2010; Montoya et al., 2010; Sherman, 2011; Lee, 2012; Ghannadian, 2013; GMAC, 2014). According to a recent survey, employers consider communication skills the most important over teamwork, technical, leadership, and managerial skills when hiring recent business grads for a mid-level position (GMAC, 2014). In order of their importance in the workplace, employers ranked communications skills, on average, twice as important as managerial skills. The top four skills employers seek in new hires are communications-related: oral and listening skills are ranked first and second-highest, followed by written communication, presentation skills, and fifth-ranked adaptability, a teamwork skill (GMAC, 2014).

In as much as there has been widely noted importance, most business programs strive to help students develop and improve communication skills during their business education journey in the program. Therefore, the issue is not about whether or not communication skills should be taught but about how to teach them effectively. In most cases, business programs teach communication as part of the required core course curriculum and in others, as part of co-curricular programs in the form of workshops (e.g., Harvard, Columbia, Stanford). While one can deduce a program's structural approach to teaching communication by looking at the list of core courses in the curriculum, it is difficult to gauge pedagogical approaches to teaching communication skills and their effectiveness – especially in teaching oral and listening skills (GMAC, 2014).

In search of the ‘what’ and ‘how’ of teaching and learning communication skills, one must be mindful about the course content and pedagogy that can bring the desired learning outcome out of students. Consider, for example, a student who is uncomfortable speaking in public due to a lack of confidence, language mastery, etc. In this case, the instructional goal is to help the student develop/improve presentation skills. It is imperative that the student's concern about his/her communication barrier and lack of confidence would have to be addressed in order for the student to fully benefit from presentation skills acquired in the course.

Achieving behavioral learning should be included as the desired learning outcome when it comes to teaching ‘skills’. In other words, cognitive learning (i.e., knowing about presentation skills/tips) is necessary but incomplete unless it is followed by action behavioral learning (e.g., effectively delivering presentation). When it comes to

carrying out learned communication skills, personal psychological barriers may act as hidden obstacles that hinder productive use of learned skills in oral communication. Addressing the barriers and creating a safe and encouraging class environment become an important foundation for landing behavioral learning outcome of oral and listening skills.

In search of communication pedagogy, one turns to the Interaction Model of Communication, which offers insight into an important pedagogical element in teaching oral and listening skills. According to the model, communication is a two-way process in which participants alternate positions as sender and receiver and generate meaning by sending and receiving feedback within physical and psychological contexts (Schramm, 1997). In this view, teaching and learning of communication skills must take into consideration the interactive nature of communication and utilize feedback as part of required exercises as much as possible.

Feedback is very important in developing and improving communication skills and must be emphasized in designing communication pedagogy. Especially in teaching oral communication skills, a behavioral rather than cognitive outcome should be the goal. Communication courses should aim at providing an experience that shows results of behavioral change/improvement utilizing feedback to engage students and create supportive and encouraging environment that motivates and helps students develop confidence. This is a necessary condition to accomplish the behavioral learning outcome of improved oral communication and listening skills at an individual level. While business programs widely emphasize the importance of oral communication skills in the core curriculum, little has been reported to share effective pedagogy and course example in teaching oral communication skills to business students.

The purposes of this paper are to present the experience of teaching communication skills – with emphasis on oral and listening skills—to MBA students and to report the effectiveness as perceived by students as well as their performance in the assessment of the program learning outcome. The details of the course, the format, the materials and exercises, and the results of the course in terms of student impact and learning experiences are reported in the following sections.

THE COURSE AND LEARNING EXPERIENCE

The Course

The focus of the course, Managerial/Leadership Communication, is to develop and improve MBA students' leadership communication skills with an emphasis on oral and listening skills. The course uses lectures, review of articles, reading of a text book and analysis of real life business cases in managerial and leadership communication. The lectures cover the major concepts and analytical tools focusing on illustrating the application of concepts and analytical tools. The course takes behavioral approaches and uses assignments and activities that help students apply concepts and tools in developing and improving their skills to understand, connect, listen, tell stories and give presentations. With the goal of achieving behavioral learning, the course utilizes intensive feedback and is designed to be extremely interactive.

Every class meeting begins with a student-led Jump Start Meeting exercise. The purposes of this exercise is to set the tone and engage students by giving ownership of the course to students. The class progresses with lecture and discussions and exercises on the discussed communications tools. Students are often expected to move around to work in pairs or teams and are often expected to present at a moment's notice. All course assignments are created to allow them to translate the conceptual knowledge into actual practice. The course also uses extensive coaching. The instructor brings 5-6 experienced coaches to guide small group communication exercises. The second half of the three and a half hour class meeting usually goes into break out session of small group practice of listening, story-telling, feedback and coaching. The shared belief that guided the development and management of the course was that the best way to learn about anything is to practice it. As such, the course was designed to achieve the purpose of providing interactive learning by practice with ample opportunity for feedback and correction, focusing on behavioral learning of developing oral, listening, and story-telling skills.

Course Learning Outcomes

The course was intended to achieve a number of student learning outcomes related to communication skills. Upon successful completion of the course, a student is expected to be able to:

Understand and apply managerial communication concepts

Write effective managerial communication documents including memos and letters.

Analyze and present complex managerial communication cases within local, national, and international contexts.
Describe and apply oral managerial communication skills.
Describe and apply effective interpersonal communication skills in areas such as listening, teamwork, and interviewing.
Describe and apply effective small group (team) communication strategies in areas such as managing conflicts, and negotiation.

Textbooks and readings

The course used books and articles to support the lecture and to facilitate the discussion and understanding of concepts and analytical tools. They include the following:

Resonate – Nancy Duarte

Leadership Presence – Kathy Lubar (et al)

Art of Possibility – Benjamin Zander

Article: Storytelling that Moves People

<http://web.mit.edu/tibbetts/Public/Storytelling%20That%20Moves%20People.pdf>

Article: Discovering Your Authentic Leadership <http://www.aawccnatl.org/assets/authentic%20leadership.pdf>

As shown in the list of books and articles, the course uses non-conventional reading materials to establish the context for tools learning and skills exercises.

Course Assignments and Activities

The course utilizes many homework assignments and in-class activities, all of which are intended to provide facilitative and interactive learning experiences and feedback opportunities. The following presents four major assignments that are highly valued by students:

Soul Portrait: Illustrate (with drawings or magazines picture clippings) a white envelope (approx. 9”x11.5”), that illustrate symbols of a student’s strengths and values. Write the student’s name on the inside flap and illustrate on the side with the flap. Also turn in a written 1 page, single space. 1” borders, 11pt font. Answer the following questions:

This is what I want you to know about me.

My deepest fear?

My Communication Goal for this course is...

What’s holding me back?

Purpose: to facilitate self-reflection in depth; encourage understanding of self, openness, and sincerity; to help students overcome self-induced communication barriers.

“Curtain Up / Curtain Down” stories and presentations: Partner up with a classmate and share a story based on the in-class parameters. Prepare to spend a minimum of ½ hour prior to the next class. Presentation in the next class.

Purpose: build listening skill through the active listening exercise; develop story telling skill by telling their story to their exercise partner and help them tell their story others based on what they heard; develop empathy; develop a skill to connect with others

RIVER of LIFE on a Poster board and Presentation in class: Identify major life events that had major impact on the student in the course of the student’s life to this date on a white Poster Board minimum 20”x30”. Each student gives his/her presentation in a story telling format going over the poster board. Students are required to turn in note of appreciation to each student in the next class.

Purpose: Understanding of self; understanding of others; facilitate openness and confidence building; develop story telling skill.

Final Paper – Write a 5-6 page paper about the 3-4 topics that moved students during the course and how the students going to incorporate them into his/her life. Should be in single space. 11 pt. font, 1” margins. Depth and authenticity are desired.

Purpose: To reinforce the learning experiences of the student as they deem valuable to them; to understand the

impact of the course on teaching communication skills to MBA students.

In addition to aforementioned major assignments, the course also uses the following assignments to facilitate self-reflection and to help build confidence in giving presentation:

Giving MYSELF an “A” assignment

Prepare a 5 slide PowerPoint on an idea or topic or cause that the student is passionate about

Why I Got an “A”

Appendix I illustrates a detailed course schedule outline showing the context in which these exercises are assigned including the relevant reading and course activities.

Other Class Activities:

The class uses many interactive activities and exercises in class. Throughout each class, students experience other interactive activities appropriate for the day’s course topic/agenda and are often required to change seats and rotate partners and group members. For example, they may include practices of eye contact, voice tone, body gestures, presentation of opposite views, etc. It is noted that, a flexible classroom with movable tables and chairs, is needed to support the rotating, stand up, interactive in-class activities. The class also utilizes several activities to help students develop and reinforce positive attitudes of a leader, including the following:

Random Acts of Kindness Activity

Gratitude Letter Exercise

Count Your Blessings Assignment

A note of appreciation to each student on the River of Life presentation.

“Best Possible Self” Activity

Forgiveness Activity

As to the structure and the organization of the course, Appendix I illustrates the course schedule outline. As shown in the appendix, the course schedule presents how the lecture, reading, activities and assignments are woven together to offer the desired flow of the course experience in a ten-week course schedule, operating in a quarter system.

CONCLUSION

The Impact of the Course

The course has been extremely successful in teaching oral communication and listening skills to MBA students in the program in discussion. The interactive workshop style pedagogy coupled with course contents has proved to be effective in teaching students not only oral communication skills but also other soft skills and attitudinal skills that are foundational for being an effective communicator. Such attitudinal components may include openness, empathy, positive mindset, and confidence.

Student Learning Outcomes

The program’s outcomes assessment data shows that students exceeded benchmarks established for the goal of demonstrating advanced oral communication skills. A couple of external evaluators assessed student presentations using the advanced oral communication rubric that looks to students’ ability to “demonstrate proper use of Content and structure, Voice quality and pace, Mannerism and Body language, Professionalism and appearance, and Rapport with audience and use of media.” The program set the overall proficiency benchmarks at 75% of students either Meeting or Exceeding expectations. The assessment reports show that 96% of students either met or exceeded overall performance expectation in 2015 and 100%, in 2016. With an exception of the component ‘Voice quality and pace’ students performed well in all rubric components according to the most recent assessment report (CSUEB MBA Outcomes Assessment Report, 2016)

Student Evaluation of the Course

In addition to delivering the intended learning outcomes, the course has shown to generate phenomenal student responses in both formal and informal observations. Since its inception in Spring 2014, the quantitative student evaluation of the course has been consistently over 3.9 on a 4 point scale where 4 being the highest score depicting “outstanding.” The qualitative student responses have been predominantly and consistently positive over the years. Students’ written comments indicate that the course not only taught them communication skills but also provided them a life changing, transformational learning experience. The vast majority of the students testify that this was one of the very few, if not the only, course that they looked forward to coming to the class each week and that they would like to take more of the similar course that would help them continue on with the path of learning experience

action-encouraging and feedback-packed course materials, assignment, and approaches that resulted in such phenomenal life changing, transformative learning experience while effectively teaching MBA students oral communication skills.

In retrospect, a number of key components are worth noting as they are responsible for the exceptionally successful course. They include the focus on behavioral learning, frequent feedback and coaching, interactive workshop style of course management, engaging course materials and exercises, engaged students, and an inspiring instructor. Most importantly, the role of the instructor is critically important in creating a trusting learning environment in a feedback intensive course in which students need to willingly engage to open oneself to evaluations, comments, and suggestions from others in public. Therefore, the instructor's ability to build 'trust' in the course is of critical importance in generating the desired impact of the course. Instructors teaching oral communication and listening skills are encouraged to practice the effective elements used in the Managerial/Leadership Communication course.

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Appendix I: Course Syllabus Managerial Communications (Leadership)

This class will encompass the predominant forms of Managerial (Leadership) Communications with intensive feedback:

Materials: 1 white Poster Board minimum 20"x30" for River of Life Exercise

Books/Articles:

Resonate – Nancy Duarte

Leadership Presence – Kathy Lubar (et al)

Art of Possibility – Benjamin Zander

Article: Storytelling that Moves People

<http://web.mit.edu/tibbetts/Public/Storytelling%20That%20Moves%20People.pdf>

Article: Discovering Your Authentic Leadership

<http://www.aawccnatl.org/assets/authentic%20leadership.pdf>

Upon successful completion of this course, a student will be able to:

Understand and apply managerial communication concepts

Write effective managerial communication documents including memos and letters.

Analyze and present complex managerial communication cases within local, national, and international contexts.

Describe and apply oral managerial communication skills.

Describe and apply effective interpersonal communication skills in areas such as listening, teamwork, and interviewing.

Describe and apply effective small group (team) communication strategies in areas such as managing conflicts, and negotiation.

Grading:

Active Participation: 20%. 8% for attending on time, (1/2 point deducted if coming in late – 6:31pm) 8% for active and positive contribution, 4% for participating in Positive Psychology Exercises and filling out surveys before deadline.

Assignments: 30%: 15% for professionalism and grammar, 15% for depth and critical thinking

Final Essay; 50%: 10% for professionalism and grammar, 40% for depth and critical thinking

Course Outline:

Orientation and baseline

Introductions

Class overview & Instructor expectations

The Soul of the Leader

Connection with Self

Connection with Purpose

Connection with our Past

Unconditional positive regard

Fundamental Communication Skills

Theater Skills, Martial Arts, Cross Cultural Anthropology & Positive Psychology

PERMA

HOMEWORK: Soul Portrait: Illustrate (with drawings or magazines picture clippings) a white envelope (approx. 9"x11.5"), that illustrate symbols of your strengths and values. White your name on the inside flap and illustrate on the side with the flap. Also turn in a written 1 page, single space. 1" borders, 11pt font. Answer the following

questions:

This is what I want you to know about me?

My deepest fear?

My Communication Goal for this course is?

What's holding me back?

I'm looking for depth, self-reflection and authenticity in your paper. Superficiality is not interesting and is a waste of your and my time. (10 points)

READ: Leadership Presence & Do Random Acts of Kindness Activity (1 point) – Assignment will be sent after first class.

Personal Communication Skills – the Fundamentals of Communication ***

Jump Start Meeting Jump-Start Meeting

Warm-up

How was our Work Yesterday?

What's our goal for Today?

Appreciations/Acknowledgements/Apologies

Inspirational Story

Interactive activities – 4 Universal Communication Skills

Being Present

Paying attention to what has heart & meaning

Telling the truth without blame or judgment

Being open to outcome, not attached outcome

How to have a difficult conversation – giving feedback

Present your "Soul Portrait:" Envelopes

Giving MYSELF an "A" assignment (10 points) – instructions in class. Due next class meeting

READ: The Art of Possibility - Do Gratitude Letter Exercise (1 point) instructions given after class.

The Fundamentals of Persuasion

Jump Start Meeting Jump-Start Meeting

Influence Principles

Quiz

Video

Electronic Communications

PowerPoint strategies

Homework- Prepare a 5 slide PowerPoint on an idea or topic or cause that you are **passionate** about. Due next class meeting

READ: Resonate & Do Count Your Blessings Assignment (1 point)

Leadership Communications ***

Jump Start Meeting

Business Passion Speech I

Preparation for next class Curtain Up / Curtain Down stories - partner up with a classmate and share a story based on the in-class parameters. Prepare to spend a minimum of ½ hour prior to the next class.

READ: Story Telling that Moves People

Leadership Presence ***

River of Life Introduction

READ: The Story Factor Chapters 6-9

***HOMEWORK: ***

“Curtain Up Curtain Down” presentations

Start RIVER of LIFE - due in 2 weeks

***Homework ***– Watch the Last Lecture (YouTube) - What moved you? What did you take away? 1 page, single space 11pt font, 1” margins. Due next class. (10 Points)

Empathy - The Art of Giving and Receiving Feedback

Jump Start Meeting

What Works – What Needs Work

Developing a Positive Mindset Activity

Presentation of your River of Life ***

Jump Start Meeting

River of Life Presentations

HOMEWORK: River of Life DUE

Forgiveness Activity (1 Point)

***Turn in note of appreciation to each student in the class.

***HOMEWORK: *** Why I Got an “A”, 1 page, single space, 11pt font, 1” margins due Nov 14 - “Best Possible Self Activity”

The Dynamic Storyteller: Communicating through Story

Jump Start Meeting

Neuroscience of effectiveness

Continue – Presentation of River of Life

Forgiveness Activity

Final Paper – due finals day – Write a 5-6 page paper. Depth is MUCH MORE important than a mere recounting of the activities we did in class. What I want to read is the 3-4 topics that moved you AND how you’re going to incorporate them into your life. Single space. 11 pt. font, 1” margins - Due finals day via e-mail by 11:59pm

Notes: *Due at START of class. No make-ups, extra credit, or late work. Attendance & active participation are expected. ½ credit for attendance & participation that day if you come in after the start of class (6:31pm). No credit for the day if you are an hour late.

Blue Ocean MBA's in The Era of Wicked Problem Disruption From Automation, Robotics, & Artificial Intelligence

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ABSTRACT

Unprecedented disruptions in the U.S. economy are occurring because human capital can be replaced with automated technologies, robotics, and artificial intelligence (AI). These seismic changes have allowed many firms to produce the same number of goods and services using far fewer workers. Because of the pace at which machines can replace human capital, the authors recommend consideration be given to a “Blue Ocean Strategy” that would significantly change the content and structure of existing MBA programs. Specifically, the authors believe streamlined MBA course curriculums would provide more room for a “Wicked Problem” emphasis on disruption from highly automated business environments.

Keywords: Automation, Blue Ocean Strategy, Disruption, Higher Education, MBA, Robotics, Technology, Wicked Problem.

INTRODUCTION

Technology and automation have advanced dramatically in recent years and changed the global economic landscape. Firms now have new ways to replace labor with automated processes and robotics. Because the influence of labor has changed significantly, new business challenges and opportunities are more widespread than ever. In turn, this is creating unprecedented challenges and opportunities for higher education. This paper will explore what colleges and universities may need to consider to survive and to assure that their MBA programs are relevant to meet the demands of society. It is critical in this new environment that students are prepared to meet the challenges of tomorrow's employers who will depend heavily on investment in automation, robotics, and artificial intelligence (AI).

Should MBA providers consider using a “Blue Ocean Strategy” to differentiate their programs and pursue new markets? After all, discussion of Blue Ocean Strategy (BOS) is common in current MBA strategy courses. The old adage “practice what you preach” should apply to MBA programs. Yet, most MBA programs today appear to be homogenous and compete heavily with each other with only marginal differentiation. The irony of MBA providers that teach extensively about the value of Blue Ocean Strategy, but rarely follow the strategy themselves is counter intuitive.

Blue Ocean Strategy (BOS) was developed by Chan Kim and Renée Mauborgne. They noted that companies are inclined to pursue a strategy involving head-to-head competition in pursuit of continuous growth and profits, especially in industries that are overcrowded or seeing declining market share. The outcome is a bloody red ocean of competitors (i.e., “settlers”) battling over dwindling profits (Kim & Mauborgne, 2005). Blue Ocean Strategy dares companies to discontinue the red ocean of bloody rivalry by creating market spaces, in a blue ocean, that are more pristine and uncharted (Kim & Mauborgne, 2005). Nobody would argue that most MBA providers currently operate in a crowded market with programs that are largely homogeneous in content and structure. A BOS provides a mechanism for MBA providers to differentiate their programs and tap into the many new markets affected by automation disruption.

DISRUPTION TRENDS IN HIGHER EDUCATION

Academic institutions are facing many challenges that threaten their continued viability. Three financial trends impacting this situation are decreases in funding, rising costs, and tuition increases. Neuman (2017) reports that over the past decade, due to intense economic pressures, funding for state schools experienced a reduction ranging from

30-45 percent. At the same time the cost of providing higher education has risen.

Most colleges have reacted to increased costs and budget cuts by increasing tuition. In the last decade, after controlling for inflation, tuition has increased for public institutions by 34 percent while private, non-profit institutions have experienced a 25 percent increase (Neuman, 2017). With increases in family income significantly behind increases in tuition, additional increases in tuition may be difficult to afford. Many Americans are left wondering if a college education is really worth the cost.

Another trend is the shrinking number of students enrolled in colleges and universities. The National Student Clearinghouse Research Center (2017, May 23) reported that the number of students enrolling in colleges and universities nationwide has dropped consistently since 2012. They indicated that 2017 has been the worst year in the last five years. As the market diminishes, many colleges and universities will fail and some have already failed. The National Center for Education Statistics (2015, p. 602) reported that one hundred twenty-five colleges and universities closed their doors between 2010 and 2015 and 139 closed in the ten-year period before that. Additionally, Federal Student Aid reported that 538 colleges and universities are under increased government oversight due to financially related issues (Federal Student Aid, 2017). There are predictions of massive failures of traditional colleges and universities in the not too distant future and there are many who believe that the entire system of higher education is in dire need of radical reform (DeMillo, 2015, Harden, 2013, Frey, 2013, & Carr 2012).

Colleges and universities have largely failed to adapt to the changing needs of the twenty-first century. Concerned about this trend, former Secretary of Education, Margaret Spellings, organized one of the highest profile commissions in higher education history. The purpose of the commission was to transform universities so they would solely serve the needs of the market (Neem, 2015). The commission's report "A Test of Leadership: Charting the Future of U.S. Higher Education" (2006) issued the following warning about American higher education:

It is an enterprise that has yet to address the fundamental issues of how academic programs and institutions must be transformed to serve the changing educational needs of a knowledge economy. It has yet to successfully confront the impact of globalization, rapidly evolving technologies . . . and an evolving marketplace characterized by new needs and new paradigms (p. ix).

Thomas Frey (2013), Google's top rated futurist speaker, states that higher education is "slow to adapt and increasingly out of sync with the needs of business and society" (p. 45). We are entering an era where the demand for education will experience significant increases. At the same time, it is ironic that an immense disparity exists between traditional college programs and what consumers of the future will want (Frey, 2013).

THE NECESSITY TO RADICALLY REDESIGN MBA PROGRAMS

The literature is rife with controversy concerning MBA value, with much of it either mixed or indicating little evidence that earning an MBA has a positive impact on salary or career. Arcidiaconco, Cooley, and Hussey (2008) reported that the majority of the returns of MBA graduates were from those attending the top ten or top 25 programs and that the returns outside of the top 25 were quite small. Pfeffer and Fong (2002) found that obtaining an MBA degree contributed very little, if at all, to career success. Conversely, what made a difference in the long run was the graduate's capabilities prior to earning an MBA.

New articles appear frequently asking if an MBA is worth the cost. A growing number of graduates are discovering business schools' hollow promises (Broughton, 2011). Furthermore, Basulto (2015) suggests the following:

Robots could soon move into white-collar and other jobs in the creative industries. In fact, robots could take over nearly one half of all U.S. jobs in a decade or two . . . That has enormous implications for the educational system, which must educate students at a time of tremendous transformation of the workplace (para. 12 & 13).

Automation, robotics, and AI developments are already causing massive disruption in many industries creating never-before-seen problems, but also unparalleled opportunities. For these reasons, institutions providing MBA programs must adjust out of necessity. According to Christenson & Eyring (2011), "To avoid disruption, institutions of higher learning must develop strategies that transcend imitators" (p. XXVI). Today's business leaders need training that incorporates the newest technological advances and future trends where more and more automation will

be the norm. The authors believe automation, robotics, and artificial intelligence are disrupters fueling the necessity to dramatically transform MBA programs. The successful MBA providers of the future will be the ones that can provide insights into these constantly changing technologies. These providers then can show students how to apply this insight in a “real world” environment that develops critical thinking skills. These providers can differentiate themselves by examining Blue Ocean Strategies that fulfill unique market needs and provide significant value.

THE “WICKED PROBLEM” OF “AUTOMATED” DISRUPTION

In many ways, disruption from automation is not new. Machines have replaced human workers even before the Industrial Revolution. What is new is the speed and the complexity of automation, robotics, and artificial intelligence. In light of these technological advances, the future of work as we know it will become increasingly unclear. Large sectors of the economy are poised to be reshaped (Thurgood & Johal, 2017). In the near future, disruption due to technological advances will become “the new normal.” A 2016 report by McKinsey & Company of 800 occupations included a detailed analysis of more than 2,000 work activities and the level to which they are susceptible to automation. The report revealed that automation will not eliminate most occupations completely. However, all jobs will be affected to some extent (Chui, Manyika, & Miremadi, 2016). As the use of artificial intelligence escalates, it will take on more and more difficult and complicated tasks and society will be faced with new political, social, and ethical challenges (Dickson, 2017).

Disruption from automation would certainly fall into the category of a wicked problem. Camillus (2008) describes a wicked problem as a problem that has “innumerable causes, is tough to describe, and doesn’t have a right answer” (p. 100). Classic examples of wicked problems include terrorism, poverty, and environmental degradation. They differ from routine but hard problems that can be solved in a finite period of time through the application of standard methods. Conventional techniques are not successful in tackling wicked problems. Instead, they may exacerbate the problem and create a new set of unfavorable consequences (Camillus, 2008). The disruption caused by automation is an extremely complex problem to solve with no singular solution, which can also be exacerbated if not approached correctly. It will be with us for a long time, and dramatically change the way we live because it will revolutionize the way we work. From a business standpoint, disruption from automation is the mother of all wicked problems.

Some MBA providers currently use wicked problems as a major part of their curriculums. The College of William & Mary, for example, uses the concept of a wicked problem in their online MBA curriculum. In the first course, students are challenged to identify their own wicked problem derived from experiences in their professional or personal lives. Each student continues to work with the problem they identified all the way through the program (Wicked Problem). Other MBA providers may use existing MBA curriculums in combination with a wicked problem as a capstone project for corporate social responsibility purposes or for achieving something good in the public sector. For example, MBA students at the University of California at Berkeley use the wicked problem of the California drought (Bernstein, 2016, January 5).

MBA students enrolled in Said Business School at the University of Oxford (2013, June 25) are engaged in tackling some of the world’s most wicked problems facing policymakers and businesses. According to a 2013 press release the central feature is “a dynamic multimedia platform hosting videos from experts and practitioners, infographics, images, curated content and real-time online debate” (p. 1). Said Business School combines this with face-to-face learning using tutorial groups and scheduled events to spawn new ideas and develop action plans that address big problems that the world is facing (University of Oxford, 2013, June 25).

Disruption from automation is different from other types of wicked problems and is a more significant one for MBA providers. This is because putting aside the wicked problem, business curriculums will need to change anyway out of necessity. Business curriculums will fundamentally change because automation, robotics, and AI will profoundly impact all functional areas of business (Marketing, Finance, Human Resources, etc.). Therefore, the MBA curriculum should be laid out in reverse order with the wicked problem of automation disruption first, followed by the core courses. Institutions may currently use an existing MBA curriculum followed by a capstone course that focuses on a wicked problem (such as poverty). However, disruption from automation as a wicked problem is fundamentally different because automation itself directly impacts the course content in the curriculum. Poverty as a wicked problem may indirectly impact the MBA curriculum. However, automation, robotics, and AI impact the MBA curriculum in a much more direct and profound way. Thus, reverse engineering the MBA program with the wicked problem first is important, followed by the course design necessary to support work on the wicked problem. Starting the MBA program with the wicked problem is important. This will require MBA providers to use a new

out-of-the-box approach or a Blue Ocean Strategy.

Since many MBA providers need to overhaul their programs anyway (because the workplace will look much different from automation, AI, and robotics), a new Blue Ocean Strategy now can assure their MBA program is relevant and useful in the marketplace. Structuring the MBA program with disruption from these technological changes as a focal point is a path forward. There are multiple benefits to be derived from engaging in this type of Blue Ocean Strategy. It has the potential to dramatically transform MBA programs while at the same time providing an extremely valuable societal benefit: mitigating disruption from automation. Such an initiative is a win/win for all parties because it helps society, businesses, and individuals. For many universities, their MBA programs would again be at the forefront of business education.

BLUE OCEAN MBA STRATEGY CONSIDERATIONS TO ADDRESS THE “WICKED PROBLEM” OF DISRUPTION CAUSED BY AUTOMATION

At the core of the massive changes in technology, robotics, and AI is the overriding issue that firms simply do not need as many workers to produce the same number of products or services. Labor costs are just not the concern that they were in the past. This creates enormous societal disruptions and is certainly at the nucleus of what this wicked problem is.

Jon Kolko (2012), the former Vice President of Design at Blackboard and founder of The Austin Center for Design, describes a wicked problem as a “social or cultural problem that is difficult or impossible to solve” (p.10). He attributes this to four problems: (1) incomplete or conflicting knowledge, (2) the number of persons and their various opinions, (3) the large economic burden, and (4) the interconnectedness of the problems with other problems (Kolko, 2012). As an illustration, poverty is connected to education, nutrition to poverty, the economy to nutrition, and so on. Kolko (2012) indicates that these types of wicked problems are usually unloaded on policymakers or dismissed because they are considered too big and cumbersome to address. Yet these are the problems that plague our world and touch everyone. Kolko maintains that by using the process of design, these problems can be mitigated. The process of design “is an intellectual approach that emphasizes empathy, abductive reasoning, and rapid prototyping” (Kolko, 2012).

EXAMPLE OF A NEW REDESIGN APPROACH

In this example of a Blue Ocean Strategy, the authors weigh the MBA curriculum courses, and a wicked problem project each at 50%. Because of reverse engineering mentioned earlier we will look at the wicked problem (the capstone project) first, followed by course curriculum considerations.

Wicked Problem (50%): Because a wicked problem has numerous causes, is difficult to describe, and lacks a right answer or solution, it differs from routine hard problems (Camillus, 2008). Ordinary or routine problems can be solved in a finite period of time by applying standard methods. However, conventional techniques are not successful in solving wicked problems. Instead, they may exacerbate the problem by creating a new set of unfavorable consequences (Camillus, 2008). The disruption caused by automation is certainly a complex problem with no singular solution. This type of problem can also be exacerbated if not approached correctly. MBA providers should carefully design their programs to maximize societal welfare and opportunities for participants. MBA providers should also engage automation disruption in a way that adds value to the firms their students work for as well as the markets they serve and other stakeholders.

Technological advances in the near future are projected to be so pervasive that the effects will bleed over into all industries, professions, and sectors of the economy. For that reason, it is recommended that students focus on how to approach the problem of disruption in a particular industry or segment of the economy. MBA providers could even tailor their program(s) to specific industries and offer areas of specialization to enable students to work together to resolve the wicked problem of adapting to automation. Because this wicked problem is so widespread, individual institutions could specialize in specific areas, avoiding redundancy and head-to-head competition, while adding real world societal value.

MBA providers who specialize in specific areas of the wicked problem of automation not only reduce redundancy but also discourage “red-ocean” competition. Because this wicked problem (automation) is so vast and will be with us indefinitely, numerous approaches will be needed from different MBA providers. Thus, institutions with MBA

programs will have new incentives to break away from competitors and the current homogenous program offerings. Using their own unique Blue Ocean Strategy, they can contribute to tackling the wicked problem in a way distinctive from other MBA programs and consistent with their institution's mission and strengths. The enormous nature of the wicked problem of automation and the length of time society will be dealing with it assures that there will be plenty of "blue waters." MBA providers will have ample opportunities to develop areas of specialization and contribute to the global economy in their own unique way.

Critical thinking skills and creativity: To encourage MBA students to actually think critically and innovatively, Hess (2014) maintains that it "will require MBA students to learn critical and innovative thinking processes and to develop the ability to manage their thinking" (p. 2). Hess (2014) indicates these new skills and abilities are best "learned by doing." Additionally, they need to be done often enough that new habits, behaviors, and ways of thinking are ingrained. Individualized attention and mentoring are important. According to Hess (2014), the level of intensity and day-to-day individualized practice needed to acquire and develop these much needed competencies will require major innovation in the majority of MBA programs. If Hess is correct, future MBA programs will be radically different from current MBA programs. Why not now? This is the time for MBA providers to redesign their MBA programs and provide real world opportunities for their students to learn by "doing" via the wicked problem of disruption from innovation. It is a win-win: MBA providers have relevant programs again at the same time that business and society reap benefits. The heavier weight of the wicked problem in the program (50%) not only allows students to learn by "doing," but also provides a greater chance to develop the new habits Hess mentions.

Curriculum course content in functional areas (50%). Streamlined courses are delivered before working on a wicked problem. An example of what a Blue Ocean Curriculum could potentially look like includes the following areas:

Human Resources in an Automated and Telecommunications World: The rise in the use of automated technologies, robotics, and artificial intelligence may mean many firms will be working with fewer workers. This, in turn, could make outsourcing the heavily compliance based human resources (HR) function more desirable. On the other hand, if the firm decides to maintain the HR function internally, the role of each remaining worker becomes even more important. As fewer workers manage increasingly complicated and automated equipment, the management of those individuals will also become more important as well. These individuals may need a stronger emphasis on the soft skills needed to be effective team members and managers in a very lean organization. They will need to be able to effectively handle more complex problems that have the potential to shut down a major portion of the automated firm. For this reason, they will also need the training and emotional intelligence to work effectively with fewer colleagues to manage robots.

Organizational Behavior in an Automated and Telecommunications World: Radical changes with organizational charts will occur because of fewer workers and even leaner organizations. Organizations will have to become faster and better at what they do to gain competitive advantage. Therefore, managers will have to address problems and challenges that are more complex than in past times. Automation and robotics in the information age have caused organizations to revamp the way people interact and communicate in today's business environment. The need for higher level skills will impact the motivation and training of leadership.

Accounting in an Automated Society: A recent McKinsey study revealed that as many as 70% of tasks have the potential to be automated with next generation technologies (Chui et. al., 2016). The finance function holds great potential for automation. The accounting/finance function of the future will take on a more strategic role in supporting businesses. The focus will be on preparing MBA students to perform more knowledge work that adds value to the business with a greater emphasis on using accounting information (both qualitative and quantitative) to support decision making. According to Vasarhelyi, Kogan, and Tuttle (2015), "Big Data has the potential to cause a paradigm shift allowing economic activities to be traced and measured earlier and deeper" (p. 384). With an abundance of data available in real time, the financial reporting process should be optimized to provide useful and timely information that supports strategic goals (e.g. use of key performance indicators, scorecards, dashboards, etc.). Key assignments will be project based and support active learning in a highly automated business environment.

Finance and Digital Currency: In addition to standard course content in corporate finance, next generation currency including Bitcoin and Crypto-currency are examined in the context of the highly automated firm. Additional emphasis on operating leverage (substituting fixed costs for variable costs) takes on a much greater

significance in a highly automated environment. Fixed costs (robots, new automated systems, and advanced machines) replace many variable costs (workers) thereby, dramatically changing the finance function. Because the shift from variable costs (workers) to fixed costs (automated systems) is at the center of all these changes, understanding the impact from various scenarios is critical. Furthermore, because even newer technology moves automated technologies, robotics, and artificial intelligence down the cost curve, decision points to automate to the next level or stay at the same level are constantly changing. Also discussed is the continuously increasing automation of the firm that puts traditional finance areas (capital budgeting, short and long-term asset management, liquidity control, etc.) into new contexts.

Data Analytics (i.e., Big Data): Big data has been expanding and becoming more complex on its own because of new methodologies, systems, and technologies. The automated firm takes this to a new level with existing data technology systems interfacing with operating systems generating near instant data. Understanding the complexity of these intersections and how to optimize big data in a highly automated firm is emphasized. New problems and solutions, are explored for enhancing corporate objectives consistent with developing trends and next generation technologies. The role of data professionals in the organization and their interaction with employees from other functional areas (and the big data problems unique to their respective disciplines) are examined. Various scenarios representing a cross section of industries combined with case studies also augment content areas.

Social Media and Technology in Marketing: Firms that operate using fewer workers will have additional challenges with marketing and public relations when it comes to corporate social responsibility. Example: Firms may no longer be able to meet previous corporate social responsibility expectations by just providing jobs if they are considerably smaller in number. If automation and robotics replace those jobs, firms may need new ways to respond to communities and other stakeholders. If the firm's societal role changes, how they determine the best way to become a good corporate citizen will also change. Communicating with customers, especially through social media, may take on new forms as organizations use it as a way to more fully explain how they interface with the highly automated firm. Firms can take advantage of the sustained and constant power of social media to keep all stakeholders current on the automated changes taking place. They can also stay informed as to why they are doing it and how it benefits the community, etc. Other marketing concerns for the highly automated firm may include utilization of AI to better understand customers' needs and desires, segmenting markets, and building brand value. Automation will also impact product development, pricing, and distribution decisions.

Automated Business in a Global Economy: Because automation and robotics make labor less of an issue than before, deciding where to produce in the world also changes. Technology should address this issue and enhance exporting and importing as well as foreign market entry and growth. Because global and domestic competition has increased tremendously in recent years, globalization will continue to pressure leaders to think more in terms of the big picture than ever before. International managers will have to use automation to represent their companies on today's stage. Innovation rather than reaction will keep companies ahead of the competition.

Ethics in a Shrinking World with Machines and Artificial Intelligence: In addition to a firm's internal ethics, there are new external and ethical decisions such as corporate social responsibility. Accordingly, the firm's focus on ethics changes as the firm experiences significant increases in automation. Leaders must, therefore, engage in making ethical decisions at home and in a cross-cultural environment in a digital world. Social media, for example, is growing at a rapid pace and will continue to impact practices such as automated data extraction and ethical decision making. As the world becomes more interdependent, questions will increasingly arise as to what is legal and what is illegal as well as what is right and what is wrong.

Leadership and Innovation through Disruption: The introduction of new technology appears on a daily basis to serve as tools to present day leaders. The process of unlearning old methods of leadership, however, will present as difficult a challenge as learning new methods. Change is often difficult for leaders to address, but changes must be faced so leaders can move forward through innovation. Disruption, therefore, must offer opportunities and not always be considered a threat. Humans will have to think outside the box to keep pace with machines, robotics, and artificial intelligence. Companies will even have to consider relieving some of their brightest most talented people from their day to day responsibilities to assist in leadership development, problem-solving skills, and collaborative endeavors.

Strategy Decisions in the Era of Automation, AI, and Societal Change: In the future, new strategy approaches

will change because of the rapidly changing technological environment. They will become more complex and traditional strategies that have worked in the past may not have the same effectiveness they once did. Firms that are highly automated with the extensive use of robotics and AI, may provide openings for new hybrid strategies, or even entirely new strategies altogether. At the very least, use of more Blue Ocean Strategies discussed in this paper may become more common as companies use the technological leverage they gained as a way to explore entirely new markets with fewer competitors. Other strategic issues for the highly automated firm may include: (1) changes in globalization and international forces because of these technological changes, (2) changes in organizational goals, (3) changes in environmental concerns (external and internal) including industry and analysis of resources, (4) technology, (5) cost management, (6) growth and (7) sustainability, etc. All of these areas will take on new meaning as global firms shift to the next big leap in automation, robotics, and AI.

After graduating from the program, continuing education should be offered because the technological environment will continue to change rapidly. MBA providers should consider offering these continuing education courses, to their graduates as a value-added service at no cost or, even, provide the courses for a nominal fee. This way MBA students' will have some assurance that their return on investment will be less volatile, and that their MBA degree will not become obsolete. Not only do MBA graduates maintain degree relevance, but they also remain close to their institution and can provide "real world" feedback from the field. This automation / AI feedback can in turn be recycled back into the streamlined course content areas so they remain current for new incoming MBA students.

CONCLUSION

Future MBA programs will be training individuals for skill sets that are increasingly a moving target. Never has this been more evident than it is now because of massive changes in automation, robotics and AI. These changes are causing unprecedented challenges and opportunities for business entities, as well as extraordinary disruption issues for society in general. MBA providers can provide valuable contributions to private and public sector interests by aggressively pursuing new and innovative training programs. Academic institutions using Blue Ocean Strategies that emphasize out-of-the-box thinking, can assure future MBA program relevance, graduates with needed skills, and a mechanism for mitigating the societal "wicked problem" of disruption from automation, robotics and AI. As the global economy evolves to the next level with these advanced technologies, MBA providers need to be in a strong leadership position to minimize adverse disruption effects while maximizing the welfare for as many stakeholders as possible.

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Expanding the Boundaries of the Traditional Classroom With Business Based TV Shows

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ABSTRACT

Television shows can be a powerful teaching resource and business-based reality programs offer an excellent opportunity to expand the boundaries of the traditional classroom. The goal of this paper is to provide instructors with teaching materials based on “The Profit”, a television show that stands out for its potential to teach managerial concepts, to enhance the learning process of their students. To reach this goal, I provide targeted episodes of this program that exemplify some of the most relevant decisions managers face such as adding or dropping product lines, making or buying the components of their finished products, and setting the optimum price and product mix. For each one of the episodes, I present a brief profile of the company and its challenges, followed by a set of questions and accompanying teaching notes that can be used to guide the conversation. This paper can be used by instructors to expand their teaching toolkits and bridge the gap between the classroom and the business world.

Keywords: teaching resources, management decisions, business-based programs, television shows.

INTRODUCTION

Our students have evolved beyond the coined “TV Generation” (Gioia & Brass, 1985) to become members of the Virtual Generation; they were born in the digital age and have been interacting with digital technology from an early age (Prensky, 2001, 2010; Tapscott & Williams, 2008, 2010; Thompson, 2013). Electronic media, particularly movies and television shows, available in a variety of formats and provided by many web services, can offer a wide range of mediums to facilitate the teaching and learning of management concepts.

The potential of films as a teaching resource has been explored by many authors. While Gallos (1993) and Hunt (2001) offered many examples of popular movies and training videos that can improve the teaching/ learning process of management and organizational behavior concepts, other authors have focused on the potential of specific movies to teach different topics such as power, role conflict, and leadership (Harrington and Griffin 1990; Serey, 1992; Comer, 2001), motivation and influencing techniques (Huczynski, 1994), the theory of escalation (Ross, 1996), cultural issues, diversity and racial inclusion (Livingstone & Livingstone, 1998; Mallinger & Rossy, 2003; Bumpus, 2005), and gender relations and sexual harassment in the workplace (Comer and Cooper, 1998).

Champoux (2001) proposed the use of animated films because their specific features allow them to show organizational behavior and management notions in unique ways. Other authors explore alternative approaches to utilizing videos as a teaching resource; Tyler, Anderson, & Tyler (2009), and Donovan (2016) have their students locate video clips that illustrate different concepts covered in class, and discuss the numerous benefits of this approach for both instructors and students.

The literature cited above clearly demonstrates the extraordinary potential of films as a teaching resource. Building on this idea, I propose that we include current business based television shows in our teaching toolkits. Television shows can be a powerful teaching/learning tool when used properly and business-based reality programs offer an excellent opportunity to close the gap between the classroom and the business world. Among the numerous options offered by different TV channels, “The Profit” stands out as one of the best educational business shows that can be used to teach managerial concepts.

The Profit is a CNBC American reality TV show featuring business leader and philanthropist, Marcus Lemonis. Premiering in July 2013, the show follows Lemonis as he seeks to help small businesses succeed. There comes a moment in every episode when Lemonis presents the business owners with an offer of investment in exchange for partial ownership, financial control, or some variation thereof. The challenges and decisions faced by the real-life companies featured in each episode can be used as real-life examples to enhance the teaching/ learning process of managerial concepts.

According to Tietz (2016), when lectures include real-life examples, students ask questions and think beyond the facts because they can see the connection between the abstract concept (the unknown) and the real-life company (the known). These connections help the concepts to stick in students' minds and, as a consequence, the focus moves from memorization to understanding.

In addition to providing real-life examples, *The Profit* allows the analysis of many aspects of the current economic situation as they have an impact on the companies featured in each episode. Another advantage of this TV program is that, not only shows how to make managerial decisions to solve specific problems, but it also shows the consequences of these decisions and the new challenges companies face through follow up episodes, called "Progress Reports". Besides, there is another website (<http://www.theprofitupdates.com/>) that is continually updated with news about the progress of the companies featured in the show. However, it must be noted that, as this web page clearly states: "The Profit Updates is in no way affiliated with CNBC's *The Profit* or any of its employees".

The fact that this show focuses on real companies, may increase the connection with students because they can actually check their websites, and in some cases, they can even see and purchase their products online or in the stores. Given the good reception of this television program, it has been renewed for a fifth season beginning Tuesday, June 6, 2017 so the materials available for teaching purposes keep increasing. And we can also encourage our students to explore additional programs such as *The Mentor*, *Shark Tank*, *Beyond the Tank*, and *Undercover Boss*.

With this article, I propose that we add business based TV shows to our teaching toolkit. In the next section, I provide targeted episodes of *The Profit* that can be used to teach and exemplify some of the most important decisions managers face when they run their businesses. For each one of these episodes, I briefly describe the company, the challenges it faces, and provide some questions as well teaching notes that can be used by the instructors to guide the discussion. Finally, I offer a summary table (Table 1) with additional examples that can be used to reinforce these management concepts. My final goal with this article is to provide instructors with innovative resources to teach their managerial courses.

SELECTED EPISODES

This section describes the episodes that I selected as the best examples of the different kinds of decisions managers have to make to ensure the survival and success of their companies. For each episode, I offer a brief description of the companies and the challenges they face. To facilitate the discussion, I provide answers to the following four questions; these questions are the same for each episode but instructors are always welcome to add more in order to enrich the conversation:

Questions.

1. How does the company differentiate its products?
2. What is the company's biggest challenge?
3. What is the solution proposed by Marcus to overcome this problem?
4. Are there any other managerial issues worthy of attention?

Adding or dropping product lines and services

Decisions relating to whether the product lines and services offered by a company should be dropped or new ones should be added are among the most difficult that a manager has to make because of the large number of quantitative and qualitative factors that must be considered. Managers have to understand the differential costs and revenues of the proposed alternatives as well as other variables far more difficult to quantify such as market trends, changing customer needs, employee morale, and potential impact on other parts of the company. These decisions must be carefully examined since they can determine the future success and even the survival of the firm.

Season 3. Episode 3.01: SJC Drums.

SJC Custom Drums (<https://www.sjcdrums.com/>) was founded in 2000 by brothers Scott and Mike Ciapri and it quickly became known for producing high quality drums used by some of today's biggest musical stars. Even with clients like Lady Gaga, the company experienced a myriad of problems. These concerns fall into two distinct categories: lack of product diversity and lack of production process.

Answers to discussion questions:

1. SJC Drums produces high quality drums; they follow an innovative approach to drum building that allows them to craft customized drums efficiently. They only use the highest quality materials to create products that are unparalleled in tone, look and feel.

2. The main problem is that SJC has limited itself to a very niche audience because their prices are too high. To make matters worse, the company takes six to seven months to produce one set and they usually encounter inventory problems during the production process.

3. Marcus proposes the addition of new product lines to diversify the price offerings. He suggests the creation of a Good, Better, and Best tier of products. The Best line would be the custom equipment that is highly expensive, the Good model would be aimed at the average customer and the Better would be priced in-between. Marcus's goal is to sell the Good model to retailers for \$895 and, at this price point, SJC would have to produce the set for \$537 in order to get a reasonable margin. Therefore, this episode can be also used as an example of target costing approach to pricing.

4. Besides the lack of product diversity, SJC faces another problem, which is the lack of production process. Marcus introduces a new ten-step process called "The Ten Steps to Success" to be followed by the shop workers. This new process requires the reorganization of the warehouse area so that all the parts are in one clear location as well as updates in the equipment to maximize the workflow and decrease the delivery cycle time. (for more information about the "The Ten Steps to Success", please visit: <https://www.sjcdrums.com/pages/process>).

Season 3. Episode 3.18: Inkkas Global Footwear.

Inkkas (<https://inkkas.com/>), a company founded in 2013 and based in Brooklyn, NY, produces unique footwear using textiles and designs from around the world. The Inkkas company is founded on the principles of fair trade and global philanthropy; its products are crafted with respect for the environment and the people who make them.

Answers to discussion questions.

1. The company is able to differentiate itself from its competitors because they make one of a kind footwear. In addition to the unique designs, Inkkas prides itself on locally sourcing the materials it uses and handcrafting the products.

2. The company is having financial problems because, despite having some designs that are huge sellers, it has accumulated too many shoes that do not sell well, weighting the company down with stagnant inventory. Therefore, the main reason for the store's low sales is the company's larger problem with inventory. They currently offer more than a hundred different designs and this lack of focus is costing the company hundreds of thousands of dollars. Another problem relates to the quality of the shoes; after trying them on, Marcus realizes that many of them are uncomfortable.

3. Marcus recommends to reduce the company's product line and focus on the models that sell well. After a careful examination of the sales data, they discovered that five models made up almost 80% of all their sales. Therefore, Marcus decides that Inkkas should only offer those five models. At the same time, they need to address the quality problems so Marcus takes the owners of the company to Modern Vice, a company based in New York, and known for the superior quality of their hand-crafted shoes. After realizing that the production process has many flaws, Inkkas turns to Modern Vice to produce the new prototypes.

4. Yes, this episode exemplifies one of the top retail trends that dominate the current marketplace: online shopping. The store only makes up for 3% of the company's sales, with online sales making up under 30%, and wholesale accounts making up the rest. Based on this information, Marcus decides to shut down the physical retail shop.

The make or buy decision

This strategic decision has the potential to shape the identity of a company and its future. Providing a product or service to a customer requires many steps, such as development, production, distribution, and after-sales service. These activities are part of what we call value chain and companies have to decide whether they want to perform all of them by themselves, or outsource part of the process.

The first option, also known as vertical integration, has certain advantages such as independence, and control of quality; an integrated company is less dependent on its suppliers and may be able to ensure a smoother flow of parts and materials for production. However, it may be more cost-efficient for the company to focus on specific activities of the value chain (those that can generate economies of scale or differentiate the company from its competitors) and purchase from outside suppliers many of the parts and materials that go into their finished products.

Season 1. Episode 1.06: Mr. Green Tea

Mr. Green Tea (<https://www.mrgreentea.com/>) is a gourmet ice cream company that was founded by Santo Emanuele in 1968. Now in its third generation, Mr. Green Tea is still family owned and continues to handcraft their exotic desserts using the highest quality, all natural ingredients.

Answers to discussion questions.

1. The high quality of its all-natural ingredients as well as its exotic flavors (green tea, red bean, and ginger) are the reasons why Mr. Green can differentiate itself in the competitive ice cream market.
2. Unlike other businesses featured in *The Profit*, Mr. Green is not in financial distress. The main problem it faces is stagnation; the business is not growing as the family wants because the process is broken. They don't make the ice cream; instead, they use co-packers. Co-packers are third party vendors who manufacture products for small companies. Mr. Green Tea is losing \$500,000 on potential profit every year (20% margin on 2.5 million dollars). In addition, the fact that they do not have control over the production process is limiting their growth potential. They have been growing 20% every single year for the last 5-6 years and the only reason why they cannot grow more is because they cannot get enough ice cream from the co-packers. Another disadvantage of using co-packers is the high transportation costs they have to cover.
3. Marcus proposes to get rid of the co-packers and open a new manufacturing plant to produce their own ice cream. This new facility will allow them to test and create new products. Therefore, by producing the ice cream themselves:
 - a. They take control of the production process and they can produce the necessary ice cream to fulfill the market demand.
 - b. They improve their profit because they do not have to give away 20% of their margins to co-packers.
 - c. They can expand the business and broad their customer base with the addition of new products and flavors.
4. Yes, this episode shows the frictions and disagreements that can affect family business. The instructor could suggest their students to write a research paper about the problems and challenges of second/ third generation businesses.

Season 3. Episode 3.15: Wick'ed.

Wick'ed Candles, now Biren & Co. (<https://birenandco.com/>), was founded in 2010 by the husband-and-wife team Mark and Samantha Biren. This company produces candles with fine fragrances using all natural soy wax blends. Despite having been able to get its products into several stores and celebrity hot spots, sales have been decreasing and they are having serious financial problems.

Answers to discussion questions.

1. The company stands out from the competition thanks to its bold designs. As they state on their website: "Founders Mark and Samantha created their first distinct candle in their kitchen as they could not find a single candle that matched their vision for their wedding day... a candle with an elegant drip exterior but one that didn't actually drip and create a mess. Determined, Mark and Sam rolled up their sleeves and made their wedding candles themselves, one by one, completely from scratch. They poured their vision and love into each candle to concoct the most exquisite and ethereal candles they could imagine for their nuptials. The "Pre-Dripped" candle was born and so was Biren & Co."
2. The main reason why this company is struggling financially is, according to Marcus, the design of their core product. While the owners of the company do believe this uniqueness allows them to have a distinctive brand identity, Marcus thinks that they should expand their customer base in order to increase their sales and, in turn, improve their financial situation.

3. To reach this goal, it is necessary to increase the capacity and efficiency of the production process. But, instead of doing this by themselves, Marcus believes that they should focus on what they excel at: design and creativity. The rest of the activities that comprise the value chain should be outsourced. Based on this idea, Marcus finds a manufacturing partner so that Mark is no longer burdened with producing the candles himself, and a distributor/representative that can get these candles into the stores. Now that Mark can focus on design, Marcus wants Biren Co. to become a design and scent company. He proposes the development of new product lines following the “kitting strategy”. Using their current products as a reference, they can create kits, a selection of different products under the same design and brand name, which could significantly increase their sales.

4. This episode stresses the importance of knowing your market. According to Anthony, owner of Candle Delirium and an expert in the candle industry, Mark put a lot of work into details that are not noticed by the average customer. This valuable feedback makes them rethink the product and come up with new designs that address their customer demands.

Pricing decisions

Setting the right price is a balancing act between internal factors such as the costs incurred by the company and the revenue target, and external factors such as market competition, demand and supply relationships, customer behavior, and legal requirements.

Even though there is no magic formula that suits all types of products, industries, or markets, the business management literature offers a variety of different types of pricing strategies that include but are not limited to cost-plus pricing formulas and market-minus strategies. Pricing strategies for new products include penetration pricing and price skimming.

Season 3. Episode 3.12: Kensington Garden Rooms

Kensington Garden Rooms LLC (<http://www.kensingtongardenrooms.com/about>) is the number one manufacturer of luxury hand crafted, cedar garden rooms in Northern California. As the owners of the company state in their own website, their pledge is “to establish lasting relationships with our customers by exceeding their expectations and gaining their trust by maintaining the highest levels of professionalism, integrity, honesty and fairness throughout the construction process”.

Answers to discussion questions.

1. The fact that the gazebos are built by hand from the finest woods gives them a real competitive advantage. Each project is handled with the same uncompromising care and attention to detail and, as a consequence, they have gained a good reputation for their excellent service and their highly refined designs. But, while the quality of its product is top-notch, its high cost makes it a luxury item most people can't afford, leaving Kensington struggling to achieve real growth.

2. With a gross margin of 40% and a net margin of 25%, this company is not in financial distress. However, they are not getting the growth they want because the price they were demanding for their products (\$25,000 - \$30,000) was too high. There seems to be a disconnection with their target market. If they want to grow, they need to increase their customer base and, to reach that goal, they need to lower the price and make more affordable models.

3. They need to lower their prices, and change their marketing strategy: going to fairs is not enough. Marcus wants them to think about the business in 3 different marketing components:

- a. Mass Marketing, which is what they have historically been doing.
- b. Target Marketing, for people who are actually in the market, like home improvement stores.
- c. Commercial companies such as vineyards, or boat and auto dealerships.

They visit True Value to promote their products and the managers they meet with want to make a deal as long as the company can offer a high-value gazebo for a lower price. With this episode, students can witness the real application of Target Costing, a product costing/pricing method in which a final cost is determined after market analysis, and the product is designed or redesigned to meet it.

In this case, True Value sets the market price and Marcus asks Damion to work with Simon to make a high-quality gazebo within the budget range of \$5,000 to \$5,500. In order to reach this target cost, they improve the assembly

line and the production process by organizing their old workplace and purchasing new tools and equipment, they rent a new warehouse, and they implement a new inventory management system.

4. This episode shows the importance of improving and strengthening a business before thinking about expansion plans.

Season 3. Episode 3.16: Kota Longboards

KOTA Longboards (www.kotalongboards.com) specializes in high quality longboards that stand out because they have unique designs and non-porous grip finishes that give riders more control. It was founded by Mike Maloney in 2012 and it quickly gained national attention and recognition. However, due to the company's limited selection of boards and high price point, KOTA is losing money.

Answers to discussion questions.

1. The company is able to differentiate its products because they have unique designs and non-porous grip finishes that give riders more control. And there is a compelling story behind the product: the founder of the company, Mike Maloney, is a former Naval Lieutenant Commander and his passion for the military has influenced many of the designs for the boards, and even the name of the company itself. In fact, KOTA is an acronym for Knights of the Air, a title used to describe those in the early 1900s who were brave enough to fly planes in combat.

2. The biggest challenge the company faces is its inability to make a profit. Even though they offer an outstanding product, they are losing money due to the company's limited selection of boards and high price point.

3. Marcus suggests to broad the customer base by offering a wider selection of longboards and lower price points in order to target a younger demographic. Marcus explains two different approaches that can be used to set the price: cost-plus pricing formulas, and market-minus strategies. After a careful review of production costs, they come up with three models: KOTA's main 44-inch board now cost \$100 to make and retails at \$199 (instead of the initial retail price of \$329). In addition, Marcus plans for a 34" board to cost \$75 to produce and retail at \$149, and for a 28" board to cost \$60 to make and to retail at \$100.

4. Yes, there are many other issues worthy of attention and one of them refers to the target market. Marcus thinks that Mike does not understand his market because, while Mike claims their target market is people between the ages of 30 and 70, Marcus believes that the age of this population is far removed from the people the rest of the skateboard industry focuses on. This lack of market knowledge led to a limited selection of boards and a high price point, which in turn, are the main reasons why the company is in trouble. This idea is reinforced when they visit Robert Dyrdek, a skateboarding expert who confirms that the older market they want does not exist and the product is too expensive. Therefore, this episode can be used to support the idea that companies need to understand their markets.

This episode also shows how the owner of the company is having issues with his employees. The staff turnover is too high; most of KOTA's employees have been working in the company for less than nine months because of the company's instability and insecurity. This episode teaches a valuable lesson about human resources management; Marcus finally decides to pull out if the deal because Mike is not treating his employees with the respect they deserve.

Decisions about the optimum product mix

The right combination of products and services define the identity of the company as well as its earnings potential. Most companies offer many products/ services with different profit margins. Hence, profits will depend to some extent on the company's sales mix; profits will be greater if high-margin rather than low-margin items make up a relatively large proportion of total sales. It is essential to have segment information so that managers can analyze the performance of the different product lines or services they offer and make informed decisions. The ultimate goal is to define the appropriate product mix that will maximize the profit of the company. The following episode may be used to discuss this idea.

Season 3. Episode 3.11: Blues Jean Bar

Blues Jean Bar, now Denim & Soul (<https://www.denimandsoul.com/>) used to be a denim retailer with the concept of serving jeans at a bar setting rather than drinks. But, with some issues such as lack of inventory, no solid leadership, and too aggressive business expansion, the Blue Jeans Bar is struggling to stay in business.

Answers to discussion questions.

1. Blue Jeans Bar is a high-end clothing and accessories retailer owned by Lady Catherine Reiss-Fuller. In 2004, she opened Blues Jeans Bar, a denim retailer with the unique concept of serving jeans at a bar setting. However, this unique setting does not seem to connect with Lady's target market.

2. This company is having serious financial problems due to the low profit margin of jeans, which is its main product, and the lack of a good inventory management system.

3. Marcus believes that adding new product lines with higher profits will help improve the financial situation of the company. The main product they currently sell, jeans, only has a 50% profit margin while other products, such as T-shirts and sweaters, have higher profit margins. If they are able to change the current sales mix and sell T-shirts (70% profit margin), and sweaters (68% profit margin), their sales will generate higher returns. The average profit margin of the company can increase from 50% to 62% $((50\% + 70\% + 68\%) / 3)$, assuming that the new sales mix is: jeans (33%), T-shirts (33%) and sweaters (33%).

4. The company faces serious management issues as well and Marcus believes it is essential to flatten the organizational/ management chart.

CONCLUSION

Television shows can be a powerful teaching resource and business-based reality programs offer an excellent opportunity to expand the boundaries of the traditional classroom. The educational potential of these televised shows have dramatically increased thanks to the rise and development of new visual technologies that allow users to have more control and interactivity in order to adapt them to the needs of a variety of learners (Moeller, 1996).

After a careful review of the programs broadcast by different television networks, "The Profit" stands out as one of the business-based shows with a higher potential to teach managerial concepts. The goal of this paper is to provide instructors with additional teaching materials based on this show that they can use in their classes to enhance the learning process of their students. To reach this goal, I present targeted episodes of "The Profit" that exemplify some of the most relevant decisions managers face such as adding or dropping product lines, making or buying the components of their finished products, and setting the optimum price and product mix.

For each one of the episodes featured in this paper I provide a brief profile of the company as well as the challenges they face, followed by a set of questions and accompanying teaching notes that can be used to guide the conversation. The answers to these questions are not intended to be an all-inclusive solution but they can be used as a starting point to guide the conversation. Actually, a secondary objective of this paper would be to stimulate instructors' creativity so that they can create their own teaching materials based on the specific characteristics of their courses and the learning styles of their students. The final goal is to bridge the gap between the classroom and the business world and enrich the learning experience of our students.

Table 1: Additional episodes that can be used to teach managerial decisions

Topic	Episode	Location	Follow-Up
Adding or dropping product lines and services	Episode 1.03: Planet Popcorn.	Newport Beach, CA	Season 2, Episode 2.16
	Episode 1.06: Mr. Green Tea.	Keyport, NJ	Season 2, Episode 2.18
	Episode 2.01: Athan Motors.	Morton Grove, IL	Season 2, Episode 2.18
	Episode 2.05: Skullduggery.	Anaheim, CA	
	Episode 2.06: Sweet Pete's	Jacksonville, FL	Season 2, Episode 2.18 Season 3, Episode 3.09
	Episode 2.08: Key West Key Lime Pie Company	Key West, FL	Season 3, Episode 3.02
	Episode 2.10: Artistic Stitch.	Queens, NY	Season 3, Episode 3.02
	Episode 2.14: Coopersburg Sports.	Coopersburg, PA	Season 3, Episode 3.02
	Episode 2.15: Shuler's BBQ.	Latta, SC	Season 3, Episode 3.21
	Episode 3.01: SJC Drums.	Southbridge, MA	Season 3, Episode 3.21
	Episode 3.04: Standard Burger.	Staten Island, NY	Season 3, Episode 3.14
	Episode 3.06: Grafton Furniture.	Miami, FL	Season 3, Episode 3.21
	Episode 3.08: The Lano Company.	Kansas City, MO	
	Episode 3.15: Wick'ed (now Biren & Co. Candles)	Burbank, CA	
	Episode 3.18: Inkkas Worldwear	Brooklyn, NY	
Episode 3.19: 240Sweet	Columbus, IN		
The make or buy decision	Episode 1.06: Mr. Green Tea.	Keyport, NJ	Season 2, Episode 2.18
	Episode 2.08: Key West Key Lime Pie Company.	Key West, FL	Season 3, Episode 3.02
	Episode 2.17: My Big Fat Greek Gyro (now The Simple Greek)	McMurray, PA	
	Episode 3.03: Tonnie's Minis.	New York City, NY	
	Episode 3.08: The Lano Company.	Kansas City, MO	
	Episode 3.13.2. Betty's Pie Whole.	Encinitas, CA	
Pricing decisions	Episode 3.01: SJC Drums	Southbridge, MA	Season 3, Episode 3.21
	Episode 3.06: Grafton Furniture	Miami, FL	Season 3, Episode 3.21
	Episode 3.12: Kensington Garden Rooms.	Hilmar, CA	
	Episode 3.15: Wick'ed (now Biren & Co. Candles)	Burbank, CA	
	Episode 3.16: Kota Longboards	Denver, Co	
Optimum product mix	Episode 2.11: Swanson's Fish Market	Fairfield, CT	
	Episode 3.04: Standard Burger	Staten Island, NY	Season 3, Episode 3.14
	Episode 3.10: Bentley's Corner Barkery (now Bentley's PetStuff)	Chicago, IL	
	Episode 3.11: Blues Jean Bar (now Denim & Soul)	San Francisco, CA	
	Episode 3.18: Inkkas Worldwear	Brooklyn, NY	
	Episode 4.02: DiLascia	Los Angeles, CA	
Episode 5.02: Windward BoardShop (now W82)	Chicago, IL		

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What Determines Students' Preference of Online to F2F Class?

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ABSTRACT

With a significant increase in both demand and supply of online classes, previous studies identified a number of factors affecting students' choice of online vs. F2F classes. These studies, however, ignored the fact that students' preferences are different from actual enrollment. This study, therefore, reexamines the issue of class delivery mode based on students' preference. Using data from 497 MBA students, this study identified a set of variables that help to predict students' preferences of class delivery mode. Based on such empirical results, implications of the findings to both instructors and administrators are discussed.

Keywords: class delivery mode, students' preference, barriers and motivators, business education

INTRODUCTION

As the demand for online classes has increased significantly over the past two or three decades, so has the supply of online classes offered by institutions of higher education (Allen and Seaman, 2013; Allen et al., 2016). Traditional face-to-face (F2F) lectures are replaced with online classes by an increasing number of institutions in higher education. In extreme circumstances, online becomes the only option available for students when the F2F classes are not offered in the term, site, or location of their convenience.

Do our students choose online because they indeed prefer it? Most of the previous studies assumed that students choose classes based on their preference, while anecdotal evidence suggest otherwise. Students' preference may be different from students' actual class selection behavior, but it is not properly considered in the design of previous studies. Students' class selection behavior is largely conditional to the classes being offered by the institution at the time of decision. The research design employed by previous studies, however, would not allow us to address this question largely due to the lack of data on students' preferences.

The lack of empirical evidence on students' preference of class delivery mode provides a motivation for this study. Most of previous studies addressed the issue with a focus on students' actual class enrollment, while ignoring their preferences. Some researchers even used these two terms, class selection behavior and class preferences, interchangeably. Findings from previous studies such as common characteristics of online students or discriminant factors that differentiate online students from F2F students requires caution in interpretation as they are incomplete, if not misleading.

The methodological challenge is how to define and operationalize students' choice of class mode, online vs. F2F. There is ample anecdotal evidence suggesting that some students are forced to take online classes against their preference. Thus, preference cannot be defined solely based on their actual enrollment. Few studies have addressed the choice of class delivery mode from the perspective of students' preferences in a setting where both options are available. Unlike previous studies, this study addresses the choice of class delivery mode in terms of students' preference. This study extends prior literature by incorporating other important factors along with the barriers and motivators. The new discriminant variables considered are dis-satisfiers of F2F, learning styles, and select demographic variables.

LITERATURE REVIEW

Early researchers identified several barriers or negative factors that prevent students from taking F2F classes (Bryant, Kahle, and Schafer, 2005; Mann and Henneberry, 2012; Wallace, 1996). Examples of such situational barriers are conflict of class schedule with their work and family, physical distance, and traffic relative to the location at which the course is offered. In addition, the researchers have identified institutional barriers (such as time, place, and term availability) that hinder students' ability to take their preferred F2F class.

Studies on selection of class delivery mode suggest, however, that students' choice of online or F2F classes cannot be explained fully with these barriers only since the class selection behavior is rather complicated. Accordingly, studies mostly from the mid-2000s and to the present have identified a list of motivating factors of online learning as another plausible explanation for students choosing online versus F2F (Mann and Henneberry, 2012; Pontes et al., 2010).

Learning style refers to how a learner perceives, interacts with, and responds to the learning environment (Broad, Matthews, and McDonald, 2004; Honey and Mumford, 1992; Kolb, 1999; Mupinga, Nora and Yaw, 2012; Neuhauser, 2002). Online courses require students to take greater responsibility for their learning. For instance, students who preferred to look for abstract concepts rather than concrete learning experiences performed better in online learning (Honey and Mumford, 1992; Kolb, 1999).

In addition, individual characteristics of learners that affect the students' class selection behavior have also been documented in studies in education. Examples of these individual characteristics include: undergraduate major (DiRenzo and Lilly, 2014; Fish, 2016); gender (Ashlong and Commander, 2012; Gonzalez-Gomez et. al., 2012); age (Dutton, Dutton, and Perry, 2002; Mann and Henneberry, 2012); and full-time work status (Liu, 2011; Pontes et al., 2010).

RESEARCH METHODOLOGY

Subjects and Data:

Participants are graduate students enrolled in a core accounting course at a state university located in the southwest United States. Final sample consists of 497 students who clearly stated their preference for either online or F2F. Table 1 shows the distributional characteristics of the final sample of 497 students. Students who prefer online (*CPREF*=Online) are likely to have the following characteristics: undergraduate degree from business, female, 30 years or older, working full time, and residing in the US for more than 10 years. Similarly, students who are likely to be enrolled online (*CTYPE*=Online) have the following characteristics: having an undergraduate degree from non-business, female, 30 years or older, working full time, and residing in the US for more than 10 years.

Table 1: Distributional Characteristics: By Class Preferred (*CPREF*) and Class Enrolled (*CTYPE*)

	All (N=497)	Class Preferred		Class Enrolled	
		Online (N=203)	F2F (N=294)	Online (N=326)	F2F (N=171)
Undergraduate major (<i>UMAJOR</i>)					
0: Non-Business	265	93	172	178	87
1: Business	232	110	122	148	84
Gender (<i>GENDER</i>)					
0: Female	238	107	131	166	72
1: Male	259	96	163	160	99
Age entered to program (<i>AGE</i>)					
0: Less than 30	225	89	136	141	84
1: 30 or more	272	114	158	185	87
Working Status (<i>FULLTIME</i>)					
0: Non-Full Time	108	40	68	59	49
1: Full Time	389	163	226	267	122
Years in US (<i>RESIDENCE</i>)					
0: Less than 10	129	35	94	68	61
1: 10 or more	368	168	200	258	110

Class Delivery Mode: Online vs. F2F

Class delivery mode, online or F2F, is an outcome status of this study. Pedagogical characteristics of the online and F2F class are consistent with the classification used by extant literature (Allen et al., 2016). For instance, in an online class, the entire course content is delivered online without any face-to-face meetings. In contrast, in the traditional F2F class, no online technology is used and the content is delivered in writing or orally. The coding for the students' preference is based on a questionnaire item with 5-point Likert scale. Using a measure representing students' preference is unique in this study, thus, it extends prior studies that defined the students' choice of class delivery mode based on the actual enrollment only.

One notable finding is that a substantial number of students enroll in a class delivery mode against their preference. As reported in Table 2, in excess of one third of students (193=158+35 or 38.8%) enrolled in the mode they do not prefer.

Table 2: Class Delivery Mode: Class Preferred vs. Class Enrolled

Class Preferred (<i>CPREF</i>)	Class Enrolled (<i>CTYPE</i>)		
	Online	F2F	Total
Online	168	35	203 (40.8%)
F2F	158	136	294 (59.2%)
Total	326 (65.4%)	171 (34.4%)	497 (100%)

Predictor Variables and Measurement

This study used a structured survey to measure students' perceptions toward online learning. The questionnaire includes 24 items regarding students' preference and actual class selection. These variables are grouped into six categories that represent situational barriers of F2F, institutional barriers of F2F, online preference, online satisfiers, dis-satisfiers of F2F, learning styles, and students' individual characteristics. Cronbach's alphas computed to check the reliability of those six categories of variables are greater than the acceptable level of .60.

Satisfiers of Online Learning: Four items are used to measure attributes of satisfaction from online classes. They include: learn more (*SO_LEARN*); get better grades (*SO_GRADE*); more convenient (*SO_CONVENT*); and, more responsive to their needs (*SO_RESPONSE*).

Facilitators of Online Learning. Five items are used for attributes that ease the process of learning. In online class, students learn: at their own pace (*FO_OWNPACE*); better from printed materials (*FO_PRINTED*); with written work than spoken work (*FO_WRITTEN*); in a new way (*FO_NEWWAY*); and, on their own (*FO_STUDYOWN*).

Dis-Satisfiers of F2F Learning. Three factors attributable to dis-satisfactory outcome of F2F classes are included. It is not particularly important: to have F2F interaction with their instructor (*DSF_S2I*) or fellow students (*DSF_S2S*) or classroom discussion (*DSF_DISCUSS*).

Situational Barriers to F2F Learning. Five situations barriers of F2F classes are included. When taking an online course, it is easier to meet work commitments (*SBF_WORK*) and family commitments (*SBF_FAMILY*). Location (*SBF_LOCATION*) and transportation (*SBF_TRANSPORT*) makes it difficult to get to campus from home/work.

Institutional Barriers of F2F Learning: Four items associated with the institutional setting are included. Students are unable to enroll the F2F course because: it was full (*IBF_CLASSFULL*); not offered at a convenient time (*IBF_TIME*); in the preferred location (*IBF_CAMPUS*); or term (*IBF_TERM*).

Individual Learning Style: Learning styles developed by Kolb (1999) are employed in the survey. Items represent being: a leader who is taking charge (*LS_LEADER*); a social specialist who prefers strong interactions with people (*LS_SOCIAL*); an organizer of specific project (*LS_ORGANIZER*); or adaptive when working within a team (*LS_ADAPTIVE*).

Students' Biographical Characteristics: Undergraduate major (*UMAJOR*); Gender of students (*GENDER*); age entered to the program (*AGE*); full time work status (*WORKFULL*); and number of years of residence in US as a proxy for the level of competency in English language and American culture (*RESIDENCE*).

FINDINGS AND DISCUSSIONS

This study employs a series of logistic regression analyses against students' preference in order to identify discriminants that helps to predict students' preference. Results from logistic regression are reported in Table 3. A total of ten variables that represents all five discriminating factors are statistically significant.

Table 3: Logistic Regression Analyses: By Class Enrolled (CTYPE)

Parameter	Class Enrolled (CTYPE)					
	All (N=497)		Online (N=326)		F2F (N=171)	
	Estimate	Wald Chi ²	Estimate	Wald Chi ²	Estimate	Wald Chi ²
<i>Intercept</i>	4.6565	23.9888***	5.1562	6.4608**	3.3514	5.8478**
<i>SO_LEARN</i>	-0.4688	10.9406***	0.4106	1.7568	-0.4886	8.0730**
<i>SO_GRADE</i>	0.0436	0.1108	0.4529	2.0195	-0.3106	2.6869
<i>SO_CONVENT</i>	-0.0233	0.0268	-0.6053	3.7801*	-0.1644	0.9083
<i>SO_RESPONSE</i>	0.2546	3.3628*	0.8114	6.3667**	0.1608	0.9307
<i>FO_OWNPACE</i>	-0.1983	2.3708	-0.3729	1.3113	-0.4186	5.4457**
<i>FO_PRINTED</i>	-0.0945	0.4239	0.1448	0.2661	0.0071	0.0018
<i>FO_WRITTEN</i>	-0.2368	3.0707*	-0.5380	2.8646*	0.0854	0.2061
<i>FO_NEWWAY</i>	0.2942	4.7984**	0.2214	0.4549	0.2502	2.1556
<i>FO_STUDYOWN</i>	-0.3000	7.4506***	-0.1651	0.5243	-0.3116	4.6702**
<i>DSF_S2I</i>	-0.3787	6.4899**	-0.9280	5.4247**	-0.3083	2.7008*
<i>DSF_S2S</i>	-0.2633	3.2491*	0.1451	0.1788	-0.3613	3.6397*
<i>DSF_DISCUSS</i>	0.0520	0.1876	0.1750	0.2630	0.2050	1.8603
<i>SBF_WORK</i>	0.1130	0.3778	-0.4866	1.8789	0.3457	1.7106
<i>SBF_FAMILY</i>	-0.1749	1.0549	-0.0449	0.0158	-0.0625	0.0753
<i>SBF_LOCATION</i>	-0.0635	0.3735	0.0435	0.0245	-0.0369	0.0860
<i>SBF_TRANSPORT</i>	0.0323	0.0964	-0.1898	0.4991	0.0811	0.4400
<i>IBF_CLASSFULL</i>	0.0628	0.2187	-0.0228	0.0094	0.1776	0.8952
<i>IBF_TIME</i>	-0.2439	2.3750	-0.0043	0.0002	-0.5182	4.6473**
<i>IBF_CAMPUS</i>	-0.2269	2.7271*	-0.0638	0.0313	-0.2949	2.7453*
<i>IBF_TERM</i>	-0.0351	0.0601	-0.2496	0.6479	0.1644	0.7159
<i>LS_LEADER</i>	0.1007	0.5157	0.1620	0.3011	0.0816	0.2025
<i>LS_SOCIAL</i>	0.0128	0.0095	0.0691	0.0763	-0.0895	0.2590
<i>LS_ORGANIZER</i>	0.2550	3.0132*	0.2318	0.5082	0.3834	3.4478*
<i>LS_ADAPTIVE</i>	0.1569	1.6730	-0.2354	0.6872	0.2924	3.6511*
<i>UMAJOR</i>	-0.5233	4.9476**	-0.2349	0.2102	-0.6505	4.5431**
<i>GENDER</i>	0.3402	1.9451	0.6016	1.3429	0.3172	1.0059
<i>AGE</i>	-0.3817	2.4884	-0.3352	0.3968	-0.3585	1.3680
<i>WORKFULL</i>	0.2437	0.6316	-0.4395	0.4396	0.6109	2.2560
<i>RESIDENCE</i>	-0.1949	0.4350	-0.1235	0.0348	-0.2683	0.5029

Note) *** <.01, ** <.05, * <.10

The most important finding is that students prefer online because of the features embedded in online classes. The variables which are significant in predicting students' preference are motivators of online. For instance, students prefer online learning because it represents a new way to learn and because they get more response from the instructor in the online mode. According to the results, students who prefer F2F are likely to be the ones who perceive that they would learn more/less in F2F/online, have less/more freedom in F2F/online, and have less/more written materials in F2F/online class. Such results are somewhat inconsistent with the extant literature.

Another significant finding is that barriers do not predict preference. One institutional barrier, unavailable F2F classes from campus site (*NA_SITE*), is significant at a .10 level. One viable interpretation of such weak association between the barriers of F2F and students' preference is that such barriers, either situational or institutional, are not important or are easy to overcome.

This study also found that the dis-satisfiers of F2F play a significant role in forming students' preference of class delivery mode. For instance, two out of three dis-satisfiers of F2F show significant but negative association with the students' preference. The negative signs of interactions between students and instructors (*DSF_S2I*) and peer students (*DSF_S2S*) indicate that students who are less/more satisfied with the interactions occurring in F2F classes are more/less likely to take online/F2F classes. For instance, students prefer to study in online instead of F2F class because they do not see much utility from interactions with instructor or students. There appears to be some implications to the instructors and designers of online classes. Both instructors and designers of online should find ways to enhance the interactions with students.

Cross-Sectional Difference in Preferences: Students Enrolled in Online and F2F

In order to compare the factors affecting students' preferences by class enrolled, the samples are partitioned by *CTYPE*. As shown in Table 4, only four predictors are significant in the online group. They are: convenience (*SO_CONVENT*), written work (*FO_WRITTEN*), new way of learning (*FO_NEWWAY*), and student-to-instructors interactions (*DSF_S2I*). One notable observation is that none of barriers are significant to students who enrolled in online class. To the sub group who enrolled in F2F classes, a total of ten variables, compared to four in the online group, are significant. The examples of discriminant variables identified are: three motivators, four barriers of F2F, two learning styles, and undergraduate major.

What is notable from this sub sample is that none of situational barriers of F2F is significant. Out of those ten variables, only variable student-to-instructor interaction (*DSF_S2I*) is significant in the online group as well, thus confirming that the class in which the students enrolled is significant in differentiating the set of predictor variables important for each group. The percentages of concordance are 83.8% in the online group and 85.3% in the F2F group, thus it confirms a very strong association between the predicted probabilities and the observed responses. The test statistics, likelihood ratio and score, for the global null hypothesis on Beta=0 is also rejected with a level of .05 for online group and .0001 for F2F group. Overall, the results indicate that the factors affecting preference are different.

CONCLUSION

This study addresses the choice of class delivery mode from the sample selected based on preference, while most of the previous studies relied only on enrollment. This study, using a series of logistic regressions, documented the effects of multiple discriminants that help to predict students in either online or F2F classes.

This study confirms that the F2F barriers are still important factors associated with the students' choice of class delivery mode but not as significant as documented in the prior literature and the 'motivators of online' instead have played a more significant role in discriminating online students from F2F students. This study also found that the students' dis-satisfaction of F2F interactions, which are known to be the most significant competitive advantages of F2F over online, served as the facilitators of online. In addition, this study documented a certain learning styles, the organizer or adaptive type, and undergraduate major affect students' preference of class delivery mode.

This study made a unique contribution to the extant literature because of its classification based on students' preferences for the choice of class delivery mode. Another contribution is that this study is based on a much bigger sample surveyed over five academic years from 2011 to 2015. Therefore, we anticipate that the findings of this study are more robust compared to other studies with smaller sample collected in short time periods. The results from this study have implications for those who are making educational policies and decisions for online education. For instance, the finding that a significant number of students are taking courses against their preference has implication to both instructors and administrators in higher education because the choice of class delivery mode is conditional to the classes offered and their features.

This study, however, has a few limitations inherent in studies using survey data, which are largely due to participants and the survey instruments/measurements used in the study. Though the empirical findings from this study are based on data collected over multiple periods with relatively large size sample, the findings from this study are relevant to the five-year period in which the survey was conducted. To that extent, the generalizability of the findings from this study to other contexts is limited.

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The Value of Multiple Choice Questions in Evaluating Operations Management Learning Through Online Homework Versus In-Class Performance

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ABSTRACT

While previous studies evaluated differences in the online and face-to-face environment for graduate and undergraduate students' performance on quantitative concepts, this study analyzes the results for qualitative concepts tested at the lowest levels of Bloom's taxonomy, knowledge and comprehension, through multiple choice questions. For undergraduate and graduate students significant differences between student performance on computer-managed and follow-up in-class factual multiple choice questions exists. Virtually no correlation between the computer-managed homework and in-class testing performance exists for the qualitative questions. Results highlight the need for instructors to be aware of the classroom activities and the learning level they are seeking to test online and in-class, as well as implications for computer-managed homework designers and instructors.

Keywords: Online Education, Multiple Choice

INTRODUCTION

Previous research evaluated the performance of undergraduates and graduates on online homework versus in-class performance with a particular emphasis on the quantitative question format (Fish, 2013, 2014a, 2014b, 2015). However, the value of qualitative questions to online learning in the business classroom remains relatively unexplored. This study seeks to begin that conversation by evaluating student performance at the lowest levels of Bloom's taxonomy (the knowledge and comprehension levels). The purpose of this study is to analyze whether student's who appear to demonstrate knowledge and comprehension learning online (prior to in-class testing) can then recall that information on in-class testing.

LITERATURE REVIEW

In today's educational environment, there is a transition towards inclusion of more online technology into the classroom. Administrators argue that online learning performance is the same or superior to those in the traditional face-to-face (FTF) classroom (Allen & Seaman, 2013). Others argue that online education does not replicate the learning that occurs in the traditional FTF classroom due to intrinsic differences (Bejerano, 2008). Falsely, instructors assume that whenever information technology is implemented into the classroom environment, it contributes to student learning (Peng, 2009). Previous studies highlight the need for instructors to evaluate online activities to verify their relevance to student learning (e.g. Braunscheidel, Fish & Shambu, 2013; Fish, 2012, 2013, 2014a, 2014b, 2015; Santos, Hu & Jordan, 2014). Online activities may include computerized homework, quizzes, exams, discussion board contributions, case study evaluations, and individual and group projects.

Research into the debate regarding student homework as contributing to student ability, knowledge and material retention reveals mixed results. Some studies find positive relationships (Eskew & Faley, 1988; Fisher & Holme, 2000), while others found no relationship (Peters, Kethley & Bullington, 2002). Similarly, research into the value of online homework is also mixed (Smolira, 2008) with some studies demonstrating positive results (Arasasingham, Martorell & McIntire, 2011; Arasasingham, Taagepera, Potter, Martorell & Lonjers, 2005; Biktimirov & Klassen, 2008), and others demonstrating negative or insignificant results (Anstine & Skidmore, 2005; Bonham, Beichner, & Deardorff, 2001; Bonham, Deardorff & Beichner, 2003; Cole & Todd, 2003; Daymont & Blau, 2008; Fish, 2013; Horspool & Lange, 2012; Topper, 2007). Some studies show weak correlations between online homework and student performance on examinations (Chamala, Ciochina, Grossman, Finkel, Kannan & Ramachandran, 2006; Fisher & Holme, 2000).

Many subject areas have started to research the relationship between web-based homework and student performance. For an undergraduate business statistics course, an insignificant relationship between web-based homework and overall performance exists (Palocsay & Stevens, 2008). Similarly, in a math course, student

performance was significantly better when using computer-generated math homework versus traditional methods (Kodippili & Senarantne, 2008). In a comparative study between four instructors using the same online homework system, only one instructor noted student improvement in exam performance through online homework (Dufresne, Mestre, Hart & Rath, 2002). Some instructors feel that students increase their homework efforts to merely accomplish it and not necessarily learn the material (Peng, 2009). There is still a lack of consensus regarding the effectiveness of online homework, which highlights the need for further investigation (Arasasingham, Martorell & McIntire, 2001).

Previous research evaluated the performance on computer-managed homework and subsequent in-class testing for different formats for undergraduates (Fish, 2014a) and graduates (Fish, 2014b). Graduate and undergraduate students demonstrated a moderate level of learning between computer-scaffolded to in-class scaffolded learning, but open-ended and partial open-ended learning were weaker (Fish, 2013, 2015). However, differences exist between graduate and undergraduate performance in online homework performance as graduate students perform better than undergraduates (Fish, 2012), and academic maturity is a significant factor as upper level students perform significantly better than freshmen (Urtel, 2009). These studies focused on testing student performance on quantitative – not qualitative – questions in operations management. For quantitative questioning, one value to online quantitative homework that is often sighted is the random number assignment, which forces each student to use different numbers to analyze. This randomization does not exist with qualitative questions, other than to randomize the order of the questions or alternatives between students.

While students may have a preferred method to study for a particular course, the learning outcomes, assessments, teaching method for the course and learning goals can impact how the students study (Hadwin, Winne, Stockley, Nesbit & Woszczyna, 2001). A well-known framework for classifying what instructors expect students to learn as a result of instruction is Bloom's taxonomy, which represents a continuum of increasing cognitive complexity (Krathwohl, 2002). Many instructors feel that qualitative multiple choice questions (MCQ) tend to be appropriate at the lower levels of Bloom's taxonomy – the knowledge or comprehension levels. At the knowledge level, student recall information, while at the comprehension level, students explain information. Qualitative testing through MCQ at the lowest levels of Bloom's taxonomy, knowledge and comprehension, is the focus of this research.

With respect to previous studies on MCQ, an early operations management study found no relationship between required homework and performance on a multiple choice exam for undergraduates (Peters, Kethley & Bullington, 2002). The study did not indicate whether the MCQ were qualitative or quantitative in nature. However, another preliminary study showed a mild correlation in support of learning through MCQ for qualitative material at the knowledge level for undergraduate students (Fish, 2014a). In an introduction to psychology course, students performed significantly better on factual MCQ with older students performing better than younger students on both factual and applied MCQ (Yonker, 2011). The psychology study also showed that there was no relationship between a reported deep study approach and MCQ achievement, and that a reported surface strategy had a detrimental impact on MCQ exam scores (Yonker, 2011). A surface strategy approach emphasizes the reproduction of what is taught to meet the minimum external assessment requirements, while a deeper approach focuses on learning for learning's sake and encourages an abstract level of conceptualization (Yonker, 2011).

While many people assume that MCQ address lower levels of Bloom's taxonomy, MCQ can be higher-ordered conceptual or applied questions (Yonker, 2011). A study on introduction to finance students and using MCQ for assessment revealed that student performance at the lowest level, knowledge, was actually worse than on higher level MCQ (Santos, Hu & Jordan, 2014). They attributed the students' poor performance on the knowledge-based MCQ to the extensive focus in the classroom on computations, the potential skimming by students of textbook material rather than careful reading, and a focus on problem-solving using calculators (Santos, Hu & Jordan, 2014). In a graduate school of business in Australia, the use of assertion-reason questions, a sophisticated form of MCQ, revealed that this type of MCQ corresponds to student performance in essays, which are regarded as a measure of deeper thinking (Williams, 2006). However, the study also highlighted the critical importance of question wording in student performance, particularly for students completing the MCQ not in their native tongue, as well as the time a student takes to process the complex prose of the MCQ as contributing factors (Williams, 2006).

Ideally, the instructor should use the appropriate question for the learning level that matches the learning goals. A common goal of education is to educate the individual for the long-term and not just in the short-term. *What is the relationship between using MCQ to evaluate short- and long-term learning?* In a computer-based study of medical education, computer-based teaching revealed that teaching strategies that improve short-term learning do not

necessarily improve long-term knowledge retention (Mounsey & Reid, 2012). Older students tend to use a surface learning strategy less than a deep strategy (Watkins, 1982).

Through their education, students learn factual information, such as a definition for a term. We refer to this as ‘factual information’, which corresponds to Bloom’s knowledge or comprehension level. In a continuation of this vein of research, this study seeks to evaluate the relationship between factual homework MCQ and factual in-class MCQ performance on qualitative concepts. Specifically, this study seeks to explore the following hypotheses:

H1: General Learning: There is no significant difference between student’s performance on online qualitative, factual homework MCQ items versus performance on in-class qualitative, factual MCQ items.

H2: ‘Short-term’ Learning: There is no significant difference between student’s performance for online qualitative, factual MCQ versus performance on in-class qualitative, factual MCQ items in the ‘short-term’ (days).

H3: ‘Longer-term’ Learning: There is no significant difference between student’s performance for online qualitative, factual MCQ versus performance on in-class qualitative, factual MCQ items in the ‘long-term’ (weeks or more).

METHOD

Over the spring semester, one graduate section (26 students) and two undergraduate sections (63 students) of operations management at an AACSB-accredited university in the northeast (which focuses on teaching) used a computer-managed homework system as part of their coursework. The graduate class average age was roughly 26 years old, with 11 females and 15 males. The undergraduate classes included 17 females, 46 males and averaged 20 years old. (Since the intent of this research is to evaluate student performance between computer-managed homework and in-class performance, and not to evaluate the specific computer-managed homework system, the specific package and textbook will not be noted other than to note that they are very popular in the operations management arena.) The same instructor taught the three sections. The undergraduates and graduate students used the same online homework program, but they used different textbooks and different MCQ.

For the full-time undergraduates, homework corresponded to 5% of their overall grade, and was due on the evening prior to the corresponding in-class quiz. The instructor included quantitative problems corresponding to the textbook and in-class problems as well as instructor developed MCQ on qualitative concepts. The qualitative, factual MCQ were similar to the textbook questions and would be classified as ‘easy to medium’ difficulty. Students could use their notes and the textbook to complete the homework. An example of an undergraduate MCQ used is:

Which of the following is NOT an operations management issue during the growth stage of the product life cycle?

(Note: “Reduce capacity” is the correct response.)

Shift towards product focus

Forecasting critical

Enhance distribution

Reduce capacity

Quizzes were worth 23% of the final grade, and the best 7 of 9 quizzes counted. Quizzes were worth 10 points each and included MCQ, and either short answer questions, quantitative problems or interpretation questions. Three non-cumulative exams were each worth 24% of the final grade. The format of the exams included multiple choice, short answer questions, interpretation questions and quantitative problems. The instructor included 1 multiple choice question from the proceeding homework on the corresponding quiz and a different, but previously administered homework multiple choice question for each of the prior homework was included on the exam. While not tracked, it appeared that many students procrastinated and completed the homework the evening before the corresponding quiz, and not earlier in the week. Since the online homework was attempted within days of taking the quiz, student performance was regarded as ‘short-term learning’ for this relationship. (In many cases, students completed the homework within 24 hours of taking the quiz.) However, with respect to the relationship between the online homework and the exam, the homework was available over weeks earlier (24 days). However, for relationship between the online homework and the exam was at least a week as the homework was due at least a week prior to the corresponding exam. Therefore, the homework to exam performance can be viewed as ‘longer-term’ learning. For the analysis, the instructor gathered the corresponding multiple choice scores from the online homework,

quizzes and exams over the semester. Three students dropped the course just prior to the third exam. For the analysis, these students were included in the overall and quiz analysis, but not the exam analysis.

The graduate students were part-time evening students at the university. Nine homework assignments were given and corresponded to 5% of the students' final grade. (Note one quiz which was totally qualitative did not have a corresponding homework assignment.) Similar to undergraduate students, homework was due the evening prior to the corresponding quiz. The online homework included quantitative problems and instructor generated qualitative, factual MCQ's. The qualitative, factual MCQ's corresponded to the textbook test bank and difficulty of 'easy to medium'. The following is an example of the difficulty of the MCQ:

Which of the following conditions is generally associated with a job process? (Note 'high resource flexibility' is the correct response.)

High product or service volume.

Resources are allocated to specific products.

Relatively standardized products.

High resource flexibility.

Ten quizzes, worth 31% were administered over the course of the semester, with the best 8 counting toward a student's final average. Each quiz, worth 15 points, included MCQ, short answer, and either a quantitative or an interpretation problem. A midterm and a final exam were administered in-class, and each exam corresponded to 32% of the student's final average. Both exams included MCQ, short answer questions, interpretation questions and quantitative problems. Similar to the undergraduate class, the instructor tracked the corresponding multiple choice scores from the online homework, quizzes and exams over the semester. While 26 students completed the course through the last week of classes, 2 students participated in the entire semester, but chose to withdraw prior to the final exam. Their performance was included in the quiz analysis, but not the exam analysis. For the analysis, the instructor gathered the corresponding multiple choice scores from the online homework, quizzes and exams over the semester.

ANALYSIS

Given the nature of the methodology used, statistically the design included a pre-testing performance (the online homework) and a testing (quiz or exam) as a Student-paired t-test. With respect to MCQ, the answer is either correct or it is incorrect, and therefore, a one-tail test is more appropriate than a two-tail test. All of the undergraduate students completed the online homework, while at the graduate level, two students chose not to do the online homework. Since there were only two students in this 'group', statistical analysis is not possible.

Undergraduate Students

In general, undergraduate students performed well on homework MCQ ($\mu = 98.18$), but did not perform as well on in-class MCQ on quizzes ($\mu = 86.99$), the exams ($\mu = 73.95$) or overall in-class testing ($\mu = 80.40$) as shown in Table 1.

Table 1: Undergraduate Student Average and Standard Deviation for MCQ

	Online	In-class Testing		
	Homework	Quizzes	Exams	Overall (Quizzes & Exams)
Average	98.18	86.99	73.95	80.40
Standard Deviation	0.13	0.34	0.44	0.40

As summarized in Table 2, student t-test comparisons reveal that undergraduate student performance on homework versus in-class testing for the multiple choice was significantly different ($p = .000$). (By in-class testing, we refer to the in-class student performance on both quizzes and exams.) Since students' performance on the online homework for qualitative MCQ's was very consistent and very good ($\mu = 98.18$, $\sigma = .13$), comparison between the students who did poorly online versus those who did well could not be performed. As expected, a comparison for 'shorter-term' ($p = .000$) and 'longer-term' ($p = .000$) learning also demonstrates a significant difference in performance between online and in-class performance. The correlation between the homework and the overall in-class testing ($r = .07$), between online homework and quizzes ($r = .05$), and online homework and exams ($r = .08$) were all very weak.

Table 2. Undergraduate Student t-test Results and Correlations

Online Homework vs.	Quizzes	Exams	Overall (Quizzes & Exams)
t-tests	.000*	.000*	.000*
Correlation	.05	.08	.07

* = Significant at $p \leq .05$

Graduate Students

In general, graduate students performed well on homework MCQ ($\mu = 98.84$), but did not perform as well on in-class MCQ on quizzes ($\mu = 86.06$), the midterm exam ($\mu = 85.42$) or the final exam ($\mu = 79.55$) as shown in Table 3.

Table 3: Graduate Student Average and Standard Deviation for MCQ

	Online	In-class Testing		
	Homework	Quizzes	Exams	Overall(Quizzes & Exams)
Average	98.84	86.06	82.48	84.24
Standard Deviation	0.11	0.35	0.38	.36

As shown in Table 4, results of the Student t-test comparison for the MCQ, reveal that graduate students performance on homework and in-class for multiple choice was significantly different ($p = .000$) overall, between homework and quiz performance ($p = .000$), and between homework and exam performance ($p = .000$). The overall correlation between the online homework and in-class testing was insignificant ($r = .03$). The correlation between online homework and in-class exam questions was very weak as well ($r = .09$). Surprisingly, the correlation between online homework and in-class quiz questions was actually negative ($r = -.04$)!

Table 4. Graduate Student t-test Results and Correlations

Online Homework vs.	Quizzes	Exams	Overall (Quizzes & Exams)
t-tests	.000*	.000*	.000*
Correlation	-.04	.09	.03

* = Significant at $p \leq .05$

DISCUSSION

Undergraduate and graduate students performed significantly better on MCQ for their homework than for follow-up in-class testing regardless of whether the testing was shorter-term (quizzes) or longer-term (exams). All of the hypotheses are not confirmed as students who completed online qualitative MCQ did not perform equally on follow-up in-class testing. They did not perform well when the in-class testing occurred within a shorter term (quizzes) or over a longer term (exams). Obviously, in completing the online homework, students had access to other resources, such as notes and textbooks. However, they may or may not have used these resources to complete the qualitative question. In class, students had to rely on whether they learned the material or not to select the correct answer.

The relationship between online multiple choice qualitative questions and in-class testing was very weak. When completing online questions, students have access to several resources. By completing the online question, as demonstrated here, the student does not necessarily retain the material that was tested. Also, in-class instructors should be aware that students may purchase test banks to courses. (Ideally, in an online course if the MCQ is part of testing, a proctoring site is recommended.) These weak correlations and low t-test scores appear to indicate that the students used surface strategies to learn the material – and not deeper learning strategies. These results correspond to the finance study (Santos, Hu & Jordan, 2014) and may highlight the operations management instructors focus on calculations and students ‘skimming’ instead of reading the material thoroughly. These results appear to demonstrate that due to the lower order skills necessary to complete the factual MCQ, students did not necessarily learn the concepts. These results highlight that while students perform well on online homework for factual, qualitative MCQ’s, in subsequent testing, they do not appear to remember the ‘basic’ information. Perhaps in completing the homework, students merely look up the information, and do not transfer the information to long-term memory.

Qualitative MCQ are appropriate to test at the knowledge and comprehension levels of Bloom's taxonomy. However, these results show that long-term learning of qualitative concepts was not demonstrated. *How long does a student retain information tested through qualitative MCQ online or in-class?* These results demonstrate that both graduate and undergraduate students did not retain the information very long as both the 'shorter-term' and 'longer-term' correlations were insignificant or extremely weak. Basically there was no relationship between how a student did on the online questions and the in-class questions – even though the qualitative questions were exactly the same! This is similar to the medical study where short-term learning strategies were not related to long-term knowledge retention (Mounsey & Reid, 2012). However, since the graduates and undergraduates did not learn the material through factual MCQ, the results here contrast the psychology study where students performed well on factual MCQ which require shallow cognitive processing (Yonker, 2011). Since the undergraduate and graduate students used different questions, the graduate and undergraduate results cannot be compared other than to note that both groups did not demonstrate learning the material.

As for 'shorter term' and 'longer term', since specific time frames between when students completed the online MCQ and when they completed the in-class question were not tracked, more detailed tracking may assist in differentiating short-term and long-term learning. A future study should evaluate student performance when the timeframe is tracked between the online and the in-class question.

CONCLUSION

Regardless of the timeframe between online performance and in-class testing, the results highlight that students do not perform at the same level for qualitative, factual information MCQ between online assignments and in-class testing. It appears that students do not learn the material when they complete online questions that test at the lowest levels of Bloom's taxonomy (the knowledge and comprehension levels). In keeping with Bloom's taxonomy, instructors need to be mindful of the MCQ analysis level as well as what they are presenting in the classroom. Using online, factual MCQ's appears to have little value to student learning of basic information at the knowledge and comprehension levels. Further analysis is needed to test whether students' performance is acceptable for MCQ's that test at the higher levels of Bloom's taxonomy (the application, analysis, synthesis and evaluation levels). Future studies need to continue to analyze the relationship between online assignments and testing and traditional face-to-face student performance.

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The Relative Efficacy of Handwritten Versus Electronic Student Classroom Notes

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ABSTRACT

As classrooms rapidly transform into high-technology spaces, a notable shift involves students' uses of laptop computers or other electronic devices to take notes. It is unclear whether the practice of recording notes electronically facilitates learning more or less effectively than does handwritten note-taking, in which students write out the material by hand. This study tests the impact of electronic versus handwritten note-taking on students' exam performance in a marketing class to address this critical question.

Keywords: note-taking, electronic note-taking, student performance

INTRODUCTION

Around the world, traditional university classrooms are being replaced with so-called e-classrooms (Kim, Turner, and Pérez-Quiñones, 2005). These increasingly complex classrooms often include, for example, a computer for the presenter's use, projection equipment, a DVD player, a document camera, white boards, and a Smart Board. Such high-tech equipment lures faculty members into using PowerPoint presentations, boosted by video clips and other glitzy displays (Lin and Bigenho, 2011). Despite the strong push for increased computer and technology use in classrooms, researchers reveal mixed results regarding the benefits of such technology uses (McKinney, Dyck, and Lubert, 2009).

Coinciding with these classroom-level changes, many students now bring laptops, tablets, and smartphones to facilitate their in-class note-taking. For example, at the authors' university, business majors were required to participate in a laptop program that provided all students with identical hardware and basic software. Thus, faculty could mandate that students use programs such as Excel, Access, and so forth, both for homework and during classroom exercises.

While the use of technology in the academic setting seems like a logical bridge for students as they prepare for careers outside of the classroom, some faculty express reservations about student use of laptops and other devices in the classroom (e.g., Yamamoto, 2007). The human mind is prone to wander at times, as has been shown to occur when students use electronic devices (Hollis, 2013). The experience at our university reveals that our colleagues are mainly concerned about learning—or its lack thereof—in the classroom. Although certainly some students surf the Web, text message, or play video games rather than focusing on class discussions, the faculty concerns are more wide ranging. Beyond the simple misuse of laptops, various instructors have come to question the effectiveness of electronic note taking. To further explore this issue, in this study we investigate the following research question: Does it make a difference in terms of student learning and exam performance, if a student takes notes by hand as opposed to electronically?

In the next section, we offer a review of these two forms of note-taking. We then present our research methodology where we test our hypothesis in a classroom setting. The results suggest that the mode of note-taking does influence learning outcomes. We conclude with a discussion of the results, implications, and directions for further research into note-taking.

BACKGROUND

In traditional note-taking practices, students listen to classroom lecture or discussions, deduce the important points, and write them down for (potential) future reference. Note-taking has long been a ubiquitous practice among college students; four decades ago, Palmatier and Bennett (1974) reported that 99% of students took notes during

instructors' lectures. In addition, students perceived note-taking as useful, according to Dunkel and Davy's (1989) finding that 94% of U.S. college students surveyed considered taking notes "pivotal" to their assimilation of lecture content.

There may be evidence that suggests that notetaking methods do influence performance. There is anecdotal evidence suggesting that note-taking may influence learning. Clark (2014) recently reported that each member of the Cleveland Browns professional football team was given a pad of paper upon which to take notes as they learned the new playbook. Every other NFL team gives their players a tablet computer with the playbook pre-loaded. Mike Pettine, head coach of the Browns, was quoted as saying, "To write down is to learn". In a recent study by Perez-Hernandez (2014), the author found that even though students taking notes by hand took barely half as many notes as their counterparts taking notes on a laptop, they scored significantly higher on a test of recall 30 minute later. This also suggests that there may be differential learning effects due to the method of note-taking used.

Taking notes by hand requires greater effort than taking them electronically (Piolat, Thierry, and Kellogg, 2004). Also, for handwritten forms of note-taking, some researchers (c.f., Aiken, Thomas, and Shennum, 1975) have suggested that the inherent division of attention (i.e., split between attending to the presented material and engaging in a recording task) may render note-taking less useful than if the instructor were to provide summaries of the lecture content. Aiken, Thomas, and Shennum found somewhat better retention when note-taking followed listening, compared with simultaneous tasks. However, Thomas (1975) argued that notes taken during information presentation or immediately thereafter appear equally facilitative of subsequent recall. Thomas also reported that note-taking was significantly more facilitative of recall than was reviewing a summary of the lecture provided by an instructor. A subsequent study affirmed that an instructor-supplied summary was inferior to student note-taking for college students' acquisition of economic principles (Cohn, Cohn, and Bradley, 1995).

Such note-taking research often addressed the distinct roles of student note-taking, whether as a means to *encode* material in memory or as an external *storage* vehicle for information, held for subsequent review or studying. Regarding the encoding function, Kiewra (1989) found that when students take notes, but never review them, the note-taking process itself facilitated recall. In terms of storage, the review of notes—whether taken by the student him- or herself or provided by another student or the instructor—also improves subsequent recall. The validity of information contained in notes provided by another student is a separate issue, beyond the scope of this article.

Other early research also has addressed the efficacy of training people in note-taking or note-reviewing techniques. For example, in a study of pertaining to note-taking, Carrier and Titus (1981) explained to students how to (1) distinguish between superordinate and subordinate information, (2) abbreviate words, (3) paraphrase lecture statements in the students' own words, and (4) use an outline format. This training facilitated students' subsequent recall, particularly when they expected an essay format of testing. Furthermore, training students to self-question while reviewing their own notes can facilitate recall more than merely training them to summarize material from their notes during review sessions. Both review methods resulted in superior recall, compared with the results achieved with no instruction on methods for reviewing notes (King, 1992).

More recent research attention has targeted the efficacy of note-taking to promote sharing of notes. Specifically, research has been conducted concerning handheld or larger electronic devices, including personal data assistants, tablet computers, and laptops, for note dissemination among students (Davis, Lin, Brotherton, Landay, Price, and Schilit, 1998; Kim et al. 2005; Landay, 1999; Landay, Davis, Chen, Huang, Lee, Li, Lin, Morrey, and Schleimer, 1998; Moran, Palen, Harrison, Chiu, Kimber, Minneman, van Melle, and Zellweger, 1997; Rekimoto, 1998; Stifelman, Arons, and Schmandt, 2001). In addition to investigations of whether electronic-assisted note-taking improves users' ability to share notes (Davis, Lin, Brotherton, Landay, Price, and Schilit, 1998; Landay, 1999; Landay, Davis, Chen, Huang, Lee, Li, Lin, Morrey, and Schleimer, 1998), other research has advocated use of electronic devices to capture additional elements of the surrounding environment within students' notes, such as with video or auditory recordings (Chiu, Kapuskar, Reitmeier, and Wilcox, 1999; Moran, Palen, Harrison, Chiu, Kimber, Minneman, van Melle, and Zellweger, 1997; Rekimoto 1998). Furthermore, Kiewra and colleagues (Kiewra, 1989; Kiewra, Mayer, Christian, Dyreson, and McShane, 1991) showed that allowing students to review a recorded lecture up to three times, and instructing them to take different notes each time they viewed the material, produced more complete notes. Although the most important information tended to be recorded in initial notes, students added less important, related clarifications or supportive information after subsequent viewing(s). Although these studies did not test recall after each viewing and note-taking session, better notes (i.e., more complete)

seemingly should facilitate subsequent recall. As Weener (1974) reported, the probability that a student recalled an item during a test was higher if that item appeared in his or her notes.

Unfortunately, until very recently, research into electronic notetaking paid little attention to either information recall or the relative efficacy of electronic versus handwritten note-taking. The scant earlier research begs the question of the effectiveness of electronic note-taking. According to Bui, Myerson, and Hale (2013), electronic note-taking may improve immediate recall on tests. Yet, in a survey of 35 computer science graduate students and human-computer interaction researchers regarding their note-taking methods and preferences (Kim et al., 2005), three-quarters of those computer-savvy people preferred taking handwritten notes to using electronic-assisted means. Only five respondents indicated a preference for computer-assisted note-taking, offering reasons such as preferring to type their notes, the ability to search for related material while recording notes, data entry speed, neatness of typed relative to handwritten output, and perceptions of greater information security. In contrast, the majority who preferred to hand record their notes complained about the difficulty of drawing within typed notes (e.g., diagrams, arrows connecting topics). They also reported that taking notes by hand provided more flexibility in placing material and greater capability to be expressive. Additionally, they viewed handwriting (versus keyboarding) as faster, which suggests that relative typing speed may influence note-taking medium preferences. Across all respondents, whether they preferred electronic or handwritten notes, typing as a means of note-taking seemed *neither particularly natural nor efficient*. As one participant in Kim et al.'s study (2005) commented, "I remember much more of what I write than what I type. In fact, most of the time, I won't remember much of anything that I type, while I can remember a great deal more of what I hand write."

This reflection is consistent with physiological findings provided by Katanoda, Yoshikawa, and Sugishita (2001). In a functional MRI study, they investigated which portions of the brain became activated when participants wrote down names of pictured objects, named pictures silently, or engaged in visually cued finger tapping, which is similar to typing. By comparing the brain activities in the three conditions, the researchers discovered that very different areas of the brain were involved in handwriting versus typing. Briefly, tapping alone is right-brain-dominant activity, whereas both hemispheres of the brain appeared equivalently activated by writing alone. If the naming function were added, writing became a left-brain-dominant activity. Thus, writing appears to *require* the activation of certain cognitive sections of the brain, but typing (finger tapping) does not require left-brain activation. People might choose to both think and type, but they can also type on "automatic pilot."

A single, recent study (Mueller and Oppenheimer, 2014) investigated the relative efficacy of note-taking either by hand or electronically. In a series of three laboratory experiments, they found that electronic note-taking resulted in reduced performance in answering conceptual questions than did note-taking by hand. They reported that, "whereas taking more notes can be beneficial, laptop note takers' tendency to transcribe lectures verbatim, rather than processing information and reframing it in their own words, is detrimental to learning" (p. 1).

Thus, for the current investigation, we expect that writing notes by hand affects the encoding of information in memory, and also provides external storage (i.e., on paper), whereas typing may be effective only as a means to store material for future analysis. In this case, classroom time seemingly could be somewhat wasted, in terms of learning, if students are typing notes. If this typing occurs without corresponding thinking, the clarification questions that should be asked during information presentations could also go unasked. In our attempt to determine the relative efficacy of student note-taking by hand or through electronic means, we reflect on previous research and accordingly propose the following hypothesis:

Hypothesis: Students taking hand-written lecture notes will perform significantly better on related essay test questions than those who take notes electronically.

Although several other variables can affect student test performance, this quasi-experimental study seeks to identify the potential effect of note-taking method on subsequent test performance in an actual classroom environment.

METHODOLOGY

Our methodology aimed to extend existing research that had utilized an artificial laboratory setting (e.g., Mueller and Oppenheimer, 2014), to a natural classroom environment. Two sections of an introductory integrated business curriculum (IBC) class participated in the study, which took place during the third month of the course. At the university in which the experiment was conducted, IBC was taught by a five-member faculty team, represented by

one professor each from finance, information systems, management and human resources, marketing, and operations management. Classes met for nine hours per week during the first semester, and eight hours per week in the second semester. The IBC class covered basic concepts in several functional business areas, and associated presentations and discussions attempted to help students integrate the concepts into a meaningful view of business as a whole. The sample included first-semester juniors majoring in accounting, economics, finance, information systems, management and human resources, marketing, and operations management. The sample was 66% male/34% female, with participants ranging between 20 and 22 years of age.

Students were informed that the instructors intended to conduct research on the potential relationship between student note-taking methods and subsequent exam performance. Of the approximately 100 students (i.e., about 50 per section) in the IBC sections, 54 voluntarily agreed to participate. Students were assured that they would be free to choose their preferred note-taking method(s), and could change it at any time during the study. Each student maintained a detailed record of his or her note-taking method(s) when the class covered any of 14 marketing-related topics. Those topics were presented over a six-week period, which bridged two exams. All marketing topics were presented by a single instructor. Each day that she taught, the marketing instructor reminded students to record their method(s) of capturing notes, on a topic-by-topic basis. Student note-taking method diaries were not collected until after both exams with related essays had been administered, graded, and returned to students.

The two separate exams that provided the performance tests took place three weeks apart, and the marketing essay questions were written and graded by the same instructor who had presented the marketing-related material. In IBC all exams were numbered, and one's number related to which calculator he/she had drawn from a box provided by the proctor before the student took a seat for the test. One's test number differed from exam to exam, and the only place in which a student's name was associated with his/her number was on a cover sheet, which was taken by the teaching assistant to create a list for use after the exams were graded. Since no names appeared on essay responses, no instructor grader knew whose response he/she was grading. Thus, the instructor who graded the marketing-related questions included in the study was blind as to the note-taking method chosen by each respondent until after the graded exams had been returned to the students and the experiment had been terminated.

During the coverage period students were prompted to fill in an hourly table describing their note-taking method(s) at the end of each three-hour class period. Of the 14 potential topics related to the note-taking method data, three appeared as exam questions. Other exam questions, such as those from other functional areas, or that integrated material from more than one topic, were excluded from the analysis. This was done to insure that we knew their related note-taking method, and that students' note-taking methods were consistent within the question's topic. Student participants were unaware of which marketing topics would serve as a basis for the research-related exam questions.

Students self-selected into teams for various class projects throughout the semester. They were not required to study for exams in those same teams, but many chose to do so. Slightly fewer than half of the teams initially volunteered to assign one member to taking electronic notes, while the other members would take class notes by hand during the experiment-related portions of the class. Thus, one member of each handwritten note "team" would fill in blanks in incomplete PowerPoint slides, which had been prepared by the instructor and provided electronically to students before the related material was presented. Thus, all students had access to a complete set of notes about the related material. Which member of each team filled in PowerPoint slides electronically could vary from one class session to another, as determined by the participants. An example of a fill-in-the-blank slide would feature a particular target-marketing strategy (e.g., undifferentiated), and would provide the terms "Advantages" and "Disadvantages." Students would then either hand write advantages and disadvantages in their notes, or type them into their slides.

Other student teams self-selected into the electronic notes condition, taking notes electronically, in whatever fashion they chose. The note-taking record provided by each participant distinguished between handwritten and electronic note-taking, and also included more detailed information about the electronic methods they selected (e.g., One-Note, fill-in-the-blank PowerPoint, Word, etc.). During the quasi-experiment each student could use whatever note-taking method he or she believed was most useful for particular material. Thus, some participants crossed between treatments during the study.

Exams in IBC relied entirely on essay responses, and were conceptual in nature. Some essay questions pertained to a particular functional business area; others integrated material from more than one functional area. By linking the

scores on questions tied to particular marketing topics to note-taking methods, we specified our dependent variable as the percentage score on each of three 20-point essay questions.

Student exam performance has been found to relate to many factors, including student aptitudes, skills, motivation, and learning-related self-efficacy beliefs, as well as instructor attributes and instruction quality (Devadoss and Foltz, 1996; Zimmerman and Martinez-Pons, 1992). Since the same instructor presented all material related to marketing topics, using the same Power Point slides in both class sections, instructor-related variables and instruction quality remained constant across the note-taking methods.

All students had equivalent previous business-related classes (accounting, economics, business law, business writing, statistics, and mathematics). They had not taken previous classes in marketing. All the lectures for which the related questions served as dependent measures pertained to marketing topics (i.e., market segmentation and targeting, marketing research, and consumer behavior).

Exams contained multiple marketing-related essay questions, and students could select a subset of those questions to answer. Thus, the cell sizes were not equivalent, ranging from 9 (consumer behavior, hand-written notes) to 23 (marketing research, electronic notes), with an average of about 17 per Exam-Topic by Note-Taking Method combination. Question 1 (market segmentation/targeting) appeared in the fourth exam of the semester, and questions 2 and 3 (marketing research, consumer behavior) were included in exam five. Thus, differences in performance across questions could reflect either a learning curve effect, and/or topical and question difficulty differences.

RESULTS

In a preliminary analysis, we employed class section as a potential predictor variable, but found that performance on the essay questions did not differ between sections. As such, we did not include it in subsequent analyses. Similarly, while college major could have related to motivation and aptitudes, and could have affected essay question performance, it was also dropped from subsequent analyses when it was found that the confidence intervals for marketing and non-marketing majors overlapped.

As an initial analysis, we divided the participants into three GPA strata. Mean question percentage scores are shown for each GPA Third and Note-Taking Method in Table 1. Before analyzing the effects of Note-Taking Method on essay question performance, we wanted to determine if choice of note-taking method was related to previous GPA. It could be that “better students” would be more likely to have learned that taking notes by hand resulted in better exam performance. Note-taking method was significantly related to GPA Third ($F_{2,81} = 3.850, p < .05$). As can be seen from Table 1, for both the top and middle GPA strata, selection of note-taking method was about half and half. However, for the lowest GPA third, a much smaller percentage chose to take notes by hand. A Duncan’s Multiple Range Test, at $p < .05$, revealed that the top and middle GPA strata were a homogeneous subset, and that the bottom GPA stratum was a separate subset in terms of likelihood of taking notes by hand. Due to the significant differences, all further statistical tests were conducted within GPA strata.

Since we had identified both question topic and note-taking method as potential sources of variation in question percentage scores, we used stepwise regression within GPA strata to analyze the data, and allowed the data to drive the results. In Tables 2 and 3, we present the R^2 and F test results from the stepwise regressions. As can be seen from Tables 2 & 3, for the top GPA stratum, only Note-Taking Method entered the equation (adjusted $R^2 = .130$). Table 4 shows that for the top GPA stratum, Note-Taking Method was significantly related to Q%Score ($t = 3.134, p < .01$).

As can be seen in Tables 3 and 4, for the middle GPA stratum Question Topic and Note-Taking Method entered the equation, in that order (adjusted $R^2 = .367, p < .001$). Table 4 shows that both Question Topic ($t = 4.515, p < .001$) and Note-Taking Method ($t = 3.527, p < .01$) were significantly related to Q%Score, indicating that the mid-third GPA students performed better on some essay questions and topics than on others. More importantly, as had been hypothesized, those taking notes by hand during class scored significantly better on the marketing-related essay questions than did those who had taken notes electronically.

Finally, turning to the bottom GPA stratum, only Question Topic entered the equation (adjusted $R^2 = .082$). For the “poor student” group, which question was answered significantly related to Q%Score ($t = 2.487, p < .05$), as can be seen in Table 4. As can be seen in Table 1, very few bottom GPA students chose to take notes by hand.

Because the cell sizes were unequal, we performed a Type III Sum of Squares Analysis of Variance (c.f., Lane, undated; Maxwell and Delaney, 2003) to determine if observed results could be attributed to the unequal cell sizes. Within the same GPA strata used in preceding analyses, we found that the same factors which had been found to be significant in the stepwise regressions remained significant in the Type III Sum of Squares Analysis of Variance, indicating that the unequal cell sizes did not create spurious results.

As can be seen from Tables 3 and 4, for both the top and middle GPA strata Note-Taking Method was significant and entered the equation. Specifically, Note-Taking Method, alone, was significantly related to Q%Score for the top GPA group. Both Question Topic and Note-Taking Method related significantly to essay question performance for the middle third GPA stratum. Only for the bottom GPA group was Note-Taking Method unrelated to performance on related essay exam question. Given that Note-Taking Method remained a significant predictor of Q%Score for the top two-thirds of students as defined by previous GPA, we concluded that the effects of Note-Taking Method went beyond a “better student” interpretation. That is, even after allowing for previous success as students, the top two-thirds of students still improved their performance by taking notes by hand.

DISCUSSION

Academic test performance relates to many different factors, including both instructor- and student-related variables. Instructor characteristic and quality of instruction, along with the nature of the class lectures and discussion, can influence student performance measures. Other instructor-selected variables, such as nature and structure of exam questions, and their subsequent grading, can also effect student test score outcomes. Noting these effects, we held instructor- and instruction-related variables constant by using a single individual for instruction, question creation, and grading of the marketing-related essay questions.

In terms of student-related variables, aptitudes, skills and motivation can all affect academic test performance. We sought to control for differences in student aptitudes and skills by dividing respondents into GPA strata, before running analyses to test the effect of note-taking method. Additionally, by selecting two sections of a class whose students were extremely homogeneous in background courses (e.g., accounting, economics, statistics, business writing and math) which could affect comprehension of the marketing material, we were better able to isolate the effect of note-taking method.

Many business academics, though highly knowledgeable in their various functional areas, are less well versed in pedagogical issues. Furthermore, the meaning of best pedagogy practices continues to change rapidly, especially with the advent of electronic classrooms and the arrival of students who have grown up with electronic multitasking. Just as instructors may be less than perfect in their pedagogical methods, so are students imperfect in their learning techniques. For example, students may believe it is easier—and *equally effective*—to use classroom time for accurate (electronic) recording of classroom notes, with the presumption that areas of potential confusion can be subsequently clarified merely by studying their notes or discussing the material with fellow students. The choice by many students to adopt electronic note-taking emphasizes the recording aspect of this task, leaving the encoding portion either wholly or partially deferred until a later time. Figuring out meaning requires more mental effort than merely recording information presented in class. In this sense, the concept of the present value of time may be something that instructors do not have to teach; students appear to understand it already. It is just plain easier to record now, and leave the figuring-out until later.

A superiority in handwritten note-taking methods was previously found and reported by Mueller and Oppenheimer (2014). Their study showed that those who took notes electronically recorded significantly more material, but did less encoding of the material. As such, when their participants were allowed to study prior to being tested, those who had taken notes by hand outperformed those who had taken them electronically. This held even when participants were instructed to take notes in their own words, rather than writing down notes verbatim.

Taking notes by hand ultimately leads to superior learning of the presented material and thus improved test performance. This evidence suggests that instructors should encourage students to take handwritten notes during

class, which could be accomplished through various means. Although an open and frank discussion of the superiority of handwritten notes seemingly should suffice, this approach did not meet with overwhelming success when we attempted to implement it, as demonstrated by the smaller cell sizes in the handwritten condition. In addition, among the 46 students who chose not to participate in the study, the majority used electronic means to take notes. Thus, though both faculty and students seem critically aware of the additional effort required to take handwritten notes, students used in this study did not appear to realize the superior value of handwritten notes, in terms of producing learning and enhancing exam performance, or in being willing to make the greater effort-related investment during class.

It should be recalled that the classes were informed of our hypothesis concerning the superiority of taking notes by hand prior to any presentation of the related class material, and before they selected means for taking notes on each section of material. Yet, for the top two-thirds of the classes in terms of previous GPA, half still chose to take notes electronically. We have no way of knowing how the proportion of electronic- to hand- notes would have been among the “better students,” had we not shared our beliefs with them in advance. Additionally, after controlling for previous GPA, in both the top and middle GPA strata Note-Taking Method did relate significantly to essay question performance. Specifically, the top two-thirds of participants by GPA performed significantly better if they took note by hand, rather than electronically, just as had been found by Mueller and Oppenheimer (2014). Clearly, the word needs to get out, even among the previously more accomplished students.

Our results revealed that note-taking method did not relate to essay question performance for the bottom GPA stratum. Thus, rather than a “better student effect” – that more accomplished students would have already learned that taking notes by hand results in superior performance and would thus select that method – we may have uncovered a “poorer student effect.” It may be either that the previously-identified weakest third did not have adequate motivation to take notes by hand, and/or did not possess the note-taking skills assumed in our predictions. Specifically, we presumed that when one takes notes by hand, he/she encodes them (i.e., translates concepts into one’s own words), rather than merely trying to stenographically record them, verbatim. Some of the weaker GPA students who tried to take notes by hand may have not only lost out on the encoding advantages, but may also have ended up with an incomplete transcription of the notes. Since we did not collect notes from the student participants, we cannot do a content analysis of them. Thus, this is only a guess on our part. But, if subsequent research determines that weaker students lack solid note-taking skills, it may be something that universities need to teach to incoming students.

Because most people learn better by doing than by listening, the current study sought to help students recognize this point for themselves. We shared the results with the students, in the hope of improving their self-efficacy beliefs with regard to preparing for exams. Another potential method to encourage students to take handwritten notes would be to withhold copies of the instructor’s notes from students, or to provide them with only abbreviated, electronic versions of the notes, after the presentation of the material and related discussions in class. If an instructor realizes that certain material is particularly complex or requires careful encoding, he or she could also ask students to close their laptops and take notes the old-fashioned way.

Even with these findings, we urge caution in interpreting our results or making broad generalizations. The human mind is prone to wander at times, and with students’ ready access to laptops, those taking electronic notes might deviate more easily from classroom learning activities, and split their focus away from the material at hand. Faculty concerned with student engagement in electronic classrooms thus may need to consider additional mechanisms to minimize distractions and wandering minds, if they hope to enhance student learning.

LIMITATIONS

In this quasi-experimental research, the participants were not only aware of the research hypothesis, but also could self-select note-taking method. Thus, determination of a causal link between note-taking method and exam performance is tentative, despite our use of other potential predictor variables to try to isolate its role. Although it seems unlikely that students selecting to use electronic means of taking notes would intentionally risk their grades in an effort to support the research hypothesis, that interpretation represents a competing hypothesis to explain the findings.

Another concern might revolve around the representativeness of the sample. Mueller and Oppenheimer’s (2014) previous experimental studies demonstrated the superiority in test performance when a laboratory setting was used,

and participants could be randomly assigned to note-taking methods. However, our interest was to see whether that superiority of taking handwritten notes would occur in a more natural setting, and when students were allowed to take notes by whatever means they preferred. While our selected quasi-experimental method is not as strong in internal validity as a true experiment would have been, it does have stronger external validity with participants, leaning and testing situations similar to those found here. Our study was conducted in an accredited business school at a state university. At our university most students attend full time and live in residence. Our sample was homogeneous in terms of the participants' academic background (starting their junior year; previous foundation courses in accounting, economics, business law, business writing, and mathematics) and their age (20–22 years). Caution is required in generalizing the results to other, dissimilar student populations.

Additionally, the nature of the testing involved use of essay questions related to class discussion. As such, they were conceptual and application oriented, much more so than factual recall tasks. That type of testing was found by Mueller and Oppenheimer (2104) to be favor handwritten note-taking, over electronic note-taking. Many classes which have a large factual-based content may not show the same marked superiority in test performance among those taking notes electronically.

Although the marketing topics for the three questions were somewhat different from each other, certain types of material and learning elements were not tested by the current study. For example, none of the topics included mathematical problem-solving. It appears unlikely that students would choose purely electronic means of note-taking with quantitative material, as formulae are difficult to record quickly with a tablet or laptop. However, for courses in statistics, mathematics, and other problem-oriented concepts, the use of electronic devices may be highly beneficial in problem-solving. If students can work through problems by themselves, using some problem-solving software (e.g., Excel, SPSS, SAS), it likely requires greater left-brain activation than would electronic note-taking of verbally presented material. In these cases, electronic means for such “note-taking” may prove highly effective in producing the learning desired by both faculty and students.

We also acknowledge that the superiority of handwritten notes over computer-generated ones in our research pertains only to standard note-taking, and does not relate to use of concept mapping. Further research is needed before we can apply the current research findings to other types of material or other means of learning. What we suggest is testing this for yourselves in your own classes, and seeing whether it leads to enhanced understanding.

Table 1. Essay Question Percentage Scores by Previous GPA Third and Note-Taking Method^a

GPA Third	Note-Taking Method	Mean	n	Std. Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Top	Electronic	82.308	13	4.752	72.843	91.772
	Hand-Written	88.929	14	4.579	79.808	98.049
Middle	Electronic	56.667	15	4.424	47.855	65.478
	Hand-Written	80.769	13	4.752	71.305	90.234
Bottom	Electronic	71.136	22	3.653	63.861	78.412
	Hand-Written	65.000	5	7.663	49.739	80.261

a. Dependent Variable = Q%Score

Table 2. Model Summary within GPA Strata

GPA Third	Model	R	R ²	Adjusted R ²	Std. Error of the Estimate
Top	1	.381 ^a	.145	.130	14.43041
Middle	1	.503 ^b	.253	.240	16.37198
	2	.624 ^c	.389	.367	14.94104
Bottom	1	.313 ^b	.098	.082	17.39414

a. Dependent Variable = Q%Score

b. Predictors: (Constant), Note-Taking Method

c. Predictors: (Constant), Question Topic

d. Predictors: (Constant), Question Topic, Note-Taking Method

Table 3. Effects of Question Topic and Note-Taking Method on Question Scores within GPA Strata^a

GPA Third	Model		Sum of Squares	df	Mean Square	F	Sig.
Top	1 ^b	Regression	2045.601	1	2045.601	9.823	.003 ^b
		Residual	12077.732	58	208.237		
		Total	14123.333	59			
Middle	1 ^c	Regression	5175.020	1	5175.020	19.307	.000 ^c
		Residual	15278.370	57	268.042		
		Total	20453.390	58			
	2 ^d	Regression	7952.242	2	3976.121	17.811	.000 ^d
		Residual	12501.148	56	223.235		
		Total	20453.390	58			
Bottom	1 ^c	Regression	1871.256	1	1871.256	6.185	.016 ^c
		Residual	17245.694	57	302.556		
		Total	19116.949	58			

a. Dependent Variable: Q#Score

b. Predictors: (Constant), Note-Taking Method

c. Predictors: (Constant), Question Topic

d. Predictors: (Constant), Question Topic, Note-Taking Method

Table 4. Coefficients^a

GPA Third	Model		Unstandardized		Standardized		Sig.
			B	Std. Error	Beta	t	
Top	1	(Constant)	74.730	2.372		31.500	.000
		Note-Taking Method	12.009	3.832	.381	3.134	.003
Middle	1	(Constant)	52.082	5.403		9.639	.000
		Question Topic	6.534	1.487	.503	4.394	.000
	2	(Constant)	48.443	5.038		9.616	.000
		Question Topic	6.148	1.361	.473	4.515	.000
		Note-Taking Method	14.541	4.123	.370	3.527	.001
Bottom	1	(Constant)	63.068	5.741		10.986	.000
		Question Topic	3.929	1.580	.313	2.487	.016

a. Dependent Variable: Q%Score

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Teaching Technology Skills to Undergraduate Marketing Students: Infusion or Dedicated Course?

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ABSTRACT

The constant and rapid change of technology has made it challenging for higher education to identify the technology skills marketing undergraduate students should possess. When specific skills are identified, obstacles such as integration, cost, faculty skill level, and other issues complicate the implementation effort. This paper examines two dominant approaches currently used in undergraduate programs, provides an employer overview of technology expectations for entry-level marketing positions, and describes how one small, private institution attempts to address this issue.

Keywords: technology skills, undergraduate marketing students, curriculum integration

INTRODUCTION

Technology used by companies to promote and build brand awareness is constantly evolving. It is a moving target for higher education to prepare graduates who possess these technology skills for entry-level marketing positions. While the marketing basics have not changed, Benbunan-Fitch, Lozada, Pirog, Priluck and Wiseblit (2001) noted “Emerging technologies are radically and quickly changing the nature of the four elements of the marketing mix” (p. 5). “Few disciplines”, Hannaford, Erffmeyer, and Tomkovick (2005) added, “have been more affected by technology than marketing” (p. 67). The premier accreditation body for business schools, AACSB, includes technology in their accreditation standards as it stresses “... the importance of information technology and the ability of students to use current technologies in business and management contexts” Crittenden & Crittenden, 2015, p. 72). The increased use of social media to promote and build brand awareness has only intensified this issue. This paper will describe the challenges universities face teaching the necessary technology skills to meet employer’s needs or risk being viewed as disconnected.

A REVIEW OF THE CURRENT ENVIRONMENT

Higher education does include technology skills as a learning outcomes/competency (Bateman, 2010; Benbunan-Fitch et al, 2001; and Faulds & Managold, 2014). If we are to consider these skills critical for our students’ job preparation, Benbunan-Fitch et al, (2001) provide a sound description for technology competency. They stated “... technology competency refers to the ability to use technology to find and gather relevant data from various sources; organize, summarize, and analyze them; and process them into meaningful and useful information for making business decisions and for improving productivity” (p. 6). Bateman (2010) suggests universities have technology enhancements as a goal in required courses and/or embed technology-based projects.

While employers may not state specific software requirements in their job descriptions, these expectations are often implied (Crittenden & Crittenden, 2015; Frederiksen, 2015; Harrigan & Hulbert, 2011; Schlee & Harick, 2010; Smith, 2015; Teer, Teer, & Kruck, 2007; and Walker, I., Tsarenko, Y., Wagstaff, P., Powell, I., Steel, M., & Brace-Goven, J., 2009). Alumni, according to a survey by Davis, Misra, & Van Auken (2002), felt underprepared in areas such as databases, spreadsheets, and statistical packages. Educators and practitioners should have closer working relationships to ensure that marketing modules (especially digital marketing) build foundations with both a theoretical and practical relevance (Duffy & Ney, 2015, p. 112). Frederiksen (2015) noted specific marketing software tools required by jobseekers included email marketing; social media management and analytics, specifically Google Analytics and Adwords; customer relationship management (CRM); and content management systems (CMS). As this field intensifies, Teer, et al, (2007) added, graduates should have a “... solid exposure to database management and analytical skills” (p.247).

The volume of available customer data continues to grow. To survive, companies must be able to use technology to aggregate and analyze customer information then develop personalized marketing messages. As consumers want to interact anywhere at any time, have unrelated information gathered to provide value for them, personalize their

experiences, and interact with ease, the demand on businesses to meet these expectations intensifies. Sound decision-making based on data coupled with accessing this information without a significant amount of manipulation are a differentiator for companies. Employees with this skill set will be in demand (Frederiksen, 2015). With all these tools at their disposal, Smith (2015) added "... that means that to be a marketer you have to know a little bit about a lot of technology" (para. 6).

We know students should be familiar with technology, however, several questions are core to this issue. What technology do we expose our students to? What level of expertise is needed? Who teaches it? Is it stand-alone course(s) or integrated into the curriculum? The next sections of the paper will provide additional information on these questions, data on technology skills required by employers, and one institutional approach.

EXAMPLES OF USING INFUSION OR DEDICATED APPROACHES

Learning new technology can be daunting for both faculty and students. It is important to follow Bloom's Taxonomy ("Bloom's Taxonomy", n.d.) of introducing, reinforcing, and then applying concepts as it is well-documented students retain information longer with this approach. Two distinct approaches to implementing technology into the curriculum are used. The first approach is to infuse technology into a specific course. This might include embedding assignments or projects using specific spreadsheet, database, or webpage software as part of a course. The second approach is to add or require a technology course with the primary outcome of the course revolving around in-depth learning of one or two software programs.

Hannaford, W., Erffmeyer, R., & Tomkovick, C. (2005) conducted a survey of AACSB schools to determine the prevalence and importance of specific technology course in the marketing discipline. They reported "...a quarter of those who responded currently offer or are strongly considering offering a discrete technology-based marketing applications course" and "...a full two-thirds report that they offer a course in Internet marketing and another 12 percent are contemplating adding such a course within two years" (p. 70). When asked to identify the biggest challenge in teaching marketing technology, the responses included competition from other departments (Management Information Systems or Computer Science); lack of an overall departmental/school strategy; insufficient time, money, or facilities; the fast-changing nature of technology; and the view that teaching technology was outside the scope of the marketing area. One particular respondent comment was astute and reinforced the main issue - How do we find room in the curriculum and, if the choice was integration due to its efficiency, are we sacrificing effectiveness?

Harrigan & Hulbert (2011) surveyed senior marketing practitioners to gain a general understanding of the marketing discipline. The results of this survey lead to old and new Marketing DNA models. The old DNA model included marketing in the context of the wider organization; marketing planning; marketing environment; buyer behavior; marketing research; segmentation, targeting, and positioning; contexts of marketing, 4Ps of marketing, marketing communications, marketing channels, and implementation ad control. The new Marketing DNA is comprised of customer led marketing; online and offline integrated marketing communications, data driven marketing, value driven strategic marketing, and marketing channels. The new model separates the organization 'response' role and the customer 'ambassador' role and allows for more in-depth in any strand, for example customer insights in the customer led marketing or Customer Relationship Management (CRM), Customer Experience Management (CEM), and analytics (dashboards) in the data driven marketing strand. As each strand is strengthened, the DNA, as a whole, is stronger. The repackaging and overlapping strategy of the new Marketing DNA model has the potential, they stated, to deliver "...many of the new technology-related skills in digital communications and marketing analytics that employers are crying out for" (p. 268).

This appears to be a good approach by not sacrificing content for technology but it still does not address the some obstacles such as acceleration of technology change (McCorkle, Alexander, & Reardon, 2001); interstudent technology competency (McCorkle et al, 2001); not having a faculty expert (Hannaford et al, 2005; McCorkle et al, 2001); sufficient technology support (Hannaford et al, 2005); implementation issues, such as marketing versus business core specific technology (Hannaford et al, 2005; McCorkle et al, 2001); and that some faculty do not believe they should be teaching technology skills in the curriculum (Hannaford et al, 2005). Hannaford et al (2005) believed some of these obstacles could be overcome by team teaching, utilizing staff to teach a portion of the course, developing technology expertise in one or two faculty, securing corporate sponsorship, charging students lab fees, adding smaller – one or two credit – courses, and/or linking critical thinking skills to technology since students typically need to 'figure out' how to use some technology features. Using the diffusion approach, McCorkle et al

(2001) detailed a four-step approach, including a faculty incentive/ reward structure, to incorporating technology. The reward structure provided summer grants, release time, titles/recognition, travel funds, graduate assistants, and even merit pay increases for achieving key success measures. The first step in the approach was to identify technology champions within the department while step two provided these champions with the appropriate resources. Step three, essentially an adoption or rejection feedback loop, was determined based on step four. In the first part of step four, the champion was responsible for mentoring faculty, disseminating the proposed technology through workshops or short courses, and developing a curriculum map. A committee then made recommendations, secured grants, and educated tech support on their needs. This approach appears to provide the appropriate structure and support for technology integration but still leaves some issues to resolve such as “Tech support is more likely focused on computer hardware and software needs within the labs and office instead of on multimedia difficulties in the classroom” or “differing levels of upgrades, making discipline-specific compatibility between classrooms, student, and faculty difficult” (p. 19).

Social and digital media utilization has brought a whole other twist to this issue. Spiller & Tuten (2015) questioned “...whether or not our college marketing courses are keeping up-to-date and teaching relevant quantitative concepts and metrics needed for the marketing profession” (p. 117). Fortunately, digital opportunities, offered by software companies, do exist. Google Analytics and Adwords, Hootsuite University, and Hubspot Academy enable professors to incorporate social media analytic concepts into their courses by offering some free access and online tutorials. “As industry continues to develop” they noted “other digital services may offer universities access to industry tools and current data” (p. 120).

Whether faculty decide to use a diffusion versus a dedicated course approach to technology, the issue of which technology to incorporate still exists. The next section of the paper provides a sample of technology skills required or preferred by employers.

EMPLOYER JOB LISTING RESEARCH

A search using Indeed and Monster job sites on current entry-level marketing positions was conducted. While there are many titles for entry level marketing positions, two primary search terms were used to gather data: marketing associate and marketing coordinator. Even with these terms, positions such as marketing specialist and sales/marketing assistant often came up in the results. Specific job posting were eliminated if they required more than three years of experience or high school diploma as these postings did not fit the entry-level marketing positions most students would be qualified or apply for.

Forty positions in a variety of industries, ranging from health care to manufacturing to business-to-business services were reviewed and entered into a spreadsheet. Nineteen of the forty postings (47.5%) listed Microsoft Office Suite, with 11 of the postings specifying advanced Excel skills as required or preferred skills. Other technology listed as preferred or required familiarity were Adobe Suite (23%), content management systems (18%), customer relationship management systems (15%), WordPress (13%), HTML (10%), and Social Media (10%). Social media included Facebook, Twitter, Instagram, and YouTube. Google AdWords or Analytics, search engine optimization, SAP, and syndicated data, such as Shopper Card were all mentioned in less than 10% of the postings.

While some of the listings called out for specific software, for instance, Pardot, Salesforce, Pipedrive, Constant Contact, or Hubspot, many of the companies preferred more general terms such as CRM, CMS, database lead tracking or social media management. Table 1 below provides a sample of business/marketing software and the basic purpose of the software. This aligns with much of the research already stated above – a specific software may not be as important as the familiarity with the overall concept of managing the consumers’ behavior and the ability to learn new technology and applying it to a marketing problem.

Table 1: Business/Marketing Software and its Purpose

Software	Purpose
Adobe Suite	Graphic design, video editing, and web development applications
Canva	Graphic design
Constant Contact	Email and online marketing campaigns
Drupal	Content-management framework
Easel.ly	Create infographics
Google Adwords	Advertising system based on keywords
Google Analytics	Marketing analytics and measurement
Google Digital Garage	Mastering online marketing
Hootsuite	Manages social media
Hubspot	Inbound marketing and sales
Microsoft Office	Word processing, spreadsheet, database, email, content management
Pipedrive	Customer relationship management and sales management
Salesforce	Customer relationship management, B2B marketing
SAP	Enterprise management system
Sprout Social	Social media management
SPSS	Statistical analysis
Tagel	Word cloud generator
Wordpress	Website or blog

The next section of the paper describes our approach to teaching students technology using both the dedicated and infused approaches.

A combined approach by our college

As a small, private college with a multitude of business majors including accounting, finance, management, and marketing that share core business classes, we have adopted a combined approach. All students get exposed to Microsoft Office, as well as project management, and document sharing software in a business software course as most companies use these in their day-to-day operations. Specific core courses add additional technology content, then marketing courses apply the knowledge learned in core courses and expose the students to marketing-specific software programs. The details of our approach are described next.

In the business software course, the instructor focuses on software the students would encounter in upcoming business courses as well as in the business field. The course objectives included:

Utilize software for use in formal reports and presentations

Analyze data by use of various software tools

Evaluate software tools needed to best perform a task

Research software needs and compare best use of resources

The instructor covered Excel, concentrating on pivot charts and other advanced techniques; database structure; Google Docs and Drive; and Adobe Creative Suite, specifically Photoshop and InDesign. The university has a Microsoft Office license plus Adobe Creative Suite in one lab on campus. As part of the course, the students researched a CRM product that could be implemented into an industry of their choice. One student, with an interest in athletics, researched Turbostats and Krossover. These students may be in a position to find and implement a specific software to solve a business problem so this project was could be useful. The students also experimented with SmartSheets and Hootsuite. As suggested in some of the literature, a staff member with content knowledge taught this course. This worked well as the staff member was open to faculty suggestions and able to communicate any issues with the structure and content of the course. The instructor does plan to introduce Tableau and Sharepoint in the future. This course was designed to be flexible, allowing us to provide exposure to core software (Excel, Access, etc.) but also pull in other software as they become mainstream in businesses.

Our college also has several core and major-specific courses integrating software with assignments/projects. Core courses include Principles of Accounting and Management of Information Systems. The Principles of Accounting use SAP to learn basic functionality and how to navigate the software. In the Management of Information Systems course, students are required to set up a Sharepoint site and communicate between group members. Major specific

courses in Marketing have used Excel, Hootsuite, Wordpress, Tableau, Easel.ly (an infographics software), social media, plus some exposure to Google Analytics and AdWords. Students reinforce and apply their previous learning by using pivot tables to analyze sales data or advertising variables, and conditional-formatted dashboards to display sales goals. Some programs, like Tableau, have video tutorials and sample data sets. These tutorials and data sets provide a strong application for the students. Current plans include incorporating Google Digital Garage into an Advertising and Public Relations class and Canva into a Consumer Behavior class.

This approach is not perfect. The Adobe Creative Suite is installed in one lab on campus leading to access issues for the students. While students can purchase a month to month student-discount license from Adobe, adding this cost to students is not attractive considering the availability of free photo editing and creative software. In the business software course, depth was an issue as some students wanted to spend more time on the Adobe Creative Suite while others asked for more Excel. In the marketing courses, students downloaded the software onto their tablets or laptops. Students encountered system requirements, storage space, or other issues. Assisting with these problems was far beyond the capability of the professor. As more and more students forego laptops for tablets, these issues may become more prevalent. The institution must also be aware of exposing students to viruses, adware, or malware when using free or open source software.

Conclusion

As industry shifts happen and advanced software skills become an expectation from employers, higher education should be conscious, but not constrained, by this shift. Preparing students for employment by equipping them with good written and oral communication skills, problem solving skills, and soft skills such leadership will always be most important. Student can get on-the-job training with any software and generally have a flat learning curve. However, students (and parents) often look for these types of skills to differentiate one school from another and businesses may find students more attractive if they already possess some aptitude with specific software. Recruiters may also perceive your institution in a more positive light as students are equipped with more pertinent work-ready skills.

There is one final hurdle to overcome with software integration – certification. These are offered in numerous areas, and while specific certifications were not identified by employers as critical, perhaps, by exposing students to this option, we can encourage them to be aware of new technology trends, update their skills, and stay relevant. Digital Marketing, Social Media, Analytics, or Search Engine Optimization certifications are available through various software companies. A limited number of these are free but these certifications can range in price from just under \$100 to several hundred dollars. In addition, some certifications require an annual renewal and/or offer higher levels of competency at an increased cost. While these are attractive and provide a point of differentiation on resumes, embedding the cost into a course may not sit well with a student and absorbing the cost is generally not an option for the university.

Duffy & Ney (2015) call for “... a more reflective exploration of how technology has been used in marketing education; greater understanding of what students are gaining, or not gaining, from this pedagogical shift; and how it will enhance their marketing practice” (p. 112). This mindset regarding technology is important. We must, as educators, keep our fingers on the pulse of changes in the market, embrace these shifts, but also remember that these tools should be incorporated in a way so that critical thinking skills are at the core of the assignment and the ability to learn new software is essentially the result of our efforts. The question is not so much an integration versus infusion as it is assessing the awareness and results of the tools being used and evolving as the industry changes.

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The Perceptions of Students on Cooperative Learning at Intermediate Accounting II Course

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ABSTRACT

This paper makes a contribution to extend accounting education literature by examining the perceptions of students on cooperative learning at Intermediate Accounting II course. Compared to previous studies, this study focuses on the students' perspective toward cooperative learning instead of academic performance. This study finds that the use of cooperative learning at undergraduate-level Intermediate Accounting II course does not have a favorable impact on students' satisfaction. The implication of this study is that instructors must be very careful in adopting cooperative learning in upper-division accounting classes, where students may prefer individual learning activity. Students feel that more flexibilities to manage their time to learn the difficult class materials is more beneficial.

Keywords: Student Satisfaction, Accounting Education, Cooperative Learning

INTRODUCTION

Cooperative learning, based on Social Interdependence Theory, is a very important tool that asks students to form small groups to engage in learning, which requires individual contribution, self-learning, peer-learning, accountability, and communication skills (Johnson and Johnson, 1999; Johnson and Johnson, 2009; Du, 2015). Team learning is one of best cooperative learning techniques that can be assessed (Slavin, 1991).

Based on the study of Strand Norman et al. (2004), existing accounting education literature related to cooperative learning "can be classified into six distinct research streams: (1) studying student involvement via cooperative learning, (2) investigating how to avoid or correct dysfunctional behavior in group and team processes, (3) examining the effects of cooperative learning on student performance, (4) investigating student satisfaction with cooperative learning, (5) case studies on successfully implemented cooperative learning, and (6) reviews of cooperative learning" (Opdecam and Everaert, 2012). Many studies have been done in category two and three (Opdecam and Everaert, 2012). To focus too much attention to student performance when ignoring student satisfaction with the use of cooperative learning "could be potentially dangerous and shortsighted" (Strand Norman et al., 2004). Only few studies in accounting education literature investigate student satisfaction with cooperative learning (Caldwell et al., 1996; Dyball et al., 2007; Lancaster and Strand, 2001; Opdecam and Everaert, 2012). In addition to it, previous studies in accounting education literature to investigate student satisfaction with cooperative learning focus on the learning activities related to team-based problem type assignments, such as homework (Caldwell et al., 1996; Lancaster and Strand, 2001; Opdecam and Everaert, 2012).

This paper makes a contribution to extend accounting education literature by examining the perceptions of students on cooperative learning at upper division accounting courses, which provides a new perspective to investigate student satisfaction with cooperative learning. How to improve student satisfaction at accounting courses to enhance course experience and learning effectiveness remains an area that is needed to be investigated more.

APPLICATIONS OF COOPERATIVE LEARNING

Prior studies in accounting education literature focus on students' problem-solving skills to investigate student satisfaction with cooperative learning (Caldwell et al., 1996; Lancaster and Strand, 2001; Opdecam and Everaert, 2012). But there are other skills are needed for accounting students. Colon et al. (2015) analyze the self-assessment reports data from 32 Association for the Advancement of Collegiate Schools of Business (AACSB)-accredited U.S. universities (26 public, 6 private). They find that "accounting programs have committed significant resources and efforts to closing the loop in four particular areas: (1) professional responsibility, (2) accounting research, (3) technology skills, and (4) communication skills" (Colon et al., 2015). A much broader skill levels required by Uniform Certified Public Accountant (CPA) Examination Blueprints. The new CPA exam requirements are approved by the Board of Examiners American Institute of CPAs on February 11, 2016 and are taken into effective on April 1, 2017 (AICPA, 2016). The old CPA exam emphasizes more in exam-takers' fundamental skills, such as

remembering and understanding, application of knowledge or theories or techniques. The new CPA exam emphasize more in exam-takers' analysis skill, which means "the examination and study of the interrelationships of separate areas in order to identify causes and find evidence to support inferences" (AICPA, 2016). This is why this paper focuses on case studies to investigate the perceptions of students on cooperative learning. Case studies can help students strengthen their high-level problem-solving skill and improve both oral and written communication skills. The team-based case studies can be a clear demonstration of students' understanding, application of the accounting concepts and high-level critical-thinking skill related to the case.

In general, cooperative learning could have a positive impact on student satisfaction through team work and more social interactions among team members (Cooper, 1995; Strand Norman et al., 2004). Some studies report that cooperative learning is more effective learning method than traditional instructor-only-lecturing format for students in a passive learning environment (Hwang et al., 2005; Hwang et al., 2008). But existing accounting education literature has mixed results about the effect of cooperative learning (Lancaster and Strand, 2001; Du, 2015). Hite (1996) makes a comparison between a control group (without cooperative learning) and a special treatment group (with cooperative learning) in individual income tax course. Students with cooperative learning outperform their peers in control group on final exam and have a better perceptions about teacher's teaching effectiveness. Du (2015) reports that after the implementation of the Cooperative Base Group (CBG) discussed in Johnson et al. (2006) at a first year Principles of Accounting course, students believe that cooperative learning is helpful in maintaining their interest and attention in learning accounting. Gabbin and Wood (2008) replicate the work of Hite (1996) and find no significant difference between the treatment and control groups at the comprehensive final or the cumulative individual exam scores in an Intermediate Accounting II course. Contrary to Hite's (1996) findings, Gabbin and Wood (2008) report that cooperative learning strategy does not improve accounting students' academic performance in an Intermediate Accounting II course. Kunkel and Shafer (1997) do not find a positive relation between academic performance of students in auditing classes and the use of cooperative learning. Lancaster and Strand (2001) also report there is no academic performance differences between control group students under lecture-based learning environment and experimental condition students under cooperative learning environment in a lecture-based managerial accounting class.

The mixed results about the use of cooperative learning in accounting education may indicate how to transform cooperative learning method into a more active and interactive learning approach or environment is crucial. Empirical evidence shows that a more active and interactive learning approach or environment could have a positive impact on student satisfaction and course experiences. Tan et al. (2013) use a more active participation to teach managerial accounting in an M.B.A. program by allowing students to join different mutual interest groups to develop a real-world business plan based on personal research. The study of Tan et al. (2013) indicates that a combination of real-world case study approach and the group project enhances the course experiences of student learning. Dunbar (2004) indicates that a combination of Flash examples, audio and video files and other learning tools does increase student satisfaction based on the student surveys. In Dunbar's 2004 study, the combination online course learning method is used into a graduate-level tax accounting course, an advanced online accounting course. Premuroso et al. (2011) find that the use of Audience Response Systems (ARS), "whereby the instructor poses questions related to the course material to students who each respond by using a clicker and receiving immediate feedback", has a significantly positive impact on the student examination performance in the introductory financial accounting course. The implementation of interactive learning tool in the classroom, such as Audience Response Systems (ARS), increases student engagement and then student satisfaction (Premuroso et al., 2011). Riley and Ward (2015) find that students working individually in an actively cooperative learning environment can outperform in their accounting information systems course. Student performance on exam questions and positive feedback on student satisfaction on a questionnaire about perceived learning support a conclusion that "active learning enhances student outcomes, particularly for those who work individually" (Riley and Ward, 2015). Irving (2011) integrates active learning research into an undergraduate accounting course and reports that accounting students can substantially improve their level of knowledge, skills, and abilities by learning from accounting journal articles related to class topics to finish a research study. To understand the perceptions of students on cooperative learning can help us measure if cooperative learning approach used in the class are active and interactive.

RESEARCH METHOD

Intermediate Accounting II course is a continuation of Intermediate Accounting I course. It covers a variety of very comprehensive and advanced financial accounting topics, such as dilutive securities, basic and dilutive earnings per share, leasing accounting and pension accounting (Kieso et al., 2016). These important topics are also included into the current and future CPA exams (AICPA, 2016; Whittington, 2015).

Canvas, an online learning course management system used at the author's university, is used to randomly select each group member at the beginning of the semester in Spring 2016. In this study, two team-based case studies are used in Intermediate Accounting II course in Spring 2016. One course-embedded Harvard Business School case assignment is used to assess students' understanding of professional responsibility, which is due in the middle of semester. Second case from the Deloitte Trueblood Accounting and Auditing Case Study Dataset is used to assess students' ability to do accounting research in Spring 2016, which is due at the end of semester. The particular case requires all students must use the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) Professional View Database. Students should list all ASC quotes they use and integrate ASC quotes into their explanations and analysis. A written report for each case study is required for all groups. In Fall 2016, the previous two team-based case study projects are dropped from course requirements and all other work remains same at Intermediate Accounting II course. Course learning objectives, content and designing structures are similar at both courses in different two semesters, including the course syllabus, end-of-chapter homework exercise assignments, and quiz.

Both courses are offered via traditional in-classroom face-to-face teaching delivery method. All students are traditional students. The author's institution is an AACSB-accredited business school at a public university. At the end of semester, the IDEA Survey, a university-level course evaluation tool, is conducted for Intermediate Accounting II class. The assessment of course objectives, student learning outcomes and student satisfaction are based on the IDEA Survey, which is used to measure the course learning effectiveness at the author's university. Fall 2016 class is used as a control group (without team-based case studies). Spring 2016 class is designed as a special treatment group with the structured team-based case studies, a type of cooperative learning. All following data and results are from the IDEA Survey.

RESULTS

In Fall 2016, 14 out of 14 students respond to all questions on the IDEA Survey. The response rate is 100%. In Spring 2016, 21 out of 21 students respond to all questions on the IDEA Survey. The response rate is 100%. The use of team-based case studies to increase student engagement was well-received. Some evidence of learning effectiveness can be noticed through the descriptive statistics report of some selected data from IDEA survey in table one.

Table 1: Descriptive Statistics of Some Selected Data Related to Students' Perception of Their Instructor's Teaching Procedures

	Mean	Standard Deviation	Total Responses
Fall 2016 (Without Cooperative Learning Activity)			
Formed teams or groups to facilitate learning	2.71	1.62	14
Stimulated students to intellectual effort beyond that required by most courses	3.79	1.15	
Encouraged students to use multiple resources (e.g., Internet, library holdings, outside experts) to improve understanding	3.36	1.34	
Spring 2016 (With Cooperative Learning Activity)			
Formed teams or groups to facilitate learning	3.90	0.68	21
Stimulated students to intellectual effort beyond that required by most courses	3.86	1.08	
Encouraged students to use multiple resources (e.g., Internet, library holdings, outside experts) to improve understanding	3.33	1.08	

Table one shows that mean value of student responses to “formed teams or groups to facilitate learning” is 2.71 in Fall 2016. The mean value of student responses to “formed teams or groups to facilitate learning” is 3.90 in Spring 2016. The student responses are consistent with the research designing because Fall 2016 class is used as a control group (without two team-based case studies). Spring 2016 class is designed as a special treatment group with the structured team-based case studies, a type of cooperative learning. The mean value of student responses to “stimulated students to intellectual effort beyond that required by most courses” is 3.79 in Fall 2016. The mean value of student responses to “stimulated students to intellectual effort beyond that required by most courses” is 3.86 in Spring 2016, a little bit higher.

Table 2: Descriptive Statistics of Some Selected Data Related to Students' Perception of Their Instructor's Teaching Procedures

	Mean	Standard Deviation	Total Responses
Fall 2016 (Without Cooperative Learning Activity)			
Related course material to real life situations	4.43	0.82	14
Involved students in hands--on projects such as research, case studies, or real life activities	3.07	1.62	
Asked students to help each other understand ideas or concepts	3.57	1.18	
Gave projects, tests, or assignments that required original or creative thinking	3.43	1.5	
No group work assignment in this accounting class improves my learning effectiveness.	4.07	0.92	
Spring 2016 (With Cooperative Learning Activity)			
Related course material to real life situations	3.62	1.05	21
Involved students in hands--on projects such as research, case studies, or real life activities	4.00	0.93	
Asked students to help each other understand ideas or concepts	3.57	1.09	
Gave projects, tests, or assignments that required original or creative thinking	3.57	1.18	

Table two shows the one surprising finding in this paper that most of students have a very positive perception about no group project in Fall 2016. Among 14 respondents, 43% of student respond to “no group work assignment in this accounting class improves my learning effectiveness” as “Strongly Agree”, the highest rank in 5-level scales. 21% of students describe it as “Agree”, the second-highest rank in 5-level scales. Overall, the average value is 4.07 and the standard deviation is 0.92. The results clearly demonstrate that students favor no cooperative learning activity in this class and want to have more flexibilities to manage their time to learn in this class.

Table 3: Descriptive Statistics of Some Selected Data Related to Students' Description of Their Progress

Mean	Standard Deviation	Total Responses	
Fall 2016 (Without Cooperative Learning Activity)			
Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories)	3.86	0.91	14
Learning to apply course material (to improve thinking, problem solving, and decisions)	3.64	0.97	
Acquiring skills in working with others as a member of a team	2.86	1.46	
Developing skill in expressing myself orally or in writing	2.71	1.44	
Learning appropriate methods for collecting, analyzing, and interpreting numerical information	3.86	0.83	
Spring 2016 (With Cooperative Learning Activity)			
Gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories)	3.43	1.05	21
Learning to apply course material (to improve thinking, problem solving, and decisions)	3.19	0.96	
Acquiring skills in working with others as a member of a team	3.24	1.02	
Developing skill in expressing myself orally or in writing	3.24	1.06	
Learning appropriate methods for collecting, analyzing, and interpreting numerical information	3.38	1.29	

In general, table three demonstrates that students in Fall 2016 have a very positive description about their progress at Intermediate Accounting II course. In Fall 2016, the average value of student response to “gaining a basic understanding of the subject (e.g., factual knowledge, methods, principles, generalizations, theories)” is 3.86 and the standard deviation is 0.91. In Spring 2016, the average value of same question is 3.43 and the standard deviation is 1.05.

Table 4: Descriptive Statistics of Some Selected Data Related to Students' Perception of the Course

Mean	Standard Deviation	Total Responses	
Fall 2016 (Without Cooperative Learning Activity)			
Difficulty of subject matter	4	0.76	14
When this course began I believed I could master its content.	3.93	0.7	
Overall, I rate this instructor an excellent teacher.	4.36	0.81	
Overall, I rate this course as excellent.	3.93	1.22	
Spring 2016 (With Cooperative Learning Activity)			
Difficulty of subject matter	4.33	0.56	21
When this course began I believed I could master its content.	3.62	0.95	
Overall, I rate this instructor an excellent teacher.	3.52	1.1	
Overall, I rate this course as excellent.	3.24	1.11	

Table four indicates that not all students feel very confident about this very difficult advanced accounting course at the beginning of the class period. The mean score for the statement that “when this course began, I believed I could master its content.” is 4.00 in Fall 2016 and 4.33 in Spring 2016 on a 5-point Likert scale with a score of 5 indicating strong agreement with the statement.

In Fall 2016, the average value of student response to “overall, I rate this instructor an excellent teacher” is 4.36 and the standard deviation is 0.81. In Spring 2016, the average value of same question is 3.52 and the standard deviation is 1.1. In Fall 2016, the average value of student response to “overall, I rate this course as excellent” is 3.93 and the standard deviation is 1.22. In Spring 2016, the average value of same question is 3.24 and the standard deviation is 1.11. One of possible attributes about significant improvement in students' perceptions toward the instructor and

course could be that students enjoy more individual learning approach at this upper-level accounting course. Since Intermediate Accounting II course is very challenging and difficult, students prefer to work alone without engaging in cooperative learning activity.

RESEARCH LIMITATIONS

One major problem for this research is that IDEA survey is a university-controlled assessment tool. As an instructor, the author only gets a summary report instead of a more detailed dataset, which really restricts the author from doing further basic and comprehensive statistical analysis. Another major problem for this research is sample size. Due to the class size, the author cannot increase sample size for this research. Using a larger sample from more than one institution would give the study results much stronger support.

CONCLUSION

Contrary to the findings of Clinton and Kohlmeyer (2005), the study finds that the use of cooperative learning in a setting of team-based case studies at undergraduate-level Intermediate Accounting II course could be one of factors attributing an unfavorable impact on students' overall rating of an instructor or a class evaluation.

From students' comments on IDEA Survey, the case or group project was a source of frustration for many students in Spring 2016. One possible explanation is that undergraduate students at author's university do a lot of group work in several classes. Scheduling the meetings for teamwork is not one of their favorite things. Another possible explanation is that undergraduate students do not have too much any real-world working experiences. This type of cooperative learning, team-based case studies at undergraduate-level Intermediate Accounting II course cannot bring in a variety of benefits from teammates, as described in other studies (Tan et al., 2013). Future research might be done in other advanced accounting courses to examine the student satisfaction related to the use of cooperative learning and the impact on the learning outcome. A more quantitative method can be used to do further analysis.

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The Tax Practitioner/Client Interview

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ABSTRACT

This paper presents an experiential assignment that introduces students to effective interviewing methods within the context of a tax practitioner/client interview. The assignment is accounting-related, but the goal of developing interviewing techniques as a critical subset of communication skills is of broad importance to all business disciplines. The exercise integrates the development of oral communication, critical thinking and team-building skills. Students work in interviewer/interviewee teams to prepare for, conduct and conclude an interview involving a tax topic. Reflection assignments and classroom de-brief sessions are used to reinforce learning and encourage critical evaluation. The exercise incorporates competencies identified as essential for entry-level accountants by the Joint Curriculum Task Force of the Institute of Management Accountants and the Management Accounting Section of the American Accounting Association. It also incorporates the taxation compliance and planning competency outlined by the Task Force.

Keywords: Interviewing, critical thinking, teamwork, accounting education, reflection

INTRODUCTION

The importance of oral communication skills for success in business is widely acknowledged with a recent study of AACSB schools showing that 76% have presentation skills as one of their learning objectives (Brink and Costigan, 2015). The development of presentation skills is important, but experience with other aspects of oral communication is also necessary for successful business careers. In a wide variety of circumstances novice professionals are required to conduct formal and semi-formal interviews, a form of conversing and listening with persons outside of their organization. Circumstances in which information must be acquired from clients are diverse and students do not often practice these skills as part of their business education.

This article describes an exercise that integrates oral communication, critical thinking and team-building skills in the context of a tax practitioner/client interview. Although the specific assignment is accounting-based, the broad objective, developing interviewing skills is of value within any business discipline. Akers and Yahr (2005) addressed the importance of interviewing and communication skills for entry-level accountants and described an interview assignment directed at helping auditing students develop these skills. In their experiential exercise, students prepared for, conducted and documented a client interview directed at understanding an entity's internal controls (Akers and Yahr, 2005). Moreover, the need for strong interview abilities is considered particularly important when participants are engaged in problem-solving communications that involve highly technical information such as tax accounting. In such situations, active and flexible information exchanges are essential. Brink and Costigan (2015, 208) note, "Conversing is also crucial in the workplace, because it is the method of choice when the oral message is important or complex."

Interviewing may be viewed as spanning three levels of difficulty: (1) Cooperative interviewee; (2) indifferent interviewee; and (3) strategic/hostile interviewee. The fundamental skills needed when dealing with each interviewee type are best acquired at the cooperative level. Common interviewer proficiencies include: appropriate preparation, active listening, effective questioning and flexibility. Yet, even when the goals of the interviewer and interviewee are aligned; there are significant communication challenges to be faced. In the course of this exercise students experience a complex and dynamic situation which provides them with a fuller understanding of potential client interview challenges and an introduction to using best practice tools by which these challenges can be overcome.

The assignment integrates three of the five foundational competencies identified by the 2014 Joint Curriculum Task Force of the Institute of Management Accountants and the Management Accounting Section of the American Accounting Association. Also addressed is the taxation compliance and planning accounting competency outlined by the Task Force. The Task Force advanced an integrated competency-based framework to improve accounting education. An over-riding objective of the framework is that accountants should master specific competencies

aligned with their unique developmental needs at various stages of their careers. The framework consists of five foundational competencies that address the particular skills required of entry-level accountants. The foundational competencies are: 1) communications, 2) human relations skills, 3) analytical thinking and problem solving, 4) quantitative methods and 5) technology (Lawson, 2014). The tax practitioner/client interview simulates a typical activity required of early career accountants and is well aligned with the oral communication, human relations and analytical thinking and problem solving competencies identified by the Task Force. Integral to achieving the assignment's oral communication learning goals are reflection activities that are discussed later in this article. Several dimensions of the human relations competency identified by the Task Force such as relationship building, team management and negotiation skills are directly addressed by the team-building learning goals of the exercise. Moreover, the critical thinking learning goals of the exercise reinforce the analytical thinking and problem-solving competency advocated by the Task Force. In this regard, students are required to interpret and develop a solution to a real-world tax fact-set. Coincident with the critical thinking objectives of the exercise, students gain exposure to the taxation compliance and planning competency established by the Task Force. This competency emphasizes that accountants should be both well grounded in tax fundamentals and possess awareness of how taxation issues can impact business activities.

THE ASSIGNMENT

In building the assignment, we adhered to Shaw's (2010) template that enumerated five basic steps to effectively design a role-play exercise. 1) Identify a topic and clear learning objectives. 2) Estimate and allot the time needed for the project. 3) Craft the role-play to include intragroup and intergroup discussion. 4) Prepare a background scenario that is made available prior to the learning unit. Include instructions for each team or individual participant. 5) Determine a specific timeline for activities to be performed.

The exercise enables students to experience the complexities of client interviewing as interviewers/interviewees in small groups. Although the reported project is based on a tax case, the assignment outline that follows is relevant to any situation in which an interviewer needs to obtain key information from a client interviewee who is cooperative, but not an expert in the subject field. Typical examples would be system designer/end-user, financial planner/individual client, and advertising executive/client.

Pre-work: Links are posted on interviewing techniques and interview competition presentations from law schools, which are assigned to be read or viewed prior to Class Session 1.

Class Session 1 (30 minutes):

Instructor presentation and class discussion on purposes, processes and interview best practices, as summarized in Table 1.

Table 1: Interview Process Steps

Step	Interview Process	Primary Elements
1	Preparation	Establish time and place, conduct preliminary research
2	Beginning the Interview	Greet the client, ensure that they are comfortable
3	Problem Identification	Establish rapport, identify major issues
4	Client Free Narrative	Listening and observing do's and don'ts, overcoming listening barriers, body language considerations, questioning techniques (open and closed-ended), overcoming disclosure issues
5	Identify Alternative Solutions	Consider information provided by client to extent it relates to preliminary research done in Step 1
6	Advising	Discussion of tax and accounting options, if appropriate
7	Concluding	Confirm client instructions, action plan, and thank-you!

Students are formed into groups as either interviewers/tax practitioner staff or interviewees/clients. The interviewer groups are given very basic facts of the case, assigned a tax issue to research and instructed to prepare a list of questions for the interview. This requires understanding the relevant tax rules and developing questions that will elicit the facts needed to determine the client's tax status. The interviewee groups are given the facts of the case to study and are instructed to convey the key facts only when asked on-point questions. Interviewer groups that ask questions targeting key issues will be rewarded with relevant facts by the interviewee. Vague or off-topic questions will elicit non-relevant responses. Each student within a group adopts a role. The roles include Board Members,

Executive Director or CFO for the client and Interviewer 1, 2 or 3 for the tax practitioner staff. The actual case, *Atlanta Athletic Club v. Comm.* (71 AFTR 2d 93-588), was edited and distributed to the interviewees with a fictitious name so that students could not simply retrieve it from the tax service.

Intervening week:

Interviewer groups perform research on tax issue.

Interviewee groups learn the complicated fact-set.

Pre-task reflection memo: Students are required to express their expectations about the upcoming interview, with the best examples appropriately conditioned by the dialogue in Class Session 1 and the pre-work. (Graded as a minor component of the post-task reflection memo).

Class Session 2 (75 minutes):

Interview (60 minutes): Interviewer and interviewee teams are matched and sent to convene in private spaces around the building to perform the interviews. All interviewers are charged with taking notes during the questioning and developing and asking follow-up questions, if appropriate.

Team wrap-up and re-convene (5 minutes): The teams talk over their observations and return to the classroom for a quick de-brief.

De-briefing session (10 minutes): The de-briefing session includes the sharing of experiences and the distribution of the actual tax case including its resolution.

Follow-up: Interview questions and responses are submitted (as a team) to the instructor.

Post-task reflection memo: Students individually write 1-2 pages on their experience that is graded using a simple, 3-column rubric that evaluates length, format, content and editing, grammar, etc. Memo excerpts are included in Table 3.

LEARNING OBJECTIVES

The overall learning objective of the assignment is to introduce students to good interviewing techniques. The broader learning objectives are to develop oral communication, critical thinking, and team-building skills and are outlined in Table 2.

REFLECTION QUESTIONS

The many benefits to students from reflection assignments are well addressed in the literature. Duron, Limbach & Waugh (2006) explain the advantages of assigning reflective writing in their article about encouraging critical thinking in any discipline. "In addition to encouraging students to reflect upon what they have actually learned, this type of activity also helps make the material personally and/or professionally relevant" (Duron, Limbach & Waugh 2006, 164). Lawrence (2013) reviews the history of the use of reflective writing in management classes. She concludes; "[I]ncorporating reflective exercises in business communication courses can help students take more responsibility for their own knowledge, become better writers and thinkers, and, in turn, become better managers and leaders" (Lawrence, 2013, 194). Similarly, Guess (2014), reporting on an accounting project, states that, "Reflective writing supports the assessment of critical thinking, communication, writing, analytical reasoning and evaluation. These skills are among the highest level of learning as identified in Bloom's Taxonomy" (Guess, 2014, 118).

Before the interview, students prepare a pre-task reflection writing, which adds to student preparation for the upcoming client meeting and provides a benchmark for later comparison. In this exercise, students are asked to consider various aspects of the client meeting such as what they expected to learn, how confident they are in their preparation and how they anticipate the client might respond.

Table 2: Mapping of learning objectives to “interviewing the client” exercise

Learning objective	How accomplished
Oral communication:	
1) Demonstrate professional behaviors including preparedness and respectful presentation.	Students conduct interviews using interviewer / interviewee roles agreed-upon in planning.
2) Develop confidence in relationship to their interviewing skills.	Students incorporate interview methods presented by instructor: questioning techniques, body language considerations, overcoming listening barriers.
3) Gain experience in interviewing either as an interviewer or an interviewee.	Interviewees convey key facts only if on-point questions are asked. Interviewers take notes and ask follow-up questions.
4) Develop awareness of interviewing techniques including listening skills.	Presentation and class discussion on purposes, processes and interview best practices.
Critical thinking:	
1a) Identify the issues needed to analyze the case or problem.	Interviewers work in groups to research the tax issue.
1b) Identify the relevant information presented in the case.	Interviewees learn complex fact-set. Interviewees formulate answers based on the given facts of the case and instructions to convey the key facts only when asked on-point questions.
2) Identify the alternative solutions to the case.	Interviewers formulate closed, open and secondary interview questions based on issues identified in 1a.
3) Derive solution and discuss actual tax case outcome.	All students de-brief, teams share their findings and class discusses the court ruling.
4) Reflect on strengths and weaknesses.	Students write pre-interview and post-interview reflection memos.
Team-building skills:	
1) Gain experience in working towards mutual agreement and common decisions in a team-based setting.	Interviewers work in teams to research the tax issue and formulate the interview questions. Interviewers work together to collectively decide on interview protocols and which questions to include. Interviewees work in groups and decide what roles each will play and basic strategy. Interviewer teams submit questions and responses as a team.

At the conclusion of the exercise the students write a post-task reflection memo. Excerpts from student memos are provided in Table 3. Post-task reflection activities provide students with an opportunity to take a step-back from and critically evaluate the encounter, consider their actions and those of other participants and assess actual outcomes versus those anticipated. They also provide an important opportunity to consider the interpersonal subtleties of the client and team dynamics. Importantly, reflection exercises reinforce student learning by transforming the assignment from a hands-on practical lesson into a critical evaluation. The following post-reflection questions were used in this exercise and can be easily modified to accommodate almost any project:

Based on the pre-reflection, how well did the interview meet your expectations?

What did you learn about your strengths and weaknesses from the project?

What was your strongest interview question/answer?

What was your weakest interview question/answer?

As noted above, only the reflection memo was graded (5% of semester grade). Performance was not evaluated as

this task was intended to be a non-stressful introduction to the dynamics of interviewing. If desired, evaluation of actual quality can be achieved through several methods: 1) Student self-assessments; 2) team peer assessments, and 3) recording of interviews by phone or other devices and posting on external or internal hosting sites for subsequent review.

Table 3: Individual Student Reflection Memo Excerpts

I learned that it can be very exciting to begin to uncover the answer you are looking for. I also noticed that there are some things that I need to work on, like skipping questions and jumping in too quickly. Overall, this was a great learning experience. Not only did I learn what client interviews are like but I also learned what I am like as an interviewer.

Overall, the interview met the expectations from the pre-reflection. The process was helpful to gain an understanding of how clients can withhold information unknowingly because questions were not specific enough to gather the required information. Several follow-up questions arose during the interview to dig deeper into the client responses.

In closing I really appreciate this assignment and think it was a great idea for our advanced taxation class.

Interviewing is not something that is regularly covered in most accounting classes and I believe it should be for all the above reasons. Given my prior work experience and in my current role I have been exposed to interviews and have developed some of the skills needed to be successful but that is not the norm for most of the students at our university. I believe these assignments will build confidence in the younger generation and make them stronger and more valuable associates in today's job market.

From this interview I gained quite a bit of knowledge, I would say. I learned there is a time to talk and there is a time to listen. I found out that if I, kind of, took a step back and listened I would get more out of what they said versus trying to talk over them. Another thing I learned was how much people open up when they trust you. At first I didn't expect it to go as smoothly as it did, but since we had rapport with our clients it truly helped. What I learned about myself is that I am a great listener. I was able to really understand everything once I truly listened to what the interviewee said. Overall, this has been a great experience because it was hands on and fun because it was on you. No one told you how to do it, you just did and getting that satisfaction of completing the task your way was great. Plus sharing it with others wasn't bad either.

The knowledge I gained from this experience was how to interact with a client. This was my first time doing anything like this so I had no idea how to ease into the interview, asking more broad questions at first, then asking more complex and in-depth questions as follow-ups to gain all the necessary information needed. Also, that the interview doesn't necessarily have to be serious the entire time, jokes and small talk are very important at times.

What I learned about myself is that sometimes I have to come out my shell and ask questions. I don't really like to talk but by doing so I actually asked a few good questions that resulted in information that we needed.

I do believe I gained some client interview knowledge from this experience that I can use in future situations. I think I would be able to prepare more questions that targeted my end goal. I also believe that the follow up questions after receiving information from the interviewee were helpful to this situation and I would make more use of them in a future scenario. It seems difficult to think of a follow up on the spot and that's the "fun" of the interview. We had no idea what we were going into and that made it interesting. I learned that it's a bit stressful to be on the interview side of a situation. You have to be on your toes and work as a team to get to the answer or end result. I learned that I am more than capable of performing this kind of task as long as I properly prepare. I also learned that I can work on calming my nerves when going into this kind of situation. I feel that with more practice, I wouldn't be as nervous to face a project like this in the future.

This interview far exceeded my expectations pertaining to the questions and interviewing skills of the interviewers. I expected for there to be a lot of confusion for the interviewers seeing how many of them had never interviewed anyone before. I was also very impressed by the depth of the questions as they were very concise as if they knew what to ask for. The interview went very well in general. I expected the interview to take a long period of time and I was surprised to see how quickly the interview took place considering the large number of questions and the information the interviewers were extracting from us.

The interview was fun because I was tough on the interviewers by answering the question, but not as thoroughly as they would have wanted me to.

I never learned much on client interviewing, everyone focuses on getting past the interviewing process for jobs. I find it interesting on how you have to really read the person across the table in order to understand how you should greet them and to help you distinguish how the interview went. The interviewers had many great open ended questions.

Honestly, I did not know what to expect prior to this interview. I was leaning toward the interview not going well,

because I didn't think the interviewers were going to ask the right questions in order for them to gain much information on if the gain was unrelated business income or not. The interview most definitely went in the opposite direction, they were full of intellectual questions that were perfect for them to gain enough information on the case to figure out what the outcome was. I was surprised how well it went, I was also shocked on how easy it was for me to answer their questions.

CONCLUSION

This paper presents an experiential assignment that introduces students to effective interview methods. It achieves this learning objective by integrating the development of oral communication, critical thinking and team-building skills within the context of a tax practitioner/client interview. Although business professionals frequently interview persons outside their organization, students seldom practice these skills. Participants were positive about their experience and one student even admitted that the exercise was "fun". The exercise incorporates three of the five foundational competencies identified as essential for entry-level accountants by the Joint Curriculum Task Force of the Institute of Management Accountants and the Management Accounting Section of the American Accounting Association in 2014. It also incorporates the tax planning and compliance competency outlined by the Task Force (Lawson, 2014). While the exercise described is assigned in tax accounting classes, developing interviewing skills is of importance to all business disciplines and the protocol described can be adapted to a broad range of scenarios.

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Best Venue for Learning? A Comparison of Practitioners' and Educators' Preferences among Delivery Method Options for Developing AIS Proficiencies

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ABSTRACT

This study evaluates the differences in perception between practitioners and academicians regarding the topic material and learning venues for ten key accounting information systems (AIS) proficiencies. We received responses from 109 practitioners and 54 academics to the same content area questions. Although there was much agreement on the preferred training venue for some proficiency areas (basic computer and business skills), there was divergence in several areas. Academicians preferred traditional classroom training for virtually every proficiency area. In contrast, practitioners were much more likely to prefer corporate or outside training for advanced topics such as accounting software, reporting tools, and data exchange. This study contributes to the literature on AIS training by adding newer technologies to the list of proficiencies and by bringing current perceptions of practitioners regarding future needs into the discussion.

Keywords: Accounting Information Systems (AIS) Proficiencies, Teaching, Delivery Methods, Curriculum, Skills, Technology

INTRODUCTION

This study broadens previous investigations of the preference gap between practitioners and academics regarding instruction in accounting information systems (AIS) courses. The presence of this gap was detected as early as 1970 (Madden, 1970) and has continued to receive attention over the course of the intervening decades (Grumet, 2001; Gupta and Marshall, 2010; Krause, 2005; Marshall et al, 2010; Siegel et al, 2010; Wells et al, 2009; Winstead and Wenger, 2015). Unlike most subfields in accounting, the composition of AIS courses may vary widely.

The present study contributes to the literature by exploring which delivery methods practitioners and academics choose as optimal for instruction in ten key AIS topic areas. Measuring the levels of AIS proficiencies recommended by academics and CPAs offers insights into selection of course content that can benefit all stakeholders (students, programs, profession, and prospective employees).

PREVIOUS RESEARCH

A number of studies have examined various delivery methods for accounting instruction, including related accounting systems and technology. Russ et al (2010) surveyed career and technical educators. They concluded that educators are willing to teach distance learning courses regardless of demographic characteristic and that students possessing self-motivation and computer literacy, who work with no interruptions, are more successful. Chen et al (2012) surveyed beginning and advanced students to examine the effectiveness of delivery method relative to level of the course. Their results suggest course level is significant when assessing whether offering online courses are appropriate for a given level. Delivery mode was not important for principles courses, but outcomes in advanced courses were significantly more favorable for traditional classroom environments than for online. They also report a preference for blended learning over a predominately online course and that course level may be important in deciding the mix of face-to-face versus online. Adebayo and McGrath (2013) recounted their school's efforts to reform its pedagogy and curriculum for technology courses to align them with the needs of today's dynamic business environment. Garman (2015) reported that a student's GPA was the most important predictor for final course average in a beginning database course. Reading score was a highly significant differentiator for online students, but not for students in a traditional classroom. Grossman and Johnson (2015) studied employers' attitudes toward graduates of traditional or hybrid accounting programs versus those of online accounting programs. Their experimental results showed employers are significantly more willing to hire entry-level job applicants from AACSB-accredited institution offering a traditional (or hybrid) environment. Furthermore, their survey results reported employers had a greater acceptance of online lower-level accounting coursework (versus online upper-level courses). They also reported acceptance of students completing either bachelors or master's degrees online over

those completing both online as well as a greater acceptance of some online accounting coursework. Chiu et al (2015) studied principles of accounting students to examine student performance, satisfaction, and perceived course effectiveness among students in traditional classrooms and those viewing pre-recorded online lectures. Their results found no significant differences in students' grades among delivery method. They reported that a student's prior GPA and interest were the most important factors in determining final course grade. In addition, they found some evidence of greater student satisfaction and perceived effectiveness in a traditional course setting.

RESEARCH DESIGN

To maintain fundamental skills as well as cope with technology-driven changes, the current study employed ten AIS proficiencies. Following method employed in a recent study (Winstead and Wenger, 2015), survey participants offered assessments of preferred delivery methods for developing proficiency the following nine areas, organized into three broader categories. In addition, proficiency in office productivity software was added to this study:

Operational Systems Proficiencies

Navigate computer's operating system/minor troubleshooting.

Understand business cycles in an electronic environment.

Navigate a major accounting software package to accomplish basic accounting tasks.

Reporting and Data-Sharing Proficiencies

Using accounting software package to create reports.

Understand data-sharing technologies commonly used with business partners.

Use XBRL to meet financial statement reporting requirements.

Organizational Systems Proficiencies

Ability to comprehend business needs and envision how technology could solve ongoing business problems.

Understand basics of e-commerce, including the implications on accounting when using outsourced web services.

Basics of safeguarding electronic accounting records, including backup media, network security, and disaster recovery.

Office Productivity Software Proficiencies

In addition to the hypothesis associated with Office Productivity Software, hypotheses were organized around these three categories: operational systems proficiencies, reporting/data sharing proficiencies, organizational systems proficiencies. Prior studies have addressed the capability to simply operate a computer (operational systems proficiencies), including transaction processing. Different forms of reporting and data sharing technologies have consistently appeared in these studies as well. Lastly, organizational systems proficiencies have become more important—Stocks and Romney (1987) found that accountants in industry favor the “innovation” trait (the “problem solver” role) and many studies since have noted increased interest in safekeeping records and e-commerce topics.

Hypothesis Development

Each hypothesis considers whether accounting academics and practitioners agree on which delivery method is most appropriate for each of the key AIS topic areas. The first supporting hypothesis addresses whether the prospective accountant can functionally operate a computer. “Operating a computer” includes the ability to navigate an operating system, fix minor problems, and navigate an accounting system to accomplish basic accounting tasks. Participants were offered four delivery method alternatives: undergraduate class, graduate class, self-study, and employer-sponsored training.

Hypothesis 1: There is a difference in the perceptions of the preferred delivery method for obtaining operational systems proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.

In the area of “reporting and data-sharing proficiencies”, we asked participants to assess the most appropriate delivery method for instruction in creating reports in an accounting software package and reporting in XBRL. In addition, participants were to consider other advanced output technology, such as data-sharing using EDI or similar technologies. Participants were offered the same four delivery method alternatives presented in the first hypothesis. Together, these three topics form the second hypothesis.

Hypothesis 2: *There is a difference in the perceptions of the preferred delivery method for obtaining reporting and data sharing proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

While the first two hypotheses address individual effectiveness using the technology, the third hypothesis addressed issues effecting businesses more broadly. Organizational systems proficiencies include ability to leverage technology in problem-solving, attaining a comfort level with issues surrounding having an online business presence, and protecting data. Participants were offered the same four delivery method alternatives presented in the first hypothesis. Together, these three topics form the third hypothesis.

Hypothesis 3: *There is a difference in the perceptions of the preferred delivery method for obtaining organizational systems proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

Most educators agree that graduates of accounting programs should enter the marketplace with well-developed skills in using office productivity software, such as word-processing, spreadsheet, and database software. This is the focus of the fourth hypothesis.

Hypothesis 4: *There is a difference in the perceptions of the preferred delivery method for obtaining office-productivity software proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.*

Six delivery methods were presented for the tenth AIS topic, office productivity software: high school class, undergraduate AIS class, other (non-AIS) undergraduate class, graduate AIS class, self-study, and IT (information technology) training center. Some U.S. high schools offer a course in office productivity software, including a pathway to certification as “power user”. In addition, some universities may not include office productivity in their curricula, instead relying on students to develop those skills independently or for employers to sponsor training at a for-profit training center.

Survey Instrument

For topics within the supporting hypotheses, delivery methods with few (less than 5) observations are collapsed into a single category with observations of a similar method, to meet requirements of Chi-square statistical tests.

Participants answered questions about the desired level of proficiency. They chose from a six-point Likert scale on levels of proficiency ranging from “No” Proficiency to “High” Proficiency, similar to the four-point Likert scale of emphasis (Heavy, Medium, Light, None) employed in earlier work (Heagy 1987). Response rates differed by group, with CPAs responding to the survey at a much lower rate than academics (Table 1). One reason for this discrepancy could be greater reliability of academic contact information vs. that of practitioners, who may change positions more frequently. Another reason may be that academics, understanding the nature of academic research, may be more inclined to support fellow researchers by responding to surveys such as this one.

Data Collection

The survey was conducted using an online survey hosting website. A list of accounting professors with a systems interest was identified using Hasselback’s Accounting Faculty Directory (2015). The list of CPAs was obtained by purchasing an address list from a marketing firm. In all, the list of academics totaled 969 and the list of certified public accountants (hereafter, simply “CPAs”) obtained from the marketing firms totaled 17,105.

Survey respondents represent a variety of accounting specializations and experience. Considering the disparity in the number of respondents among the groups and lack of evidence to support the normality assumption, nonparametric Mann-Whitney U-value test was applied to analyze the data collected in this study. The Mann-Whitney U test is a nonparametric counterpart of the t test used to compare the means of two independent populations. The other assumption is that the level of data is at least ordinal (Black 2001, 692). Data collected in the study fit these criteria.

Table 1: Demographic Information

	<u>Practitioners</u>	<u>Academics</u>
<i>Highest Degree Attained</i>		
Bachelor’s Degree	73	
Master’s Degree	33	6
Doctorate Degree	1	46
Other (Associate’s Degree or “Some” College)	<u>2</u>	
No Response		<u>2</u>
Number of Respondents	<u>109</u>	<u>54</u>
<i>Certifications</i>		
Certified Public Accountants	95	46
Other Certifications (CMA, CFE, etc.)	3	2
No Certifications	<u>10</u>	<u>6</u>
Number of Respondents	<u>109</u>	<u>54</u>
<i>Place of Business</i>		
Public Accounting	103	
Industry	3	
Other	<u>3</u>	
Education		<u>54</u>
Number of Respondents	<u>109</u>	<u>54</u>

Data Analysis

In the first topic in Table 2 below, for example, no academic and only one practitioner indicated that new accountants should learn about navigating the operating systems and solving minor troubleshooting in graduate school class. In this case, the “undergraduate class” and “graduate class” response cells were collapsed into a “college classroom” category. This treatment is consistent with Davis and Leitch’s (1988, pp. 163-164) recommended topics for prerequisite and/or the first (undergraduate) AIS courses. Similarly, only one academic indicated that the second topic should be studied after college and, therefore, the “self-study” and “employer-sponsored training” responses cells were collapsed into a “outside source” category. Despite these efforts, a number of cells still contained fewer than the prescribed minimum of 5 per cell. To support chi-square testing, the Freeman-Halton extension (1951) of Fisher’s Exact Test was computed, resulting in significance levels similar to chi-square test.

Hypothesis 1 tests whether accounting academics and practitioners agree on the level of AIS proficiencies they would recommend to accounting graduates entering the marketplace. The first of three supporting Hypothesis 1 addresses an accountant basic operational skill set, including the ability to navigate an operating system, fix minor problems, understand business cycles (such as revenue cycle, expense cycle, etc.) in an electronic environment, and accomplish basic accounting tasks in a modern accounting software package.

Table 2: Recommended Delivery Methods for <i>Operational Systems Proficiencies</i>				
AIS Topics: Operational Systems Proficiencies	Observed-Practitioners: Count(Mean)	Observed-Academics: Count(Mean)	X ²	X ² Sig. (Fisher's Exact Sig.)
Navigate computer's operating system/minor troubleshooting:				
College Classroom (Undergraduate or Graduate)	63 (57.8%)	29 (53.7%)	2.99	0.224 (0.228)
Self-Study	22 (20.2%)	17 (31.5%)		
Employer-Sponsored Training	24 (22.0%)	8 (14.8%)		
Understand business cycles in an electronic environment:				
Undergraduate Class	80 (73.4%)	49 (90.7%)	8.03	0.018* (0.012*)
Graduate Class	12 (11.0%)	4 (7.4%)		
Outside Source (Employer-Sponsored Training or Self-Study)	17 (15.6%)	1 (1.9%)		
Navigate a major accounting software package to accomplish basic accounting tasks				
College Classroom (Undergraduate or Graduate)	42 (38.5%)	34 (63.0%)	9.08	0.011* (0.009*)
Self-Study	9 (8.3%)	4 (7.4%)		
Employer-Sponsored Training	58 (53.2%)	16 (29.6%)		
* = Significant at the 0.05 (one-tailed) level.				

The Freeman-Halton extension (Freeman and Halton, 1951) supports 2 x 3, 2 x 4, and 3 x 3 designs in addition to the sample cell size problems addressed by Fisher's Exact Test for 2 x 2 designs. The Freeman-Halton extension also has limitations, including no cells containing values less than 1 (no zeroes) and total sample size (N) must be less than or equal to 320 for 2 x 3 designs and 120 for 2 x 4 designs. As a result, response data could only be analyzed in collapsed form (2 x 3) and Freeman-Halton was not used in analyzing the last hypothesis regarding office productivity proficiency.

As for the three hypotheses related to operational systems proficiencies presented in Table 2, analysis of responses indicates agreement between practitioners and academics on the first topic, navigating the operating system (p = 0.224, fail to reject the null). Responses for the second topic (understanding business cycles) and third topic (navigating a major accounting software package), however, indicate disagreement (p = 0.018 and 0.011, respectively). Therefore, we reject the second and third supporting null hypotheses in the area of operational systems proficiencies; support for rejecting supporting null Hypothesis 2 is inconclusive.

Table 3 below reports the survey results concerning reporting and data-sharing proficiencies. The second set of three topics supporting Hypothesis 2 addresses how new accountants gain proficiencies in using reporting and data-sharing technologies (as described previously).

Davis and Leitch (1988) recommended studying "Statements and Reports" in prerequisite or first AIS classes and "Communication Systems" and "Local-Area Networks" (conceptually similar to modern data-sharing) in first or other AIS classes. XBRL did not exist at the time of the Davis and Leitch study, but some XBRL textbooks are aimed at senior-level accounting students and workshop participants (White, 2009, p. vii), suggesting that XBRL is an advanced topic. Analysis of these response indicate support for rejecting the supporting null hypotheses in this area (p = 0.014, less than 0.000, and 0.008, for chi-square tests, respectively). Academics and practitioners clearly differ on conveyance of these proficiencies, with academics primarily favoring classroom instruction and large numbers of practitioners favoring training from outside sources (self-study and sponsored training) as an alternative to traditional classroom training. Overall, responses to preferred delivery methods in this area support rejecting the null Hypothesis 2—practitioners' responses differ from those of academics with respect to the preferred methods of delivering reporting and data-sharing proficiencies.

Table 3: Recommended Delivery Methods of <i>Reporting and Data-Sharing Proficiencies</i>				
AIS Topics: Reporting and Data Sharing Proficiencies	Observed-Practitioners: Count(Mean)	Observed-Academics: Count(Mean)	X ²	X ² Sig. (Fisher's Exact Sig.)
Using accounting software package to create reports.				
College Classroom (Undergraduate or Graduate)	50 (45.9%)	37 (68.5%)	8.58	0.014* (0.010*)
Self-Study	7 (6.4%)	4 (7.4%)		
Employer-Sponsored Training	52 (47.7%)	13 (24.1%)		
Understand data-sharing technologies commonly used with business partners.				
Undergraduate class	33 (30.3%)	33 (61.1%)	30.51	< 0.000* (3.073)
Graduate class	17 (15.6%)	16 (29.6%)		
Outside Source (Employer-Sponsored Training or Self-Study)	59 (54.1%)	5 (9.3%)		
Use XBRL to meet financial statement reporting requirements.				
Undergraduate class	37 (34.0%)	25 (46.3%)	9.70	0.008* (0.006*)
Graduate class	25 (22.9%)	19 (35.2%)		
Outside Source (Employer-Sponsored Training or Self-Study)	47 (43.1%)	10 (18.5%)		

*= Significant at the 0.05 (one-tailed) level.

Table 4 below reports the survey results concerning organizational systems proficiencies. Hypothesis 3 addresses how new accountants gain systems proficiencies benefitting the organization at large (as described previously).

Table 4: Recommended Delivery Methods of <i>Organizational Systems Proficiencies</i>				
AIS Topics: Organizational Systems Proficiencies	Observed-Practitioners: Count(Mean)	Observed-Academics: Count(Mean)	X ²	X ² Sig. (Fisher's Exact Sig.)
Ability to comprehend business needs and envision how technology could solve ongoing business problems.				
Undergraduate class	40 (36.7%)	29 (53.7%)	11.31	0.004* (0.002*)
Graduate class	39 (35.8%)	22 (40.7%)		
Outside Source (Employer-Sponsored Training or Self-Study)	30 (27.5%)	3 (5.6%)		
Understand basics of e-commerce, including the implications on accounting when using outsourced web services.				
Undergraduate class	52 (47.7%)	34 (63.0%)	12.87	0.002* (0.001*)
Graduate class	24 (22.0%)	17 (31.4%)		
Outside Source (Employer-Sponsored Training or Self-Study)	33 (30.3%)	3 (5.6%)		
Basics of safeguarding electronic accounting records, including backup media, network security, and disaster recovery.				
Undergraduate class	58 (53.2%)	41 (75.9%)	18.33	< 0.000* (< 0.000*)
Graduate class	11 (10.1%)	10 (18.5%)		
Outside Source (Employer-Sponsored Training or Self-Study)	40 (36.7%)	3 (5.6%)		

*= Significant at the 0.05 (one-tailed) level.

Davis and Leitch (1988, pp. 163-164) recommended "Program Design" and "Systems Design and Analysis" topics for the first and other AIS courses. Exposure to these topics extends students'

understanding from “how-to” accomplish a task using technology to “how does the system work” and “where else this can be applied”. Certainly, the “accountant as problem-solver meme” discussed in an earlier section continues through this “envision” topic and is well-suited for the first (undergraduate) or other (graduate-level) AIS course. Davis and Leitch (1988, pp. 163-164) recommended “Security and Backup” at the prerequisite course as well as the first and other AIS courses. E-commerce and web services were not in widespread use at the time of the Davis and Leitch study, but such advanced topics are likely better suited for graduate-level courses.

Analysis of these responses indicate support for rejecting the supporting null hypotheses in this area ($p = 0.004, 0.002,$ and less than $0.000,$ for chi-square tests, respectively).

Delivery methods for obtaining proficiency in this area include high school classes, undergraduate courses (AIS and others), graduate courses, for-profit IT training centers, and self-study. Davis and Leitch (1988, pp. 163-164) recommended “Spreadsheets” and “Word Processing” as topics for prerequisite courses, not the first or other AIS courses. Due to only one practitioner indicating a preference for a graduate course in this instance, this response was included with the undergraduate AIS course observations. With the restrictions of the Freeman-Halton extension of the Fisher Exact Test for 2×4 designs ($\$120$), no other cells were merged together and chi-square testing was conducted to this 2×5 design.

Table 5: Recommended Delivery Methods of <i>Proficiency in Office Productivity Software</i>				
AIS Topics: Office Productivity Software	Observed-Practitioners	Observed-Academics	X^2	Significance
High School class	35	5	17.55	0.001*
Undergraduate/Graduate AIS class	44	20		
Other Undergraduate class	22	26		
Self-study	6	1		
IT Training Center	2	2		
* = Significant at the 0.05 (one-tailed) level.				

Analysis of these responses indicate support for rejecting the supporting null hypothesis for this topic ($p = 0.001,$ for chi-square test). A large number of practitioners favored a High School class for delivery of office productivity proficiencies, while academics preferred undergraduate classes. Overall, responses to preferred delivery methods in this area support rejecting the null Hypothesis 2—practitioners’ responses differ from those of academics with respect to the preferred methods of delivering office productivity software proficiencies.

DISCUSSION

The results of this study reinforce how AIS, unlike many other courses in accounting curricula, elicit a broad range of responses regarding topic areas and expectations for learning environments and prerequisites. Practitioners and academicians largely agree that basic computer skills should be learned prior to taking an AIS course/joining the profession; in fact, many practitioners expect such training to occur at the high school level. Both groups largely agree that an understanding of business cycles and how technology has an impact on them is best developed in the classroom at the undergraduate level. When it comes to more advanced skills, such as accounting software packages, data sharing and integration, and reporting requirements such as XBRL, practitioners are much more likely to expect training to take place on the job or through an outside source rather than in the classroom.

This research updates the discussion on AIS curricula by incorporating new technologies (i.e., XBRL) and changing practitioner needs. As the ability of software and related technologies continues to automate increasingly complex tasks, accountants’ skill sets must adjust accordingly. The current emphasis firms have placed on data analytics in audit and tax practices is but one example. As with all such research, there may be limitations to the generalizability of this research based on the nature of the respondents and how well they reflect the general population of practitioners. As the pace of technology change increases, it is important to maintain a dialog between the profession and academia regarding the “what” and “how” of teaching and learning AIS concepts.

CONCLUSIONS

Overall, with the exception of the first topic, rejection of the other nine supporting hypotheses indicate evidence to support rejection of the null Hypothesis 2—there is evidence to suggest a statistically significant difference in the perceptions of the preferred delivery method for obtaining AIS proficiencies needed by accounting graduates entering the marketplace held by accounting academics and those held by CPAs.

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Encouraging Participation in a Management Accounting Classroom

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ABSTRACT

An ongoing challenge in the college classroom is to keep students engaged and encourage participation in class discussions. Storyboarding, a collaborative technique borrowed from the entertainment industry and business, has been used in the classroom to draw out responses from students who are typically reluctant to participate in class discussions. In addition, storyboarding can stimulate creativity, facilitate the sharing of information and enable teamwork. For decades, this technique has been a critical component in the creative process in the entertainment field. Historically, Walt Disney is credited with formulating the storyboarding process as a quick visual means of organizing ideas, developing stories and characters. This paper describes the use of storyboarding, with and without technology, in a graduate managerial accounting course.

Keywords: Class discussion, Student participation, Collaborative Learning

INTRODUCTION

Increasingly, business educators look to innovative teaching methods, such as active learning and the use of technology, to provide students with a transforming and exciting learning environment. According to seven principles of good undergraduate teaching (Chickering & Ehrmann, 1996; Chickering & Gamson, 1987), active participation of the student is critical to effective learning. The authors suggest that “sharing one’s own ideas and responding to others’ reactions sharpens thinking and deepens understanding.” The implication is that good teaching methods encourage active participation by all the students. Yet, more often than not, some students tend to dominate class discussions while others may be reluctant to speak their minds in front of their classmates. In *Tools for Teaching*, Davis (2009) suggests that the more reserved students may actually be “waiting for a non-threatening opportunity” to express their thoughts. Similarly, Davis suggests that the enthusiasm of students “who monopolize the discussion” can be carefully channeled in order to avoid having one or two students dominate class discussions to the exclusion of the rest of the class.

Technology has also been touted as a means to improve the educational process. In their book on building learning communities, Palloff and Pratt (2007) argue that computer technology is beneficial in encouraging student participation. Specifically, the authors suggest that the ability to communicate via computers is especially beneficial to students who are “...quieter than their peers and less likely to enter into a classroom discussion” p.9. It has also been suggested that current and emerging technologies may help stimulate creativity (Proctor, 2014).

The purpose of this paper is to describe storyboarding (with and without technology) as a tool for encouraging wider and greater participation in the accounting classroom. Storyboarding, a collaborative management technique, has been used by the entertainment field and many businesses to stimulate creativity and promote greater involvement and participation in the decision-making process. An adaption of the concept of brainstorming, storyboarding (Barr, 1988; Ragon & Kittleston, 1994), asks participants to use storyboards to communicate responses to specific questions using pictures and/or words. The storyboards document and present individual responses with these responses ultimately becoming an integral part of a group discussion. The process of creating the storyboards has been found to improve participant engagement (Dexter, 2016; Lillyman, Gutteridge, & Berridge, 2011). Storyboarding has also been found to be helpful in gaining consensus and acceptance of group decisions in a way that is non-threatening to individual participants (Barr, 1988). Davis (2009) suggests that requiring everyone to “jot down a response” as a prelude to discussion can be an effective means to “discourage students who monopolize the discussion” p.109.

This study also describes technology enabled storyboarding. Communication via computer has been found to result in greater participation by students who would otherwise be uncommunicative. The implication is the reticent student may find technology enabled storyboarding a relatively less intimidating environment.

STUDENT PARTICIPATION

Keeping students interested and engaged is increasingly a top priority and encouraging student participation is one important dimension of engagement that many academics find challenging. Those of us who have taught for a while have also noticed that today's students, to a larger extent than past student generations, expect far more than straight lectures from their instructors (Allred & Swenson, 2006; McCutcheon, 2015; Stapleton, Wen, Starrett, & Kilburn, 2007). Millennial students expect to be engaged and interact. The question often comes down to trying to understand student why some students are less communicative than others and what an instructor can do to help.

In a study of class participation and personality, Williams (1971) found some major differences between active participants and those who do not participate. Although he did not find personality characteristics such as introversion/extroversion significant, he did demonstrate a significant relationship between greater participation and the individual's sense of security. Specifically, active participants were found to have low levels of insecurity. Williams suggests that "one major deterrent to participation is the perception of personal threat" p.197.

Previous research also tells us that student participation is an essential part of the learning process and that the instructor can make a difference. In particular, research also tells us that making the student comfortable with class discussions needs to be part of any strategy to widen participation (Dallimore, Hertenstein, & Platt, 2006, 2010, 2013). This stream of research suggests that that cold-calling, which many consider problematic, can actually be quite effective. Specifically, the authors (Dallimore et al., 2006) suggest that professors "...warm up" their cold calls to ensure that students have a positive experience and that they fully benefit from participating in the discussion" p.373. In an extensive review of the literature Rocca (2010) concluded that participation is important and "...classroom climate is critical to higher levels of participation"p.204. Prior research also suggests students interacting with each other experience positive benefits for learning (Hertenstein, 1991). In a more recent study of the influence of participation on student performance in an accounting theory course, Ward and James (2015) found a significant relationship between participation and performance on virtually all assignments.

STORYBOARDING

The use of storyboarding in businesses and in the classroom represents an extension of the technique used by Walt Disney (Pallant & Price, 2015) as a means for generating and organizing creative input from a wide variety of participants. Although the purpose of storyboarding at Disney was to facilitate the development of film, both academics and non-academics have adapted the technique as an effective means to stimulate creativity, share ideas and/or facilitate consensus building in different settings (Atkinson, 2011; Barr, 1988; Kolod & Ungar, 2016; Mentzer, 2014; Ragon & Kittleson, 1994; Reeder, 2005). In settings outside of the entertainment field, storyboarding has successfully been used to generate and organize concepts and enhance collaboration (Atkinson, 2011; Barr, 1988; Fraser, 2003; Proctor, 2014). In reviewing five case studies, Fraser found that storyboarding was critical to project success by facilitating sharing of information and teamwork while fueling creativity. Barr (1988) reports how storyboarding was used at General Electric to deal effectively with design engineering challenges. Referring to the method as "a sophisticated form of brainstorming", Barr (p.45) concludes that storyboarding is a valuable technique for bringing together and documenting diverse perspectives for problem solving. Reeder (2005) suggests that storyboarding provides benefits for both industrial engineers and industrial engineering students.

In discussing the value of storyboarding for health education Ragon and Kittleson (1994) describe the method as type of brainstorming. According to the authors (Ragon & Kittleson, 1994), storyboarding provides organizations with the means to "... maximize team collaboration through an activity that is virtually void of criticism" p.15. By facilitating the organization and documentation of ideas, the storyboards themselves allow the process to be conducted over several time periods while giving participants a great deal of flexibility in how they communicate their thoughts. Typically, participants have the option to use pictures, words or a combination of both (Barkman, 1985; Ragon & Kittleson, 1994) as part of the process.

Storyboarding has also been found to be valuable for the education of nurses (Dexter, 2016; Lillyman & Bennett, 2012; Lillyman et al., 2011). Lillyman et al. (2011) found that storyboarding led to greater engagement of students and improvement of critical thinking skills. Similarly, Dexter also found student engagement enhanced through storyboarding.

Besides promoting creativity, storyboarding has also been found to dramatically increase participation rates even among normally reluctant participants while helping to build consensus. *In Creative Problem Solving for Managers*, Proctor (2014) describes the benefits of Storyboarding:

“Storyboarding is like taking your thoughts along with the thoughts of others and spreading them out on a wall as you work on a project or solve a problem. When you put ideas up on storyboards, you begin to see interconnections, how one idea relates to another, and how all the pieces come together. Once the ideas start flowing people ‘hitch-hike’ onto other ideas” (p. 234)

Traditionally, storyboarding has been accomplished by the use of “Pen and Paper” techniques. The “Pen and Paper” approach, however, has drawbacks such as problems with handwriting, keeping track of materials, and requiring a great deal of in-person meetings for the participants. In recent years, a number of companies have started to use technology, including using PowerPoint as an authoring tool to streamline and improve the efficiency of storyboarding (Atkinson, 2011). Technology is also expected to enhance the storyboarding process by providing an environment which is less intimidating for individuals who tend to be less communicative in a group setting.

Traditional “Pen and Paper” Storyboarding

The traditional storyboarding process begins with selection of a “topic” which can be as focused as one learning objective or as complex as a major group project. The materials needed before the process starts include large quantities of index cards in various colors and sizes, pens, push pins and masking tape. The index cards are needed to document each participant’s responses. There is also the need for a large textured wall or a large bulletin board for placement and replacement of the storyboards represented by index cards. Alternatively, post-it notes can be used in place of the index cards allowing the storyboards to be posted without the need for masking tape or push pins.

Using index cards or post-it notes and working independently, each student writes down his or her solutions/ideas related to a given topic. A separate index card or post-it note is used for each solution/idea. Once the topic has been introduced and each student has written responses, group discussion commences with each student explaining his or her solution to the others. (See Table 1 for a description of the typical phases involved).

Technology Enabled Storyboarding

Although there are other software packages that could be used as an authoring tool, PowerPoint was used since it is widely available throughout many campuses and it has been used successfully for storyboarding in businesses and non-profits (Atkinson, 2011; Kisak & Conrad, 2004). For that reason, this paper describes technology enabled storyboarding using PowerPoint as the authoring tool. Using PowerPoint for storyboarding has been suggested by several authors (Atkinson, 2011; Kisak & Conrad, 2004) as an effective means to facilitate the process. The use of PowerPoint eliminates the need to mount and spread out many index cards or post-it notes on a bulletin board or wall. An added expected benefit is that the student participants gain experience in the use of PowerPoint in a non-typical setting. (See Table 2 for a description of the typical phases involved).

THE STORYBOARDING ASSIGNMENT

Any number of managerial accounting topics can be adjusted to fit storyboarding, such as building an Activity-Based Costing (ABC) system (see Table 3) or designing a Balanced Scorecard. For example, for the ABC assignment, the initial emphasis is on generating as many potential cost drivers as possible. Each student’s list is then discussed in turn by the group and sorted. It is only in the final phases of the process that the group is asked to pare down the number of cost drivers and come to a resolution. It is crucial that the facilitator emphasize the importance of generating and discussing as many cost drivers as possible in the first few phases of the process. It is helpful to post a picture of smiley face or some other positive visual to reinforce the concept that the objective is to focus on identifying a large number of drivers. Later in the process, the groups will need to critically evaluate the drivers and come to one or more solutions. At that point, the facilitator removes the positive visual posted earlier or replaces it with something that suggests it is time to pare down the solutions.

OBSERVATIONS ABOUT STORYBOARDING

The course using storyboarding is required as part of the school's MBA program and is offered at night. Most students come to class after a full day of work and the challenge is to keep them interested and engaged. For a number of semesters, building an ABC system had been a topic and an in-class exercise for this class. The ABC system exercise was transitioned to "Pen and Paper" storyboarding with student performance (with and without storyboarding) being unobtrusively observed by walking around the room periodically. Although transitioning to "Pen and Paper" storyboarding resulted in an increase of only 2 more items over the exercise without storyboarding, there were a number of positive comments from students about the storyboarding experience. Several students mentioned that requiring everyone to participate by writing down the drivers kept them involved even in spite of being tired. Others stated that storyboarding helped them understand what we were trying to accomplish with ABC. Several students mentioned that they learned a lot from the interaction with the other students in coming to a final resolution. I also sought out students who had never participated previously and asked their opinions. Storyboarding seemed to provide a less stressful environment for them.

In subsequent semesters the ABC assignment was transitioned to the technology enabled approach. Students were asked to use PowerPoint as an authoring tool to keep track of their lists. The results showed that the number of items listed increased by 7 over the "Pen and Paper" storyboarding. Comments were quite positive with students expressing the same type of positive comments observed with "Pen and Paper" storyboarding. Storyboarding with technology, however, seemed better at creating an atmosphere that encouraged everyone to fully participate. One student stated that working on the computer was far less intimidating than jumping into a class discussion dominated by one or two people. In addition, unexpectedly, a number of students indicated that they felt that the exercise helped them improve their PowerPoint skills.

CONCLUSION

Previous research indicates that student participation is a critical component of the learning process and instructors can make a difference by employing certain teaching methods and strategies. Many students find active participation intimidating and/or threatening to some extent. Millennial students, in particular, expect more interaction and less of lecture format as part of the learning process. Storyboarding, a technique adapted from the entertainment industry, is suggested as a way to create a more inviting experience in which students feel free to express their opinions and exchange thoughts with others in the class. Traditionally the technique has been implemented using a "Pen and Paper" approach, which although effective, has some drawbacks that can be overcome with technology. Technology enabled storyboarding, therefore, is suggested as the way to encourage student participation and enhance collaboration.

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Table 1 “Pen and Paper” Storyboarding

- 1. Generation of solutions/ideas.** Working independently, each participant writes down all the possible solutions/ideas related to the story or topic with each solution/idea being written on a separate index card or post-it note. If the class period is short this phase can be assigned as homework. The emphasis at this point is on generating many possible solutions/ideas and 100% participation. A critical element of this phase of Storyboarding is to encourage each participant to focus on the quantity rather than the quality of solutions/ideas. As a consequence, this approach prevents one or two highly vocal individuals from dominating the generations of solutions/ideas. The class is split into groups of between 4-6 students to facilitate discussion. The cards or post-it notes are collected and posted on a wall or bulletin board and form the basis for group discussion, the next phase. The facilitator often places a large smiley face picture prominently on the board reiterating that at the stage we want as many solutions/ideas as possible.
- 2. Group Discussion.** Each solution/idea that was recorded on an index card or post-it note is reviewed with each participant explaining his or her solutions/ideas to the group. Understanding the concept behind each solution/idea is critical for success in the next phase which requires an appreciation of the similarities and differences among the solutions/ideas.
- 3. Sorting.** Based on further group discussion, the cards are sorted into similar categories. The emphasis is on finding solutions which seem to cluster on similar concepts. Each clustering of similar cards is given a separate title to distinguish it from the others and communicate its general meaning. The title for each cluster of similar concepts is recorded on a larger, different color index card or post-it note called a header card.
- 4. Group Review.** At this stage, the group reviews the clustering of concepts and decides to do further sorting, adding or deleting cards as needed. The facilitator often removes the smiley face picture from the board signaling that the time can come to be critical. Some facilitators will actually place a frowning face on the board at this point.
- 5. Pare down the solutions.** The group selects a limited number of solutions. This phase may require a multi-stage voting process to achieve a consensus. Depending on the topic and assignment it may require a number of computations as well.

Table 2 Technology Enabled Storyboarding

- 1. Generation of solutions/ideas.** Working independently and using PowerPoint, each participant documents all the possible solutions/ideas related to the story or topic under consideration. Participants are instructed to create a separate slide for each possible solution/idea using the title section of the slide. This phase of the process can be assigned as homework. Alternatively, creation of the slides can be accomplished in class using a computer lab setting or by asking students to bring laptops or tablets with PowerPoint to class. Similar to the approach with “pen and pencil” storyboarding, the class is split into groups of between 4-6 students with the facilitator emphasizing that the goal is to enumerate as many ideas/concepts as possible. Typically, students submit slides using a collaboration tool such as Groups in Blackboard. Some students elect to use SKYPE to facilitate dissemination and discussion of ideas.
- 2. Group Discussion.** Each solution/idea is reviewed with each participant explaining his or her solutions/ideas to the group. Understanding the concept behind each solution/idea is critical for success in the next phase which requires an appreciation of the similarities and differences among the solutions/ideas.
- 3. Sorting.** Based on further group discussion, the slides are sorted into similar categories. The emphasis is on finding solutions which seem to cluster on similar concepts. Each clustering of similar slides is given a separate title to distinguish it from the others. Participants are encouraged but not required to include visuals (clipart, pictures, drawings) for the heading of similar concepts to help communicate its general meaning.
- 4. Group Review.** At this stage, the group reviews the clustering of concepts and decides to do further sorting, adding or deleting slides as needed. The facilitator signals that the time can come to be critical.
- 5. Pare down the solutions.** The group selects a limited number of solutions. This phase may require a multi-stage voting process to achieve a consensus. Depending on the topic and assignment it may require a number of computations as well.

Table 3 Activity- Based Costing – Using Storyboarding

- 1. Generation of solutions/ideas.** The students read a short narrative (See Appendix A) about a company that is contemplating changing their cost system and is encouraged to identify as many cost drivers as possible.
- 2. Group Discussion.** The class is split into groups of between 4-6 students. Each participant explains his or her list to the group. No cost drivers are eliminated at this point.
- 3. Sorting.** Each group decides to sort the drivers into categories, such as unit, batch, product or facility sustaining. Again, no cost drivers are eliminated at this point.
- 4. Group Review.** At this stage, the group critically evaluates the list adding or deleting drivers as needed. Sometimes additional information is added at this point to aid the group in this phase of the assignment.
- 5. Pare down the solutions.** The group collaborates on a solution. This phase requires computations of the various alternatives under consideration.

Appendix A Building an ABC System in PW&M Kitchen Manufacturing

PW&M manufactures two models of a kitchen appliance, the Gourmet and the Standard. The company started many years ago with the Gourmet appliance and added the Standard model two years ago to meet demand for a less costly product. Ever since the addition of the Standard, the controller has received complaints from product management and production that the cost allocations between the two products are highly inaccurate and do not reflect actual resource usage. Having heard about activity-based costing (ABC), the controller asks your help in determining if ABC makes sense for this plant. Currently, the plant uses a single cost driver system aggregating all the overhead accounts into one big cost pool and allocating based on machine hours. The Table 1 represents the overhead costs that are expected for next year for each department.

Table 1
Expected Overhead Costs by Department

Receiving	\$80,000
Engineering	180,000
Material Handling	240,000
Power	60,000
Setups	168,000
Maintenance	160,000
Shipping	70,000
Depreciation (on production equipment)	\$120,000

Part One- List as many cost drivers as possible.

Part Two- Review your list with the group. No drivers should be eliminated at this time.

Part Three- Sort each of the cost drivers listed as unit, batch, product and/or facilities sustaining. No drivers should be eliminated at this point.

Part Four- Work toward resolution. The controller decided that more information was needed and provided you with the additional information in Table 2. Using this new information please select one cost driver for each of the eight departments. Write a short note to the controller summarizing your thoughts about the accuracy of the current, single driver system versus the system you just built.

Table 2
Activity level/Cost Driver Forecast

	Standard	Gourmet	Total
Number of order received	1,000	1,000	2,000
Machine hours	10,000	20,000	30,000
Engineering labor hours	5,000	3,000	8,000
Number of setups	60	40	100
Maintenance hours used	2,000	4,000	6,000
Kilowatt hours	15,000	30,000	45,000
Shipping hours used	2,000	4,000	6,000
# of parts received	15,000	20,000	35,000
# of material moves	4,000	2,000	6,000

Part Five- Pare down the solutions. Are you up for a challenge? The controller wants to know if there is any way to get the same level of accuracy as shown in an eight-driver system with fewer drivers?

SOLUTION

Part Four- The expected eight- driver system is as follows:

Receiving	# of parts rec'd
Engineering	Eng. Labor hrs.
Material Handling	# of material moves
Power	Kilowatt hours
Setups	# of setups
Maintenance	Maintenance hrs. used
Shipping	Shipping hours used
Depreciation	Machine hours

Part Five. -A five-driver system is just as accurate as the eight-driver system. This is accomplished by aggregating into one cost pool the departments that have a 1/3, 2/3 resource usage pattern. Note: some students suggest just using # of orders which provides close, but not identical, allocations as the eight-driver system. This usually leads to a discussion of the order entry function versus production.

Teaching Business Analytics with Virtual Laboratories

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ABSTRACT

Significant advances in cloud computing technology and the ubiquity of consumer electronics devices, such as, tablets and smart phones, which are connected to the Internet have made it possible to develop flexible and cost effective virtual lab systems to support online learning courses that require a computer laboratory component. In this paper, the authors describe their experience of designing and using a virtual computer lab for teaching an online business analytics class. The virtual lab provides an opportunity for students to do hands-on assignments in navigating business data warehouses, creating data cubes, writing SQL queries, creating dashboards and other visualizations, writing reports, and using descriptive and predictive models for data mining. The authors describe alternative cloud architectures for designing virtual labs and discuss their criteria for selecting the optimal deployment method.

Keywords: virtual lab, remote lab, business analytics education, virtualization, and cloud computing

INTRODUCTION

Virtual computer laboratories (virtual labs) represent an interesting emerging technology for online learning in courses that traditionally required the use of campus-based computer laboratories (Son, Irrechukwu, & Fitzgibbons, 2012; Fulmer & Johnson, 2014). By means of these virtual labs, students can interact with the required software applications anytime of the day, from any location, and using any personal computer or smart mobile device provided that they have Internet access. Furthermore, instructors can remotely assist users in the virtual labs in real-time when required. This emerging development is also part of the blended learning revolution in education which seeks to provide students with convenient options for accessing learning materials (Neacsu & Adascalitei, 2016). All this has been made possible by significant advances in cloud computing technology and the ubiquity of consumer electronics devices, such as, tablets and smart phones. In this paper, the authors describe their experience of designing and using remote labs and then virtual labs over several semesters for teaching an online business analytics class. A virtual lab system provisioned in the public cloud provides a flexible and cost effective solution for students to do hands-on assignments in navigating business data warehouses, creating data cubes, writing SQL queries, creating dashboards and other visualizations, writing reports, and using descriptive and predictive models for data mining. The authors describe alternative cloud architectures for designing virtual labs and discuss their criteria for selecting the optimal deployment method.

LITERATURE REVIEW

Virtual labs, according to Son et al. (2012), are hands-on laboratories that are built using virtualization technology. They describe how virtual labs have been used in technology-based courses, such as information security courses. In other fields, particularly in engineering and the physical sciences, virtual labs have been defined as environments where student experiments can be simulated through the use of software (Chan & Fok, 2009), while remote labs allow students to access the physical lab equipment at a distance via the Internet in order to perform real-time experiments (Auer, 2001). Extension of use of these labs is also now evident in business courses such as Design Thinking and Innovation where visual experiments form a key component of the students' learning experience. We will use the definition by Son et al. (2012) and will describe remote labs as computer labs where all of the software tools for the hands-on exercises are installed directly on a student's personal computer. Burd, Seazzu, and Conway (2009) describe an implementation of a virtual computing lab in one college of a large public university and they compare this type of computer lab to the traditional physical computer labs.

In terms of deployment, there are three types of clouds: public clouds, private clouds, and hybrid clouds (Jadeja & Modi, 2012). With the public clouds all of the computing servers, network infrastructure, and software applications are managed by a service provider. Users select the applications that they need and only pay for the time duration that they use these applications, it is a pay-per-use model. The primary limitation with public cloud deployments is that they are less secure than the other two options. The private clouds on the other hand are provisioned within the organization's internal data center, all of the computing servers, network infrastructure, and software applications are

managed by the organization's IT staff. The hybrid cloud is a combination of the private and public clouds, where primarily the private cloud is used and when additional computing resources are needed then external public clouds maybe engaged on an ad-hoc basis. From an end user's perspective, the deployment model is of no consequence since end users get the same benefits regardless of the deployment model, however from the organization's perspective there are significant differences between the deployment models with regards to costs, security, and time to deploy applications. Despite its security limitations, the public cloud is considered more useful than its private counterpart based on the costs and deployment flexibility (Vikas, Gurudatt, Vishnu, & Prashant, 2013).

BACKGROUND

This paper discusses the use of virtual labs for an online class in the MBA program at a college of a large public university in the spring semester of 2016. The college's MBA program offered both a full-time residential MBA option and a completely online MBA option. Since the fall semester of 2013 the residential option had been offering a business analytics course as a core course. This course was hands-on based and as such it required the use of a computer lab for all class meetings. A couple of factors drove the need to explore ways to offer this course in the online option. Firstly, in order to remain competitive in the online MBA space there was a growing need to quickly offer one or more analytics courses as part of the core. Secondly, a strategic decision was taken by the college to harmonize the core course offerings in the two MBA options.

Three technology options on how to take the residential business analytics course and make it available to students taking classes via the online option were studied. Below we discuss these options.

The first option was to try and use university-hosted virtual labs (UVlabs). This would involve the provisioning of virtual labs using desktop virtualization (VDI) technology that would be hosted in the university's data center (University of Southern California, 2017; University of Arkansas, 2017). In other words, with this option a virtual lab would be created in a private cloud. The advantages with this option were that it would facilitate compliance with the university's data policies and if successful could be scaled to the online offerings campus-wide. However, the campus IT department would need to acquire additional IT personnel to support this options, as well as, additional computer hardware and software resources. As such, the challenges with this option were the high direct costs, together with the long lead time required to get this option approved via the university inter-departmental processes.

The second option was to try and use university-supplied remote labs (URLabs). This would involve the campus IT department creating images of the campus computer labs and placing those images as virtual machine files on portable USB (flash) drives or DVDs (Casini, Prattichizzo, & Vicino, 2007). Each student taking the business analytics course via the online option would then be mailed a flash drive together with instructions on how to access their personal computer lab using the home machine. This option had the advantage that students can use their personal computer labs in situations where they have limited Internet connectivity and all of the students' data would be stored locally and so minimizing the risk of violating the university's data policies. The challenges with this option centered around the cost of creating and maintaining the virtual machine images over time, together with the licensing for the operating system and productivity applications, such as, Microsoft Office® that were installed on the image. There was also a concern about the potentially long lead time required to get this option approved via the university inter-departmental processes.

The third option that was reviewed involved the use student-built remote labs (SRLabs). This required the development of detailed install instructions for all of the software applications to be used in the course. The 10 software applications that were used for the exercises in this course are described in the Implementation and Course Description section below. Using this option students would then be required, with some support from the instructor, to install all of the software applications onto their personal computers before the start of the course. This option meant that students were responsible for acquiring the software licenses for the operating system and productivity applications, such as, Microsoft Office® on their personal machine. The install software and software licensing information for the analytics applications application for the course would be provided as part of the install instructions. This option could be implemented quickly as it did not require any University inter-departmental approval processes. This option required that the course instructor have a background or some experience in IT support. Furthermore, both students and the instructor would spend a significant amount of time working on issues that were not related to the course content. A major limitation of this option was that the business analytics course could not be offered as a core course since there was the possibility that some students due to technical or personal limitations may not be able to build their own remote labs.

The SRLabs option was selected primarily due to its lower direct costs and the shorter timeframe for implementation, as shown in Table 1. The direct costs for the UVlabs and URLabs options could have been offset by adopting a technology fee for students enrolling in the business analytics course. However, such a decision would have required approval at the university-level. The UVlabs and URLabs options were also dependent on the IT department's resource availability. Phase 1 section below discusses the implementation of the SRLabs option and the issues that were encountered.

Table 1: Remote Labs versus Virtual Labs in the Private Cloud

	UVlabs	URLabs	SRLabs
Pros	<ul style="list-style-type: none"> - Students can use any device - No software installs by students - University's data policies can be strictly enforced - The instructor does not provide tech support. 	<ul style="list-style-type: none"> - Students only have to install a VMM - The instructor does not provide tech support. 	<ul style="list-style-type: none"> - IT department is not required to setup the remote labs - No 'technology fee' is required for the course
Cons	<ul style="list-style-type: none"> - Costs of setting up private cloud - IT department required to setup each virtual lab - Costs have to be offset by a 'technology fee' 	<ul style="list-style-type: none"> - Costs of distributing the drives - IT department required to setup & duplicate the imaged drives - Costs have to be offset by a 'technology fee' - Licensing issues since software in VMs not installed by the user. 	<ul style="list-style-type: none"> - Students have to install 10 applications - The instructor has to provide tech support.

IMPLEMENTATION AND COURSE DESCRIPTION

The course offered an introduction to business intelligence (BI) with emphasis on the BI infrastructure, as well as, the processes used to get data into data warehouses and the data mining tools used to search for patterns in the data. It was a single semester 14-week course. Concepts were introduced through lectures and assigned readings, and they were assessed using quizzes. Application of the concepts was taught via twelve in-class hands-on exercises using different commercial and open-source BI tools. Students were first introduced to Structured Query Language (SQL) to extract and manipulate data in production relational database systems and data warehouses. Queries were written and executed using the Oracle SQL Developer tool (Oracle, 2017). Next, students studied the need for data warehouses and they learned about the different architectures that were available for data warehouses. In the hands-on exercises students used a SAP Business Warehouse (<https://www.sap.com/products/business-warehouse.html>) to create a data cube and to load data into the cube from external data sources. Students were then able to slice-and-dice the data in their cubes using the SAP Business Explorer Query Designer (BEx) and SAP BusinessObjects Analysis for Microsoft Office (<https://www.sap.com/community/topic/businessobjects-analysis-ms-office.html>). Students then developed two dashboards using SAP BusinessObjects Dashboards (<https://www.sap.com/products/dashboards.html>). Using data from a database students wrote a report using SAP Crystal Reports (<https://www.sap.com/products/crystal-reports.html>). Several data mining algorithms were introduced: apriori algorithm for association mining problems, decision tree algorithm for classification problems, linear regression and exponential smoothing algorithms for estimation problems, and k-means algorithm for clustering problems. Students completed a market basket analysis exercise using a Teradata data warehouse with historical retail data from Sam's Club and the SAP Predictive Analytics application (<https://www.sap.com/products/analytics/predictive-analytics.html>). Several scenarios were presented with different data sets for the data mining hands-on exercises that were completed using SAP Predictive Analytics and R software. Text mining was introduced using the concept of regular expressions (Friedl, 2006) and students used the open-source GNU Grep tool to mine text files and emails for patterns of interest (<https://www.gnu.org/software/grep>).

Phase 1: Using Student-Built Remote Labs

The online version of the Business Analytics course was rolled out in the fall semester of 2014. The course was taught by an instructor whose experience included IT technology support and database development. The course was also taught by the same instructor in the spring and fall semesters of 2015.

In all three semesters the course was taught using the student-built remote labs. Students could email questions to the instructor or post them on a discussion board in the online classroom. We categorized these inquiries into two categories; lab-setup related and course-content related. Table 2 shows the student inquiries data, together with the course enrollments for each semester.

In the fall of 2014 students were encouraged to install all of the applications and thus build their complete remote lab at the start of the course, however, some students chose to install the applications separately. They installed an application as and when it would be needed for each upcoming hands-on exercise. In subsequent semesters the setting up of the complete remote lab by the students was made into a graded assignment which was due in the first week of the course.

Students used personal computers (Windows and Mac), as well as, employer-provided laptops (Windows). Since most of the commercial analytics applications used in the course only run on the Windows platform, students using Macs needed to have a virtual machine running Windows 7 or later hosted in a virtual machine monitor (VMM), such as VirtualBox (<https://www.virtualbox.org/wiki/VirtualBox>) or Parallels Desktop for Mac (<http://www.parallels.com/products/desktop>). Common problems encountered with the setups of the remote labs were:

Firewalls and anti-virus software restricting the installs and access to the hosted data warehouse servers.

Lack of administrative rights to perform the installs on employer-provided laptops.

Misconfigured environment variables

Missing operating system device drivers or incorrect versions of device drivers.

Missing pre-requisite applications, such as, Java or Microsoft .NET frameworks

Most problems were diagnosed via screen shots in email exchanges between the instructor and students. A few more difficult cases required that the instructor remotely access the student's computer using a WebEx session. On a few occasions a student's computer with a functional remote lab broke down during the semester which resulted in that student needing to rebuild their remote lab.

Phase 2: Using a Public Virtual Lab

The student-built remote labs solution that was implemented in Phase 1, while successful still had a significant downside; the solution was not scalable. It required that the instructor have the dual roles of teaching and providing technical support, and that the students spend time doing software installs which were not part of the course content. Furthermore, students who were not using the latest versions of Microsoft Windows on their personal computers faced significant challenges in taking this course online. All of these limitations did not affect students taking the course in the residential MBA option since the course was taught in a computer lab that was supported by the IT Department.

Table 2: Student Inquiries by Type and Semester

	Fall 2014	Spring 2015	Fall 2015	Spring 2016
Enrollment	19	31	18	16
Lab Setup Inquiries	140	69	64	29
Course Content Inquiries	50	109	75	77

In the spring 2016 semester a public cloud-based virtual lab solution was trialed for this course in the online MBA option. This solution did not require the IT Department's resources and it addressed the limitations discussed above. The public cloud-based virtual lab for the course was provisioned and managed by a vendor, vLab Systems (<http://www.vlabsystems.net>). The service was provided at no cost as a trial in the spring 2016 semester, however for future semesters students would be required to pay for access to the virtual lab at a cost of \$48.86 per 14-week semester. These payments would be made directly to the vendor by the students. The virtual lab access course requirement and costs would be posted in the syllabus alongside information about the required course textbook. All of the required software was installed in the virtual lab by the vendor and each student only had to configure a single app on their personal computer or mobile device in order to access virtual lab, as shown in Figure 1. The virtual lab could be accessed from any computer or mobile device that was running any of the following operating systems: Microsoft Windows 7® or later, Mac OS X®, Android® or iOS®. Using the Microsoft Remote Assistance® feature in the virtual lab the instructor could access a student session in the virtual lab in real-time via a student-initiated invitation. This allowed students to receive personalized assistance with the hands-on exercise when needed.

Security

Potential security threats were the main issue noted against the public cloud deployment model (Jadeja, & Modi, 2012). Below we discuss some of the actions were taken in the implementation of the virtual lab in Phase 2 in order to mitigate against some of these potential security threats:

Firstly, the login credentials (usernames and passwords) that the students used to access the virtual lab were not associated with any of the other university-supplied computer accounts. The virtual lab vendors generated the login credentials for the class and provided them to the instructor via a secure download. The instructor then assigned the individual accounts to the students in the class. This provided a fail-safe mechanism in that, in the event of any security compromises to the virtual lab, such a security compromise would not lead back to other university systems used by the students. Furthermore, the assigned passwords were 'strong' passwords created using a password generator and students were not permitted to change these passwords.

Secondly, students were required to store all of their data files on the university cloud drive or on other cloud storage systems, such as Google Drive® or Microsoft OneDrive®. This ensured that students would have access to their data files even if they did not have access to the virtual lab. Storing the data files on the university cloud drive ensured that the data storage for the virtual lab solution met the university's data policies.

Finally, a sandbox environment was created where all of the analytics applications and utilities which the students needed to complete the hands-on exercises were only available via icons on the desktop. Students could not start any applications using other methods, such as, the command line or any other menus. This measure provided for easy access to the required applications and protected the virtual lab system against any potential misuses.

Figure 1: Accessing the Virtual Lab from an Android Phone.



RESULTS AND DISCUSSION

The change of making the setting up of the student-built remote labs into a graded assignment starting in the spring 2014 semester resulted in a 50.7% drop in number of lab setup inquiries. The number of lab setup inquiries remained relatively steady between the spring 2015 and fall 2015 semester, despite the differences in the enrollments in those semesters. This might suggest common lab setup issues with each cohort and that the use of the discussion boards to disseminate solutions to the issues may have helped lower lab setup inquiries. The use of the virtual labs starting in the spring of 2016 resulted in a further 54.7% drop in the number of lab setup inquiries. Many of these lab setup inquiries were resolved by the virtual lab solution vendor. From the student survey in Appendix A, all of the students found the instructions on how to setup access to the virtual labs easy to follow. From a scalability perspective, the virtual lab solution doesn't require the use of the IT Department and the students only have to setup access to the virtual lab from any of their personal computing devices. Furthermore, students only have to setup access to the virtual lab from any of their personal computing devices just once. Students in the spring 2016 did not have to spend anytime installing the analytics tools onto personal computing devices. With the virtual lab solution,

the course instructor is not required to have any experience with technical support. The course content inquiries, however increase with the class size.

Based on the survey results 80% of the students had previous experience with the use of remote desktops, which are the foundational technology for VDI-based virtual labs. This suggests that wider adoption of virtual labs in higher education may not be accompanied with a high learning curve on the use of such labs by the students. 20% of the students used multiple devices to complete a hands-on assignment in the virtual lab, this is a convenience not available with traditional computer labs. 80% of the students found that the virtual lab provided an environment that was: easy to navigate, easy to locate their applications and data files, and the applications responded quickly. All of the students surveyed found it easy to exchange their data files between the virtual lab and external systems, such as, Google Drive® or Microsoft's OneDrive®.

CONCLUSIONS

In this paper, the authors have described their experience with teaching a hands-on based online business analytics class by first using student-built remote labs, then followed by the use of a virtual computer lab. The challenges for both the instructor and the students with the remote labs were highlighted. This was then followed by a discussion of how those challenges were mitigated through the use of virtual labs based on the public cloud. Based on their experience, the authors concluded that public cloud-based virtual labs provide a cost effective and flexible avenue for teaching computer labs based courses in online programs. For student-based use of virtual laboratories there were no data security concerns identified by student relating to their own files or to the university's own systems, since the public cloud-based virtual labs operate in much the same way that the email system provided on public platforms such as Google Mail®, Yahoo Mail® or Hotmail®, for example. Public cloud-based virtual labs apply the same public email concept to traditional campus labs and therefore making the traditional campus lab portable albeit at a nominal fee. The efficacy of virtual labs for teaching, experimentation requires more trials beyond what this study was able to do in order to make more data available, before definitive results can be determined. However, preliminary evidence of their efficacy for students and their cost-sharing benefit between students and institutions is convincing.

Public cloud-based virtual labs have been in existence for more than a decade and they offer some attractive advantages over traditional campus labs and yet universities have been slow to adopt them. The question is what accounts for their lack of traction within the academic community when this case study has shown their attractiveness and at a time when more and more higher education institutions are offering online programs and competing for students worldwide? Intuitive logic would suggest that public cloud-based virtual laboratories should be a vital tool that enables institutions to offer previously restricted on-campus only lab-based courses, to online students worldwide. As such, they should be more attractive than they have been to date. Future research on the subject should perhaps examine the nature and causes of barriers to the adoption of public cloud-based virtual laboratories compared to traditional campus-based laboratories which at face value are more costly to acquire and maintain. Given their benefit of portability for all students regardless of whether they are online or on-campus students and their ability to widen access to lab-based courses for online students worldwide, the question that remains to be answered is; are public cloud-based virtual laboratories the future of lab-based teaching and learning or are they a passing fad?

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APPENDIX A: Student Survey Questions and Responses

Response Rate: 31.25%

Did you find the instructions to setup the connection to the virtual lab from your device(s) easy to follow?

Answer	Response
Yes	100%
No	0%

What device(s) did you use to access the virtual lab?

Answer	Response
Android Phone	0%
Android Tablet	0%
iPad	0%
iPhone	0%
Mac	20%
Windows Desktop Computer	40%
Windows Laptop	40%
Windows Phone	0%

Did you work on an assignment using two different devices?

Answer	Response
Yes	20%
No	80%

Please tell us if you agree or disagree with the following statements about your experience once you successfully logged on to the virtual lab.

Question	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
The environment was easy to navigate	40%	60%	0%	0%	0%
It was easy to locate what you needed	40%	40%	10%	0%	0%
It was easy to exchange my data files with other systems	20%	80%	0%	0%	0%
The applications responded quickly	20%	60%	0%	20%	0%

Before your experience with this virtual lab, had you used any other remote desktop solution to complete an assignment for school or work?

Answer	Response
Yes	80%
No	20%

Strategic Planning, Learning and Company Performance In A Strategic Management Simulation Environment

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ABSTRACT

Total enterprise simulation games are an accepted pedagogical technique to create and sustain student engagement in strategic management courses. An important research question is whether students learn to manage companies in a total enterprise simulation. A second important question is whether strategic planning has any effect on company performance in the simulation environment. Our research examined these questions in the context of student team performance in the Business Strategy Game Online® as a research setting for a time-series experimental design. The change in the mean trend of Company Performance before and after the intervention of Strategic Planning shows strong support for a positive effect of strategic planning on company performance. A control group also showed similar but somewhat muted pattern. These results can be interpreted as a manifestation of student learning during the simulation game.

Keywords: Strategic Planning, Business Simulation, Company Performance, Student Learning

INTRODUCTION¹

Simulations and games have been used in many disciplines, including business, to create and sustain student engagement in learning (Auman, 2011; Misfeldt, 2015; Moseley & Whitton, 2014). In the field of strategic management, three distinct pedagogical tools have been in use, viz., Case Analysis, Total Enterprise Simulation Games (TESGs), and projects in Small Business Consulting. The virtues of TESGs for purposes of teaching, learning and research have been examined for over half a century (Dill, 1963; Faria, 2001). However, student engagement is important to faculty because it is expected to lead to learning. It is an important question for all of them to know whether students learn to manage a company's various aspects through simulations as experiential learning. Those faculty who use TESGs for the teaching of strategic management want to know whether strategic planning helps students in improving their company performance. These are separate but interconnected questions.

Feinstein & Cannon (2002) have argued that simulations have "representational validity", which means simulations do what was intended, and "validity" where conclusions reached by participants are like those obtained from the real world being modeled. Dickenson and Faria (1997) examined the performance of "real" simulation companies versus the performance of a group of companies using random strategies. The real companies outperformed the random strategy companies, and thus they argued, the simulation used was internally valid. Wolfe and Luethge (2003) performed a similar study. They found real players who consciously made decisions outperformed both players who copied the industry leader's decisions and players who simply regurgitated their opening decisions. Thus, we may conclude that (a) well designed simulations exhibit an appropriate level of realism, and (b) purposeful decision-making by students is related to student team performance in the simulation because they beat random decisions, cruise control decisions that never change, or copycat decisions that imitate industry leaders.

Fortmüller (2009) examined the kind of learning that takes place in a simulation game environment. He starts with the two distinct forms of knowledge in cognitive learning theory. Declarative knowledge refers to "knowing about something", while Procedural knowledge refers to "being able to carry out an activity". As an example, most people use grammar rules of their native language without difficulty (due to procedural knowledge), but cannot always define those rules of grammar (due to lack of declarative knowledge). Competence in any professional field requires both kinds of knowledge. He states that there are four learning objectives (LOs) behind the use of experiential learning techniques such as games: (LO1) to be able to use already-acquired specialized knowledge in specific problem situations, (LO2) to be able to combine activities acquired separately to a systematic sequence of action, (LO3) to be able to reconstruct basic correlations and processes, and (LO4) to be able to assess the interactions and consequences of an individual's and others' activities.

¹ The authors gratefully acknowledge the detailed and helpful comments from their anonymous reviewer.

There is a direct correspondence between these LOs and the learning objectives behind using a TESG in a strategic management course. Typical course objectives are (a) learning how to apply knowledge acquired in the business curriculum (declarative knowledge) to the analysis of reports and synthesis of strategies for their company (specific problem situation); (b) learning to make decisions about various aspects of the simulated company to form a coherent pattern (combine activities acquired separately – financial / marketing / production theories, concepts, and analysis – and apply to the game systematically); (c) learning by continually revising their estimates of degree of impact of different variables on their performance (reconstructing basic correlations and processes by which performance can be achieved); and (d) learning about the interactions between, and impact of, their own decisions and competitor decisions on their own results (assessing the interactions and consequences of their own and competitors activities).

Hornaday and Curran (1996) examined the relationship between formal planning and the performance of student teams competing in a comprehensive business simulation. After controlling for the effect of differences in competitive sets and exogenous conditions, statistical testing indicated that planning teams perform significantly better than non-planning teams. Since the planning teams performed strategic planning exercise before starting the simulation, we conclude that the study utilized a Pre-Experimental Static Group Comparison design (Campbell and Stanley, 1963).

METHODOLOGY

We decided to use a Time Series Quasi-Experimental Design to study the effect of formal planning on performance of student teams competing in a comprehensive business simulation. It would be a methodological contribution to the research in this arena.

The Business Strategy Game Online (BSG-Online®) by Thompson, Stappenbeck, et. al. (2004 - 2017) served as the research setting for this study. BSG-Online simulates a global athletic footwear industry with a maximum of twelve companies competing with one another. Student teams are tasked with strategic management of a company. All companies are considered to have been in existence for ten years, and start on an equal footing to compete beginning year 11.

In the game, students plan their operations and strategy, and make and save their decisions prior to deadlines on a preset schedule, when the game program processes decisions from all companies and computes performance of each company for that year. Company and Industry reports are available to students for analysis almost immediately for the next annual cycle. The fifty-three (53) decisions involve most aspects of a manufacturing company including forecasting, production, distribution, marketing, human resources, finance, etc. In addition to annual short-term decisions, students also make capital budgeting and financing decisions with longer term implications for the life of the simulation. Teams begin with decisions for Year 11.

The game administrator has the option to assign a Strategic Planning (SP) exercise where teams systematically go through their strategies and set goals in all areas of performance to create a 3-year strategic plan. This exercise can be assigned in Year 14 or later, i.e. after teams have three years of data on competitor decisions and performance.

There are two types of performance indicators in BSG – the Investor Expectation (IE) score and the Best-In-Industry (BII) score. The IE is a composite indicator on a scale of 0 – 100. It is the sum of scores on five criteria, such as ROE, EPS, Credit Rating, Stock Price, and Image Rating – each weighted equally at 20 points. These five scores are added together to form the composite IE score. A company may achieve a score above 100, up to 120, if it has surpassed the numerical goals on those criteria.

The Best-In-Industry (BII) is the second type of composite performance indicator of comparative performance of each company compared to the best performing company on each criterion in that year. As this is a measure of relative performance, this score was considered unsuitable for examining the effect of strategic planning on the company's performance with respect to goals set by the game, and known to all the company managers.

We used the IE score as an indicator of company performance in each year of the game for three reasons. First, the goals are preset for each of the five criteria at the beginning of the game; second, these goals are same for all

companies; and third, that a company's achievements on the criteria reflect the effectiveness of competitive strategies and internal operations of the company.

Game player subjects were all undergraduate, senior students with Business Majors in accounting, computer information systems, finance, management and marketing. All subjects had, as a prerequisite to the class, completed their Business Core courses prior to enrolling in the capstone class in Strategic Management. Students in each class section were assigned to teams of three to four students each with a view to maximizing the diversity of Majors and gender in every group. Each team was expected to strategically manage a footwear manufacturing company by making decisions for the coming yearly cycle. Class size varied between 25 to 30 students each, therefore all industries consisted of eight companies.

The game provided an excellent setting to test the effect of Strategic Planning (SP) on company performance as measured by Investor Expectation (IE) score. The timing of SP intervention could be adjusted between Year 14 and Year 15 to test if the effect is changed by timing of intervention. There was one semester when three sections – all online – were not assigned any strategic planning exercise due to an error in setting the game decision schedule. This error resulted in a control group of three industries.

The study utilized a Time Series Quasi-experimental design (Campbell and Stanley, 1968) with eight (8) annual IE scores as observations of each company's performance in Year 11 (Y11), Year 12 (Y12) ... until Year 18 (Y18). The Strategic Planning exercise (SP) was the intervention. (see Table 1) For one set of industries which we designated as Y14set, SP was required between Y13 and Y14 (i.e. the third and fourth observations) and the strategic plan was to be submitted with Year 14 decisions. For another set of industries which we designated as Y15set, SP was required between Y14 and Y15 and the strategic plan was due with Y15 decisions.

Table 1: Time Series Quasi-Experimental Design for comparing trends before and after the treatment

Y14set: SP in Year 14	IE ₁₁	IE ₁₂	IE ₁₃ SP	IE ₁₄	IE ₁₅	IE ₁₆	IE ₁₇	IE ₁₈
Y15set: SP required in Year 15	IE ₁₁	IE ₁₂	IE ₁₃	IE ₁₄ SP	IE ₁₅	IE ₁₆	IE ₁₇	IE ₁₈
Control Set (No SP required)	IE ₁₁	IE ₁₂	IE ₁₃	IE ₁₄	IE ₁₅	IE ₁₆	IE ₁₇	IE ₁₈

Per the Time Series design, if the trend in IE *after* SP intervention is statistically higher from the trend in IE *prior* to SP, then we may conclude that SP has an effect on company performance. From strategic planning literature, we would predict that the trend in IE *after* the SP intervention would be greater than the trend in IE prior to the intervention.

We collected data from capstone Strategic Management classes from Fall 2014 through Spring 2016. In each semester, two sections were conducted in a face-to-face setting, while two sections were conducted online. There were a total of 16 sections or industries with eight teams competing in each industry for a total of 128 companies. All sections were given five weeks to study the game, develop strategies, and two practice year runs to get them familiarized with the mechanics of decision input as well as to test the way the game responds to decisions. Game data for all companies was reset back to Year 10 after the practice runs, and the game ran through 8 cycles, i.e. from Year 11 through Year 18.

For each of the Fall and Spring semesters of academic year 2014-15, the Strategic Planning exercise was scheduled in Y14 for two Online and two Regular (face-to-face) sections. This is the Y14 Set of 8 industries with eight competing teams each. The Y15set consisted of eight industries (with eight competing teams in each industry) from the Fall and Spring semesters of AY 2015-16. Again, there were two Online sections and two Regular sections in each semester. Table 1 provides a summary of these.

Table 2: Industries tabulated by Medium of Instruction, Semester and Strategic Planning Treatment Year

		Y14 Set (AY2014-15)	Y15 Set (AY 2015-16)
Regular Sections	Fall	Industries: 20, 21	Industries: 30, 31
Online Sections	Fall	Industries: 22, 23	Industries: 32, 33
Regular Sections	Spring	Industries: 24, 25	Industries: 34, 35
Online Sections	Spring	Industries: 26, 27	Industries: 36, 37
Total		8 Industries, 64 teams	8 Industries, 64 teams

The data for IE scores for each company is automatically recorded by BSG Online after every run of the game, therefore there is no interaction between subjects and instrumentation. BSG Online also evaluates achievement of each team on strategic plans per preset rules that are known to students when they go through the strategic planning exercise. The rules provide incentives to teams for setting realistic yet high enough goals on the five criteria for performance evaluation. BSG website showed that all teams in the experimental industries completed their strategic plans as required. This was an excellent check that the intervention occurred in all the teams.

Given the data, we can set up research questions, and test hypotheses for (1) the year of treatment, i.e. Y14 treatment vs. Y15 treatment (i.e. irrespective of Medium of Instruction), and (2) controlling for Medium of Instruction, i.e. Y14 Regular sections vs. Y14 Online sections, as well as Y15 Regular sections vs. Y15 Online sections.

Two trends in IE scores were computed for each company for the pre-intervention and post-intervention period. Accordingly, for companies in the Y14 Set, trends were designated as “T11-14” for pre-intervention, and “T14-18” for post-intervention. Similarly, for companies in the Y15 Set, trends were designated “T11-15” and “T15-18”. The means of pre- and post- trends were subjected to Paired T-tests using Minitab® for each condition – year of treatment and medium of instruction.

Research Question 1: Is there a positive effect of the Strategic Planning (SP) exercise as an intervention on the performance of teams when the intervention is in year 14?

Ho: There is no significant improvement in the trend of instruction medium scores after the strategic planning exercise in year 14 for companies in industries 20-27.

Table 3: Paired t-test for trends in IE scores of Y14 Set industries before and after the intervention

Trend of IE for Years	Sample Size (Y14 Set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T14-18	64	7.29	9.08	1.13
T11-14	64	-6.80	10.75	1.34
Difference	64	14.09	17.79	2.22
95% C.I. for the population mean of the difference between Years 14-18 and Years 11-14 = (10.38, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = 6.33 p-value = .000				

A paired t-test of hypothesis using companies in industries 20-27 with an intervention year of 14 resulted in a p-value of .000 and rejection of the null hypothesis. We cannot reject the null hypothesis that states there is not a statistically significant change in the instruction medium scores for years 14-18. We are 95% confident the interval (10.38, infinity) contains the true value of the difference between the trend for years 11-14 and the trend for years 14-18.

Research Question 2: Is there a positive effect of the Strategic Planning (SP) exercise as an intervention on the performance of teams when the intervention is in year 15?

Ho: There is no significant improvement in the trend of instruction medium scores after the strategic planning exercise in year 15 for companies in industries 30-37.

Table 4: Paired t-test for trends in IE scores of Y15 Set industries before and after the intervention.

Trend in IE for Years	Sample Size (Y15 Set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T15-18	64	-0.185	6.506	0.847
T11-15	64	1.886	7.226	0.941
Difference	64	-2.07	11.74	1.53
95% C.I. for the population mean of the difference between Years 15-18 and Years 11-15 = (-4.63, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = -1.35 p-value = 0.910				

A paired t-test of hypothesis using companies in industries 30-37 with an intervention year of 15 resulted in a p-value of .910. We cannot reject the null hypothesis that states there is not a statistically significant change in the

instruction medium scores for years 15-18. We are 95% confident the interval (-4.63, infinity) contains the true value of the difference between the trend for years 11-15 and the trend for years 15-18.

Research Question 3: Is there a positive effect of the Strategic Planning (SP) exercise as an intervention on the performance of teams when the intervention is in year 14 and the medium of instruction is face-to-face?

Ho: There is no significant improvement in the trend of instruction medium scores after the strategic planning exercise in year 14 for companies in industries 20-21-24-25 taught in regular sections.

Table 5: Paired t-test for trends in IE scores of Y14 Set industries in face-to-face sections only before and after the intervention.

Trend of IE for Years	Sample Size (Y14 Set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T14-18	32	7.65	9.40	1.66
T11-14	32	-4.19	8.64	1.53
Difference	32	11.84	16.04	2.84
95% C.I. for the population mean of the difference between Years 14-18 and Years 11-14 = (7.03, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = 4.18 p-value = .000				

A paired t-test of hypothesis using companies in industries 20-21-24-25 with an intervention year of 14 resulted in a p-value of .000 and rejection of the null hypothesis. The statistical conclusion states there is a statistically significant change in the instruction medium scores for years 14-18. We are 95% confident the interval (7.03, infinity) contains the true value of the difference between the trend for years 11-14 and the trend for years 14-18.

Research Question 4: Is there a positive effect of the Strategic Planning (SP) exercise as an intervention on the performance of teams when the intervention is in year 15 and the medium of instruction is face-to face?

Ho: There is no significant improvement in the trend of instruction medium scores after the strategic planning exercise in year 15 for companies in industries 30-31-34-35 taught in regular sections.

Table 6: Paired t-test for trends in IE scores of Y15 Set industries in face-to-face sections only before and after the intervention.

Trend of IE for Years	Sample Size (Y15 Set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T15-18	32	-0.93	6.57	1.26
T11-15	32	3.0	7.29	1.40
Difference	32	-3.93	11.66	2.24
95% C.I. for the population mean of the difference between Years 15-18 and Years 11-15 = (-7.76, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = -1.75 p-value = 0.954				

A paired t-test of hypothesis using companies 30-31-34-35 with an intervention year of 15 resulted in a p-value of .954. We cannot reject the null hypothesis that states there is not a statistically significant change in the Investor Expectation scores for years 15-18. We are 95% confident the interval (-7.76, infinity) contains the true value of the difference between the trend for years 11-15 and the trend for years 15-18.

Research Question 5: Is there a positive effect of the Strategic Planning (SP) exercise as an intervention on the performance of teams when the intervention is in year 14 and the medium of instruction is online?

Ho: There is no significant improvement in the trend of instruction medium scores after the strategic planning exercise in year 14 for companies in industries 22-23-26-27 taught in online sections.

Table 7: Paired t-test for trends in IE scores of Y14 Set industries in Online sections only before and after the intervention.

Trend of IE for Years	Sample Size (Y14 Set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T14-18	32	6.94	8.88	1.57
T11-14	32	-9.40	12.09	2.14
Difference	32	16.34	19.38	3.43
95% C.I. for the population mean of the difference between Years 14-18 and Years 11-14 = (10.53, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = 4.77 p-value = .000				

A paired t-test of hypothesis using companies in industries 22-23-26-27 with an intervention year of 14 resulted in a p-value of .000 and rejection of the null hypothesis. The statistical conclusion states there is a statistically significant change in the instruction medium scores for years 14-18. We are 95% confident the interval (10.53, infinity) contains the true value of the difference between the trend for years 11-14 and the trend for years 14-18.

Research Question 6: Is there a positive effect of the Strategic Planning (SP) exercise as an intervention on the performance of teams when the intervention is in year 15 and the medium of instruction is online?

Ho: There is no significant improvement in the trend of instruction medium scores after the strategic planning exercise in year 15 for companies in industries 32-33-36-37 taught in online sections.

Table 8: Paired t-test for trends in IE scores of Y15 Set industries in Online sections only before and after the intervention.

Trend of IE for Years	Sample Size (Y15 Set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T15-18	32	0.44	6.49	1.15
T11-15	32	0.94	7.15	1.26
Difference	32	-0.50	11.77	2.08
95% C.I. for the population mean of the difference between Years 15-18 and Years 11-15 = (-4.75, 3.74)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = -0.24 p-value = 0.811				

A paired t-test of hypothesis using companies in industries 32-33-36-37 with an intervention year of 15 resulted in a p-value of .595. We cannot reject the null hypothesis that states there is not a statistically significant change in the instruction medium scores for years 15-18. We are 95% confident the interval (-4.75, infinity) contains the true value of the difference between the trend for years 11-15 and the trend for years 15-18.

Control Group

During the past fourteen years, there was one semester in 2005 when teams were not required to work through a strategic plan. Statistical analysis was performed on these three industries.

Table 9 shows the results of this statistical analysis *as if* year 14 was an intervention year for comparison with the Y14 Set under Research Question 1.

Ho: The population mean of IE Trends after year 14 is less than or equal to the population mean of IE Trends before year 14 without a strategic planning intervention.

Table 9: Paired t-test for trends in IE scores of three Industries using year 14 as an intervention year

Trend of IE for Years	Sample Size (as if Y14 set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T14-18	24	1.73	4.83	0.99
T11-14	24	-3.42	8.85	1.81
Difference	24	5.15	10.82	2.21
95% C.I. for the population mean of the difference between Years 14-18 and Years 11-14 = (1.36, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = 2.33 p-value = .014				

The null hypothesis is rejected since the 95% C.I. for the difference in the population means is (1.36, infinity) and since the p-value for the test of hypothesis is .014. The trend in the IE scores for years 14 thru 18 is statistically greater than the trend in the IE scores for years 11 thru 14 even though there was no strategic plan introduced in year 14.

Comparing the results in table 3 with the results in table 9 shows the strategic plan in year 14 with a greater improvement in the trend for years 14 thru 18 than found in the results with no strategic plan since the 95% C.I. for the table 3 results is (10.38, infinity) and the 95% C.I. for the table 9 results is (1.36, infinity).

Table 10 shows the results of this statistical analysis *as if* year 15 as an intervention year for comparison with Y15 Set under Research Question 2.

Ho: The population mean of IE Trends after year 15 is less than or equal to the population mean of IE Trends before year 15.

Table 10: Paired t-test for trends in IE scores of Industries 21, 22, and 23 using year 15 as an intervention year

Trend in IE for Years	Sample Size (as if Y15 set)	Sample Mean	Sample Standard Deviation	Standard Error of Mean
T15-18	24	1.53	5.40	1.10
T11-15	24	-2.12	7.68	1.57
Difference	24	3.65	9.08	1.85
95% C.I. for the population mean of the difference between Years 15-18 and Years 11-15 = (.47, infinity)				
Paired t-test of population mean difference ≤ 0 versus > 0 t-value = 1.97 p-value = .031				

This null hypothesis is rejected since the 95% C.I. for the difference in the population means is (.47, infinity) and since the p-value for the test of hypothesis is .031. The trend in the IE scores for years 15 thru 18 is statistically greater than the trend in the IE scores for years 11 thru 15 even though there was no strategic plan introduced in year 15.

Comparing the results in table 4 with the results in table 10 shows the strategic plan in year 15 with LESS improvement in the trend for years 15 thru 18 than found in the results with no strategic plan since the 95% C.I. for the table4 results is (-4.63, infinity) and the 95% C.I. for the table 10 results is (.47, infinity).

DISCUSSION

This research attempted to answer two questions. The first research question is whether students learn to manage companies in a simulation. The second question is whether strategic planning has any effect on company performance in the simulation environment. For purposes of discussion of results, it may be useful to start with the second question.

Per the time-series experimental design, if the trend in the time series of a variable changes after the intervention, one may conclude that there is an effect of the intervention on the variable under observation. When we examine the effect of strategic planning on company performance, the statistical analysis of trends presented in the previous section shows strong support for the assertion that strategic planning exercise is related to improved company performance in the simulation game setting of BSG-Online®. This effect is statistically significant if planning takes place in Year 14, as the null hypotheses were rejected for Research Questions 1, 2, and 5 for the entire Y14 set, as well as for each medium of instruction, whether face-to-face or online.

Support for the effect is weaker if strategic planning takes place in Year 15. Although the null hypothesis under Research Question 2, 4 or 6 could not be rejected, the confidence interval for the mean difference between the slopes is mostly positive (-4.63, infinity), (-4.63, infinity), and (-4.75, 3.74).

There is an interesting difference between the Y14 vs. Y15 sets. For the Y14 set the initial sample mean trend is negative (Y14 set -6.80, Face-to-face subset -4.19, Online subset -9.40), whereas for the Y15 set the initial trend is positive (Y15 set +1.886, Face-to-face subset +3.0, Online subset +0.94). If “Strategic Planning” results in learning

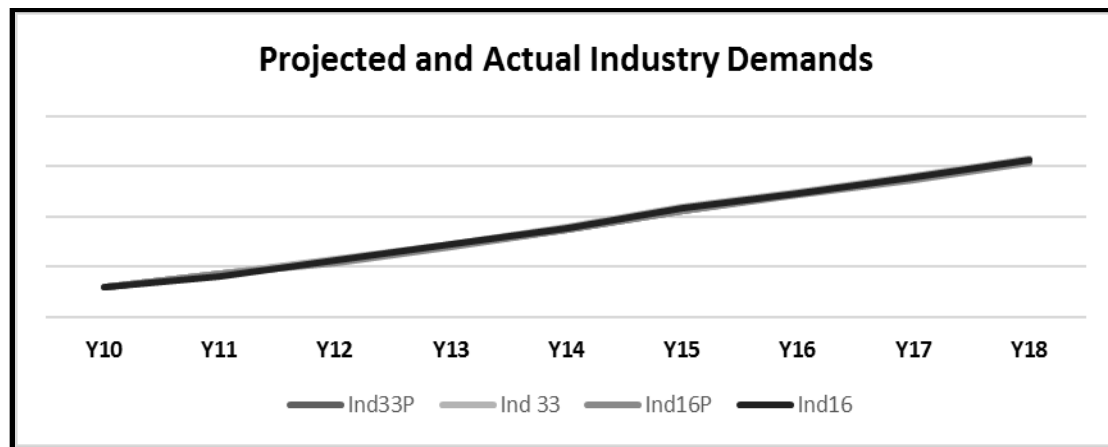
about the company and the industry competitive dynamics, it is possible that the already well-performing student teams increase the intensity of competition in ways that result in declining performance for all the teams in that industry. Recall that there were only eight (8) teams per industry, and Investor Expectation scores could vary only between 0 and 120. If these teams were doing well for the first four cycles of the game, they would already be achieving a high enough mean score. High degree of competition could result in lower achievements as each team incurs significantly more expenses (particularly marketing expenses) and increased break-even levels for production and sales even as the industry may have production capacity well beyond industry demand.

There is a side benefit of this research. Faculty often have questions about equivalency of learning outcomes of students in online classes. This research shows that the Medium of Instruction does not affect the effect of the strategic planning exercise on company performance. There is a similarity in statistical results between Research Questions 3 (Face-to-face, Y14 subset) and 5 (Online, Y14 subset), as well as between Research Questions 4 (Face-to-face, Y15 subset) and 6 (Online, Y15 subset). One possible explanation is that Online students communicate with their team members almost as much and as frequently as students in face-to-face classes. Technology now offers multiple ways of communicating, such as telephone, texting, and video-conferencing. Technology brings team communication in online sections of the course almost on par with communication in regular classes, and levels the field.

Interestingly, the Control Group also showed improvement in team performance before and after Y14 as well as Y15. It must be noted, however, that the control group industries, just like the Y14 set of industries, had a negative initial mean trend in performance, and this held true for “what if” analysis when the data was treated *as if* it had an intervention in Y15. One explanation of this result is that students learn from the concepts presented in the class and apply those concepts to the game to improve performance. This explanation is supported by the fact that students read, discuss and learn concepts of strategy along with the progression of the game. Another explanation could be that the game itself may have something built into it that allows improvement in team performance.

The question is what factors in the design / operation of the game itself would allow teams to perform better after Year 14. Since all other parameters were held constant, the only game artifact that might allow improvement in the performance of teams would be the Industry Demand Curve. If the demand in the industry suddenly started increasing after Y14, at a much higher rate than before, that could explain the improvement in team performance after Y14 because they would face highly benevolent demand conditions. The forecast and actual demands were charted for two industries picked at random (Figure 1). The graphs almost overlap to give an impression of one thick lined graph. They show no abrupt changes in the rate of increase of the demand. Therefore, it may be safely concluded that no game artifact affects the performance of teams.

Figure 1: Graphs of Forecast and Actual Industry Demand in two industries



These intriguing results about the effect of strategic planning on performance are directly related to the question whether team performance indicates any learning on the part of students and student teams. Some may argue that the effect of strategic planning on performance is questionable because (1) the control group shows improvement in performance, just as the Y14 set, which may be construed as due to “maturation” which is one of the artifacts

pointed out by Campbell and Stanley (1963), and (2) results for Y15 set may be construed as movement towards central tendency, again due to “maturation” rather than due to any effect of strategic planning on performance. The question then is what exactly does the process of “maturation” denote? Maturation certainly does not have anything to do with any physical changes in the students over a period of a semester. The only answer is that the “maturation” represents “learning” on the part of students along the four Learning Objectives (LOs) we mentioned in the introduction.

Since the control group showed an improvement in performance, with all three industries in Online medium of instruction and without a strategic planning intervention, the least that we may conclude is that students learn how to manage a company in a business simulation environment. The support for a positive effect of strategic planning on company performance, and the somewhat larger magnitude of effect in the experimental Y14 set, would indicate that a systematic strategic planning exercise facilitates learning about strategically managing a company.

For future research, there can be another way to examine the effect of strategic planning on performance of student teams by comparing their performance against the goals they set for the three plan years in their strategic plans. This approach would show light on the efficacy of strategic planning in directly producing desired performance as well.

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Teaching What Degrees of Freedom Are In Statistics

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ABSTRACT

One of the most confusing topics in statistics is degrees of freedom. Everyone is taught that the sample standard deviation has $n - 1$ degrees of freedom. Why is this the case since you use all n data points to compute the standard deviation? The paper shows why this is the case by showing that the sample standard deviation can be broken down into $n - 1$ independent parts and that the last deviation can be absorbed into these independent parts. After that a related technique shows what degrees of freedom are about in the important cases of regression and analysis of variance.

Keywords: sample standard deviation, degrees of freedom, degrees of freedom in multiple regression, degrees of freedom in analysis of variance.

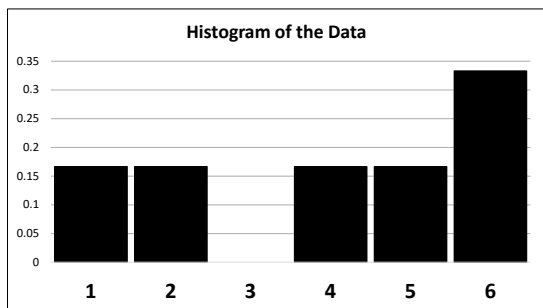
INTRODUCTION

In introductory statistics degrees of freedom are a mystery. In beginning statistics degrees of freedom are first encountered in the sample standard deviation which is used in t-confidence intervals and t-tests for the population mean μ . Students are taught that the sample standard deviation, in this case, causes the t-distribution to have $n - 1$ degrees of freedom when there are n data points. The sample standard deviation is also used to find confidence intervals for the population standard deviation σ where this confidence interval is calculated using the chi-square distribution which also has degrees of freedom. The next place where degrees of freedom are usually met is in regression where they are even more complicated. This paper presents ways of teaching degrees of freedom that can be understood in introductory classes. It is possible to understand what degrees of freedom are in an elementary statistics context, for the most part, without having to go all the way to advanced statistics and mathematics. The first section of the paper discusses degrees of freedom in the standard deviation context. The second section talks about degrees of freedom in regression, and the third section covers degrees of freedom for the ANOVA Table in regression. The fourth section covers degrees of freedom in Analysis of Variance problems.

DEGREES OF FREEDOM FOR THE STANDARD DEVIATION

Suppose you have a data set with $n = 6$ data points: $X_1 = 5$, $X_2 = 1$, $X_3 = 4$, $X_4 = 2$, $X_5 = 6$, and $X_6 = 6$. These data points came from a population that is being studied and give general information about the population. For example you can use this data to draw a histogram, as in Figure 1, to infer the shape of the population.

Figure 1: The Data Histogram



This histogram is skewed to the left suggesting that the population may be skewed to the left. The X -values in this section will be considered as variables since they depend on what data points from the population have been collected.

It is almost always the case that the original data is transformed to get other information about the population such as its center and such as how spread out the population is. The measures from the data of center and spread, the sample average and the sample standard deviation, are used to estimate the unknown μ and σ of the population that is being studied. These measures are calculated below for the above data.

The sample average is:

$$\text{SampleAverage} = \bar{X} = \frac{5 + 1 + 4 + 2 + 6 + 6}{6} = \frac{24}{6} = 4.$$

The spread in the data is measured around the average. The first step in computing the standard deviation is to find how far each data point is from the average. The rest of the steps, as are taught in statistics, are given in Table 1.

Table 1: Computing the Standard Deviation

Data	Deviations from the Average $X - \bar{X}$	Squared Deviations $(X - \bar{X})^2$
5	$d_1 = 5 - 4 = 1$	$d_1^2 = 1$
1	$d_2 = 1 - 4 = -3$	$d_2^2 = 9$
4	$d_3 = 4 - 4 = 0$	$d_3^2 = 0$
2	$d_4 = 2 - 4 = -2$	$d_4^2 = 4$
6	$d_5 = 6 - 4 = 2$	$d_5^2 = 4$
6	$d_6 = 6 - 4 = 2$	$d_6^2 = 4$
	Sum = 0	Sum = $SSX = 22$

$(SSX = \text{Sum of Squares } X).$

The sample standard deviation is defined as:

$$\text{SampleStandardDeviation} = s = \sqrt{\frac{SSX}{n-1}} = \sqrt{\frac{d_1^2 + d_2^2 + d_3^2 + d_4^2 + d_5^2 + d_6^2}{6-1}} = \sqrt{\frac{22}{6-1}} \approx 2.1.$$

From these calculations one would estimate that the center of the population is about 4 and that the spread in the population around 4 is about 2.1. This section of the paper explains why here in the calculation of “s” you should divide by $6 - 1$ and not 6, or in the general case what the difference between n and $n - 1$ is all about.

The standard deviation is interpreted as follows: *The standard deviation represents a typical distance or deviation of a data point from the average.* The second column in Table 1, containing the deviations from the average, $X - \bar{X}$, tells you how far each data point is from the average. For example the data point 5 with a deviation of 1 is one unit from the average of 4, while the data point 1 with a negative deviation is three units below the average. A typical number in the column of deviations is 2 (ignoring the minus signs). The fact that standard deviation of about 2.1 is close to this typical number 2 is not a coincidence. This always happens when you compute the standard deviation. It will always be the case that the standard deviation will be close to a typical number on the list of $X - \bar{X}$, and this is a useful way of understanding what the standard deviation measures.

The reason the standard deviation is calculated as in Table 1, with the subtracting the average, then squaring, adding, and everything else, has to do with the normal curve. If your data is normal you can prove that the optimal way to measure spread is via the above calculation. In this data the quantity SSX in the computation of s is calculated from the six deviations: d_1, d_2, \dots, d_6 yet is said to have 5 degrees of freedom. To start to see why this is the case, in Table 1 you can see that the deviations, defined as: $d_1 = X_1 - \bar{X}, d_2 = X_2 - \bar{X}, \dots, d_6 = X_6 - \bar{X}$, satisfy $d_1 + d_2 + d_3 + d_4 + d_5 + d_6 = 0$. The consequence of this is that the deviations are related at least a little, so that in this case $d_6 = -d_1 - d_2 - d_3 - d_4 - d_5$. This is evident in Table 1 since: $d_6 = 2 = -1 - (-3) - 0 - (-2) - 2$.

Therefore you do not even need d_6 since you can always get it from the other five deviations if necessary. The sample standard deviation here is really a function of the five numbers: d_1, d_2, \dots, d_5 ,

$$s = \sqrt{\frac{SSX}{n-1}} = \sqrt{\frac{(1)^2+(-3)^2+(0)^2+(-2)^2+(2)^2+(2)^2}{6-1}} = \sqrt{\frac{d_1^2+d_2^2+d_3^2+d_4^2+d_5^2+(-d_1-d_2-d_3-d_4-d_5)^2}{6-1}}.$$

This is the first indication that s here has 5 degrees of freedom and not 6, the number of squares in Table 1. [The fact that the deviations add to zero is true for every data set since once you take away the middle what's left adds to zero.]

A good way to think about degrees of freedom is to think of a degree of freedom as a piece of information. The six data points: $X_1, X_2, X_3, X_4, X_5,$ and X_6 have 6 pieces of general information about the population or 6 degrees of freedom. Given the original data, $X_1, X_2, X_3, X_4, X_5, X_6,$ you can calculate $\bar{X}, d_1, d_2, d_3, d_4,$ and $d_5.$ However since $X_1 = \bar{X} + d_1, X_2 = \bar{X} + d_2, \dots, X_6 = \bar{X} + d_6 = \bar{X} - d_1 - d_2 - d_3 - d_4 - d_5,$ then given $\bar{X}, d_1, d_2, d_3, d_4,$ and d_5 you can get back $X_1, X_2, X_3, X_4, X_5,$ and $X_6.$ Since you can go back and forth between both sets (of six numbers), they must contain the same amount of information about the population. Consequently the numbers: $\bar{X}, d_1, d_2, d_3, d_4,$ and d_5 must contain 6 pieces of information, it is just that the information is in a different form. Instead of general information about the population, the numerical value of \bar{X} has one degree of freedom that measures the center of the population, the values of $d_1, d_2, d_3, d_4,$ and d_5 have 5 degrees of freedom that measure the spread in the population. The original data could be transformed in other ways to get other information about the population such as its skewness and kurtosis and you could even divert some of the information in the d 's toward that purpose. However if there are six data points there is a maximum of six independent pieces of information available to study the population. The researcher can then decide to what purposes that information should be used. For studying the degrees of freedom in the standard deviation we will assume that all information other than that in \bar{X} will be used for measuring spread. In statistics it is common to assume that the data points X_1, X_2, \dots are statistically independent so that each point gives additional information about the population. Under this assumption you can prove that d_i and d_j are correlated, this is evident since the d 's sum to zero. This basically means that some of the information about spread that is in d_i is also contained in $d_j.$ It is this fact that makes studying the behavior of SSX more complicated. In the next paragraph SSX is separated into its uncorrelated parts. Before moving on, a key idea to notice in this paragraph is that to measure center and spread you must transform the original data. For example, you can write: $\bar{X} = (1/6)X_1 + \dots + (1/6)X_6, d_1 = (5/6)X_1 - (1/6)X_2 - \dots - (1/6)X_6,$ and so on.

The sample average, sample standard deviation, sample skewness and kurtosis are all transformations of the data. Transformations are a constant feature of statistics. The idea that the sample standard deviation above has 5 degrees of freedom can be made even more exact if you consider a slightly different and perhaps more complicated transformation of the original data. We will define the transformation first and then discuss the properties of the transformation. Let

$$\begin{aligned} Z_1 &= \bar{X}, \\ Z_2 &= \frac{X_1 - X_2}{\sqrt{2}}, \\ Z_3 &= \frac{X_1 + X_2 - 2X_3}{\sqrt{6}}, \\ Z_4 &= \frac{X_1 + X_2 + X_3 - 3X_4}{\sqrt{12}}, \\ Z_5 &= \frac{X_1 + X_2 + X_3 + X_4 - 4X_5}{\sqrt{20}}, \\ Z_6 &= \frac{X_1 + X_2 + X_3 + X_4 + X_5 - 5X_6}{\sqrt{30}}. \end{aligned} \tag{1}$$

For understanding degrees of freedom it is not necessary to know why the Z 's are defined this way or even how these Z 's were calculated, they come from the subject of linear algebra. The details of this can be left to advanced statistics and advanced mathematics. For understanding degrees of freedom what you need to know is that the Z 's defined this way have the properties detailed in the next two paragraphs and that it is always possible to find such Z 's for every data set. These Z 's are uncorrelated. A little about where the Z 's come from is discussed below in the general case, but the square roots turn out to be absolutely necessary for the above and for everything below.

In Equation 1 from the X 's you compute the Z 's. However it is also true that given the Z 's you can get the X 's back.

For example: $X_6 = Z_1 - \sqrt{\frac{5}{6}}Z_6$, $X_5 = Z_1 - \sqrt{\frac{4}{5}}Z_5 + \sqrt{\frac{1}{30}}Z_6$ and it is possible to write down the formulas for X_4 , X_3 , X_2 , and X_1 if you need to. The exact formulas for the X 's in terms of the Z 's are not important. The important fact here is that you can go from the the X 's to the Z 's and vice versa, so accordingly they must contain the same amount of information about the population, just in different forms. Even more specifically, given d_1, \dots, d_6 you can find Z_2, \dots, Z_n and vice versa. For example: $d_1 = \frac{1}{\sqrt{2}}Z_2 + \frac{1}{\sqrt{6}}Z_3 + \frac{1}{\sqrt{12}}Z_4 + \frac{1}{\sqrt{20}}Z_5 + \frac{1}{\sqrt{30}}Z_6$, $d_2 = -\frac{1}{\sqrt{2}}Z_2 + \frac{1}{\sqrt{6}}Z_3 + \frac{1}{\sqrt{12}}Z_4 + \frac{1}{\sqrt{20}}Z_5 + \frac{1}{\sqrt{30}}Z_6$, and so on and $Z_2 = \frac{1}{\sqrt{2}}d_1 - \frac{1}{\sqrt{2}}d_2 + 0d_3 + 0d_4 + 0d_5 + 0d_6$, $Z_3 = \frac{1}{\sqrt{6}}d_1 + \frac{1}{\sqrt{6}}d_2 - \frac{2}{\sqrt{6}}d_3 + 0d_4 + 0d_5 + 0d_6$ etc. Therefore d_1, \dots, d_6 and Z_2, \dots, Z_n contain the same information, in this case all of this information is about spread. The important property of the Z 's is that it is always the case that no matter what the X 's are, the following equation holds:

$$SSX = d_1^2 + d_2^2 + d_3^2 + d_4^2 + d_5^2 + d_6^2 = Z_2^2 + Z_3^2 + Z_4^2 + Z_5^2 + Z_6^2. \quad (2)$$

So that

$$s = \sqrt{\frac{Z_2^2 + Z_3^2 + Z_4^2 + Z_5^2 + Z_6^2}{6 - 1}}.$$

The information in the 6 correlated d 's has been transferred to the last 5 uncorrelated Z 's. The Z 's have extracted the independent pieces of information about spread that are available in the d 's.

To check Equation 2, if $X_1 = 5, X_2 = 1, X_3 = 4, X_4 = 2, X_5 = 6$, and $X_6 = 6$, then $Z_1 = 4, Z_2 = \frac{4}{\sqrt{2}}, Z_3 = \frac{-2}{\sqrt{6}}, Z_4 = \frac{4}{\sqrt{12}}, Z_5 = \frac{-12}{\sqrt{20}}$, and $Z_6 = \frac{-12}{\sqrt{30}}$, and it is easy to verify that: $SSX = d_1^2 + d_2^2 + d_3^2 + d_4^2 + d_5^2 + d_6^2 = 12 + (-3)^2 + (-1)^2 + (-2)^2 + (2)^2 + (3)^2 = 28$. Just to check that you can get the d 's from the Z 's, using the formulas in the previous paragraph: $d_1 = \frac{1}{\sqrt{2}}\left(\frac{4}{\sqrt{2}}\right) + \frac{1}{\sqrt{6}}\left(\frac{-2}{\sqrt{6}}\right) + \frac{1}{\sqrt{12}}\left(\frac{4}{\sqrt{12}}\right) + \frac{1}{\sqrt{20}}\left(\frac{-12}{\sqrt{20}}\right) + \frac{1}{\sqrt{30}}\left(\frac{-12}{\sqrt{30}}\right) = 1$, and so on. [If the data were different, for example if: $X_1 = 5, X_2 = 1, X_3 = 3, X_4 = 2, X_5 = 6$, and $X_6 = 7$, then $\bar{X} = 4, d_1 = 1, d_2 = -3, d_3 = -1, d_4 = -2, d_5 = 2, d_6 = 3, Z_1 = 4, Z_2 = \frac{4}{\sqrt{2}}, Z_3 = 0, Z_4 = \frac{3}{\sqrt{12}}, Z_5 = \frac{-13}{\sqrt{20}}$, and $Z_6 = \frac{-18}{\sqrt{30}}$. Again you can check that: $SSX = (1)^2 + (-3)^2 + (-1)^2 + (-2)^2 + (2)^2 + (3)^2 = 28 = \frac{16}{2} + 0 + \frac{16}{12} + \frac{169}{20} + \frac{324}{30} = Z_2^2 + Z_3^2 + Z_4^2 + Z_5^2 + Z_6^2$. Again to check that you can get the d 's from the Z 's: $d_2 = -\frac{1}{\sqrt{2}}\left(\frac{4}{\sqrt{2}}\right) + \frac{1}{\sqrt{6}}(0) + \frac{1}{\sqrt{12}}\left(\frac{3}{\sqrt{12}}\right) + \frac{1}{\sqrt{20}}\left(\frac{-13}{\sqrt{20}}\right) + \frac{1}{\sqrt{30}}\left(\frac{-18}{\sqrt{30}}\right) = -3$, and so on.]

Through Equation 1 and Equation 2 you can get to the sample standard deviation s in one of two ways. The first way, which is the definition of the sample standard deviation, is to use the X 's to compute d_1, \dots, d_6 and then get s through SSX . The second way is to start with the X 's, then use Equation 1 to get Z_2, \dots, Z_6 , then use these to get SSX and s through Equation 2. Since with the 5 numbers Z_2, Z_3, Z_4, Z_5 , and Z_6 you can get SSX and s (and even get d_1, \dots, d_6) these 5 numbers contain the totality of the information that there is in the data set for measuring the spread in the population. This shows that the sample standard deviation s is really made up of 5 numbers and therefore really has 5 degrees of freedom. In a sense the information in d_6 has been absorbed into Z_2 through Z_6 . So in total the Z 's have 6 degrees of freedom, one degree of freedom in $Z_1 = \bar{X}$ for measuring the center of the population, and 5 degrees of freedom in Z_2, Z_3, Z_4, Z_5 , and Z_6 for measuring the spread in the population.

The previous analysis extends to n data points, not just 6 data points, and the sample standard deviation will have $n - 1$ degrees of freedom. Again $Z_1 = \bar{X}$, but now for the rest of the Z 's the general Z_i , for $i = 2$ to $i = n$, is given by:

$$Z_i = \frac{X_1 + \dots + X_{i-1} - (i-1)X_i}{\sqrt{i(i-1)}}.$$

Exactly what the Z 's are is not important, what is important is that it is the case always that: $SSX = Z_2^2 + Z_3^2 + \dots + Z_n^2$, no matter what the X 's are. All the information in the data about spread in the population is contained in the numbers: Z_2, Z_3, \dots, Z_n , showing that SSX has exactly $n - 1$ degrees of freedom. The property that the Z 's have that make this happen is that if $Z_p = p_1X_1 + p_2X_2 + \dots + p_nX_n$ and $Z_q = q_1X_1 + q_2X_2 + \dots + q_nX_n$ and if $p_1q_1 + p_2q_2 + \dots + p_nq_n = 0$, as in Equation 1, then this will make Z_p and Z_q uncorrelated. If $\{p_1, \dots, p_n\}$ is considered to be a vector then the purpose of $\sqrt{i(i-1)}$ in the Z 's is to give these vectors all a length of 1. For that reason square roots are ubiquitous in this paper. In advanced mathematics it is shown that lots of such sets like $\{p_1, \dots, p_n\}$ and $\{q_1, \dots, q_n\}$ exist. These types of sets will be used over and over again in the rest of the paper.

If we assume that X_1, X_2, \dots, X_n are independent and have normal distributions, with mean μ and standard deviation σ , then statisticians have proved, as mentioned previously, that the correlation between Z_i and Z_j is zero for $i \neq j$. This makes the Z 's very different than the previous d 's, the original deviations. Under these assumptions statisticians have proved that Z_2, Z_3, \dots, Z_n are normal with mean 0 and standard deviation σ , in addition to being uncorrelated. By definition when you square and add uncorrelated normal mean 0 random variables, such as in $Z_2^2 + Z_3^2 + \dots + Z_n^2$, the chi-square distribution comes into play with degrees of freedom equal to the number of squared variables, here $n - 1$. A chi-square distribution means that a formula has been found for calculating probabilities in this sums of squares situation just as a formula for the normal curve has been found and is used to calculate probabilities when the data is normal. Therefore chi-square distributions become relevant when you are measuring spread. When statisticians talk about degrees of freedom they are really talking about the degrees of freedom in the situation generated chi-square distribution. The original SSX , adds up squared correlated deviations and there is no simple distribution that can be applied to that situation. That is how and why one must go to the uncorrelated Z 's to figure out the behavior of the original SSX .

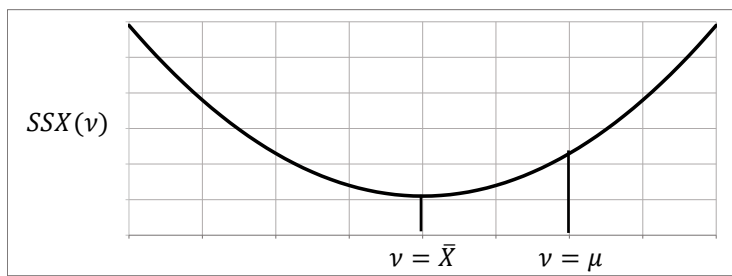
In the above, part of the data was used to measure the center of the population which is measured with \bar{X} . Suppose now that your Fairy God Mother told you the exact value of the population mean μ . Then it would not be necessary to use the data to estimate the center since you would know that the center is μ . That would signify that all of the data in the sample could then be used to measure the spread in the population. Let $Z_1 = X_1 - \mu, Z_2 = X_2 - \mu, \dots, Z_n = X_n - \mu$ and let:

$$\hat{\sigma} = \sqrt{\frac{SSX}{n}} = \sqrt{\frac{Z_1^2 + Z_2^2 + \dots + Z_n^2}{n}}$$

This $\hat{\sigma}$ would measure the spread in the population and SSX would indeed have n degrees of freedom since it would use all of the n independent pieces of information in the X 's for spread. The behavior of SSX would be determined by a chi-square distribution with n degrees of freedom if the X 's are normal. Statisticians can prove that $\hat{\sigma}$ tends to correctly measure the size of the population standard deviation σ , meaning $Expected(\hat{\sigma}) \approx \sigma$ (see Bickel and Doksum, 1977, or Mood, Graybil, and Boes, 1974).

To see one last way why the quantity $n - 1$ is used in the sample standard deviation, consider the following function: $SSX(v) = (X_1 - v)^2 + \dots + (X_n - v)^2$, which is a function of the X 's and a parameter v . The function is graphed in Figure 2.

Figure 2: The Function $SSX(v)$



The function $SSX(v)$, it can be proved, has a minimum at $v = \bar{X}$ so that $SSX(\bar{X}) < SSX(\mu)$ for the Fairy God Mother's μ . If $\hat{\sigma}$, which is based on $SSX(\mu)/n$, tends to have the correct size then an estimate of spread based on $SSX(\bar{X})/n$ would tend to be too small. This too small quantity can be made bigger by dividing by the smaller number $n - 1$ rather than dividing by n , so that $SSX(\bar{X})/n < SSX(\bar{X})/(n - 1)$. Statisticians have proved that $SSX(\bar{X})/(n - 1)$ tends to have the correct size, and thus s , the sample standard deviation, which is based on this quantity satisfies $Expected(s) \approx \sigma$. The final thought for all of this is that taking $v = \bar{X}$ in $SSX(v)$ just fits the data, the X 's, too well compared to $v = \mu$, making $SSX(\bar{X})/n$ too small. If your Fairy God Mother is mad at you and you do not have any knowledge of μ then you have no choice but to use s , but if your Fairy God Mother is a happy camper it will be more efficient to use $\hat{\sigma}$.

DEGREES OF FREEDOM IN REGRESSION

Suppose in a regression problem there are two predictor variables X_1 and X_2 and a response variable Y which is a function of X_1 and X_2 plus a random error term ε , i.e. specifically assume that $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$. The values α , β_1 , and β_2 are unknown parameters to be estimated from the data. A different error term ε turns up for each set of observations collected and it is assumed that the (set of) errors are independent. It is common in regression to assume, and we will assume, that the X -values are fixed and that the Y -values are the variables. The Y 's that turn up will depend on the fixed X -values but also on the particular random error ε 's that show up in the data. This is in contrast to the previous section where the X -values were the variables that could change, but are now fixed.

To estimate the parameters, a regression equation is fit to the data. Students are taught that estimates of the typical size of the prediction error when there are two predictor variables would have $n - 3$ degrees of freedom, when there are n triplets of data (X_1, X_2, Y) . These degrees of freedom for error usually appear for the first time in the Regression ANOVA Table. Why these are the degrees of freedom for the error term is the topic of this section. To understand what the degrees of freedom are, in this regression context, we again resort to transformations of the data as was done in the previous section. Now both the X 's and the Y 's will be transformed, but only Y will be considered a variable that can change.

For an example a cell phone company will want to predict the data requirements of its customers and will most likely use regression to make the predictions. Suppose the predictor variables are X_1 the family household income (in tens of thousands of dollars), and X_2 the size of the family. The dependent variable Y , which is a function of the X 's (and the random error), will be the yearly number of gigabytes of cell phone data used by the household. Suppose a hypothetical data set of $n = 5$ triplets of data is $(X_1, X_2, Y) = (4, 2, 36), (6, 2, 41), (7, 4, 47), (11, 6, 83),$ and $(12, 6, 73)$. Below is the regression output for these triplets from Excel.

Figure 3: Regression Output

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.961558094					
R Square	0.924593968					
Adjusted R Square	0.849187935					
Standard Error	8.062257748					
Observations	5					
ANOVA						
	df	SS	MS	F	Significance F	
Regression	2	1594	797	12.26154	0.075406	
Residual	2	130	65			
Total	4	1724				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	12	10.81665383	1.1094	0.382787	-34.5403	58.5403
Income	3	4.163331999	0.7205	0.54601	-14.9134	20.9134
FamilaySize	5	7.059272862	0.7082	0.552189	-25.3736	35.3736

From the printout, the regression equation for this data set is: $Y = 12 + 3X_1 + 5X_2$. To see how well this equation fits this data we compute the root mean square prediction error (*RMSE*) in Table 2.

Table 2: Root Mean Square Error Calculations for the Regression Equation

		Actual Y	Predicted $Y = \hat{Y}$	Prediction Error	Squared Error
X_1	X_2	Y	$\hat{Y} = 12 + 3X_1 + 5X_2$	$Y - \hat{Y}$	$(Y - \hat{Y})^2$
4	2	$Y_1 = 36$	$\hat{Y}_1 = 34$	$e_1 = 2$	$e_1^2 = 4$
6	2	$Y_2 = 41$	$\hat{Y}_2 = 40$	$e_2 = 1$	$e_2^2 = 1$
7	4	$Y_3 = 47$	$\hat{Y}_3 = 53$	$e_3 = -6$	$e_3^2 = 36$
11	6	$Y_4 = 83$	$\hat{Y}_4 = 75$	$e_4 = 8$	$e_4^2 = 64$
12	6	$Y_5 = 73$	$\hat{Y}_5 = 78$	$e_5 = -5$	$e_5^2 = 25$
				Sum=0	Sum= $SSE = 130$

$$[SSE = \text{Sum of Squares Error.}], \quad RMSE = \sqrt{\frac{SSE}{n}} = \sqrt{\frac{130}{5}} \approx 5.0990.$$

A typical prediction error for the regression equation is approximately 5 which represents a typical number on the list of prediction errors: $Y - \hat{Y}$ (ignoring the minus signs). From Table 2 you can see: $e_1 + e_2 + e_3 + e_4 + e_5 = 0$, similar to the previous section. [This is true not just in this case but is true, in every regression data set, that the sum of the predictions errors is zero.] The prediction errors are therefore linked and in regression there is an even stronger relationship among the e 's than there is for the d 's in the standard deviation (where the last deviation was a function of the first $n - 1$ deviations). In regression when there are two predictors it always turns out that the last three prediction errors are always functions of the first $n - 3$ prediction errors. Since $n = 5$ for the cell phone data this tells us that for this data e_3, e_4 and e_5 are functions of e_1 and e_2 . Given the X 's in this data set it can be derived that always $e_3 = -2e_1 - 2e_2$, $e_4 = 2e_1 + 4e_2$, and $e_5 = -e_1 - 3e_2$, no matter what the Y 's are. For the cell phone data this checks with Table 2 since: $e_3 = -2(2) - 2(1) = -6$, $e_4 = 2(2) + 4(1) = 8$, and $e_5 = -(2) - 3(1) = -5$. [If the data instead had been: $Y_1 = 36, Y_2 = 40, Y_3 = 54, Y_4 = 74$, and $Y_5 = 86$ with the same X 's, then it is easy to check that the regression equation becomes: $Y = 10 + 4X_1 + 4X_2$ with $e_1 = 2, e_2 = -2, e_3 = 0, e_4 = -4$, and $e_5 = 4$. So again: $e_3 = -2(2) - 2(-2) = 0, e_4 = 2(2) + 4(-2) = -4$, and $e_5 = -(2) - 3(-2) = 4$.] These relationships state that there is no more additional information about prediction error in e_3, e_4 and e_5 than there already is in of e_1 and e_2 .

The e 's are obviously correlated since some are explicit functions of others, but for the degrees of freedom in *SSE* we can now rewrite *SSE* as

$$SSE = e_1^2 + e_2^2 + e_3^2 + e_4^2 + e_5^2 = e_1^2 + e_2^2 + (-2e_1 - 2e_2)^2 + (2e_1 + 4e_2)^2 + (-e_1 - 3e_2)^2.$$

This suggests that *SSE* has only two degrees of freedom despite the fact that originally it is computed with 5 numbers. Similar to what was done in the previous section this relationship can be made even more exact by making a slightly more complicated transformation of the e 's which separates *SSE* into its uncorrelated parts. For these X 's if you let $e'_1 = (5/\sqrt{10})e_1 + 0e_2$ and $e'_2 = (-15/\sqrt{30})e_1 - \sqrt{30}e_2$ then it is always the case that:

$$SSE = e_1^2 + e_2^2 + e_3^2 + e_4^2 + e_5^2 = e_1'^2 + e_2'^2. \quad (3)$$

Here e'_1 and e'_2 have extracted and contain in totality all of the independent information that is available in the data for estimating the size of a typical prediction error, and in addition they are uncorrelated. All of the information available in e_1 to e_5 has been transferred to e'_1 and e'_2 so that *SSE* in this example is really a function of exactly two numbers demonstrating that *SSE* has exactly two degrees of freedom. For the original data $e'_1 = \sqrt{10}$ and $e'_2 = -2\sqrt{30}$ so that: $SSE = e_1^2 + e_2^2 + e_3^2 + e_4^2 + e_5^2 = (2)^2 + (1)^2 + (-6)^2 + (8)^2 + (-5)^2 = 130 = (\sqrt{10})^2 + (-2\sqrt{30})^2 = 10 + 120 = e_1'^2 + e_2'^2$.

The exact numbers involved in this example are not important. The important fact is that in every regression data set, a relationship such as in Equation 3 always exists. [This is true no matter what the Y 's are, for if $Y_1 = 36$,

$Y_2 = 40, Y_3 = 54, Y_4 = 74,$ and $Y_5 = 86,$ with the errors for these Y 's reported above, and which give $SSE = 40,$ have $e'_1 = \sqrt{10}$ and $e'_2 = \sqrt{30}$ so that $e'^2_1 + e'^2_2 = 10 + 30 = 40.$]

In terms of understanding degrees of freedom in regression the formulas for the values of a, b_1, b_2, e'_1, e'_2 should be considered as transformations of the Y 's. For these X 's it can be calculated that:

$$\begin{aligned} a &= Y_1 + .2Y_2 + .6Y_3 - .2Y_4 - .6Y_5, \\ b_1 &= -.2Y_1 + (1/3)Y_2 - (4/15)Y_3 - (1/15)Y_4 + .2Y_5, \\ b_2 &= .2Y_1 - (2/3)Y_2 + (13/30)Y_3 + (7/30)Y_4 - .2Y_5, \\ e'_1 &= (2/\sqrt{10})Y_1 - (1/\sqrt{10})Y_2 - (2/\sqrt{10})Y_3 + 0Y_4 + (1/\sqrt{10})Y_5, \\ e'_2 &= 0Y_1 - (1/\sqrt{30})Y_2 + (2/\sqrt{30})Y_3 - (4/\sqrt{30})Y_4 + (3/\sqrt{10})Y_5. \end{aligned}$$

For example for the original cell phone data this checks as: $a = 36 + .2(41) + .6(47) - .2(83) - .6(73) = 12,$ and so on. [It also checks for the other set of Y 's just above.]

This transformation can be reversed and you can show that:

$$\begin{aligned} Y_1 &= a + 4b_1 + 2b_2 + (2/\sqrt{10})e'_1 + 0e'_2 = \hat{Y}_1 + e_1, \\ Y_2 &= a + 6b_1 + 2b_2 - (1/\sqrt{10})e'_1 - (1/\sqrt{30})e'_2 = \hat{Y}_2 + e_2, \\ Y_3 &= a + 7b_1 + 4b_2 - (2/\sqrt{10})e'_1 + (2/\sqrt{30})e'_2 = \hat{Y}_3 + e_3, \\ Y_4 &= a + 11b_1 + 6b_2 + 0e'_1 - (4/\sqrt{30})e'_2 = \hat{Y}_4 + e_4. \\ Y_5 &= a + 12b_1 + 6b_2 + (1/\sqrt{10})e'_1 + (3/\sqrt{30})e'_2 = \hat{Y}_5 + e_5. \end{aligned}$$

The coefficients in these ten equations depend on the fixed X values, and such relationships exist in every regression data set. Since you can go from Y_1, Y_2, Y_3, Y_4, Y_5 to $a, b_1, b_2, e'_1, e'_2,$ and back again, the two sets (of five numbers) must have the same amount of information, just in a different form. The five degrees of freedom in Y_1, Y_2, Y_3, Y_4, Y_5 become one degree of freedom for the intercept $a,$ two degrees of freedom total for the slopes, one each in b_1 and $b_2,$ and two degrees of freedom in $e'_1,$ and e'_2 for the error such that $SSE = e'^2_1 + e'^2_2,$ and showing that SSE has precisely two degrees of freedom.

In general in regression with k predictors with the model $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots + \beta_kX_k + \varepsilon,$ and n sets of observations on both the independent and dependent variables, the n degrees of freedom in $Y_1, Y_2, Y_3, \dots, Y_n$ become one degree of freedom for a, k degrees of freedom in $b_1, b_2, b_3, \dots, b_k,$ and $n - k - 1$ degrees of freedom for SSE from $e'_1, e'_2, e'_3, \dots, e'_{n-k-1},$ such that $SSE = e'^2_1 + e'^2_2 + \dots + e'^2_{n-k-1}.$

In advanced statistics it can be shown that $RMSE,$ which divides SSE by $n,$ tends to underestimate the size of a typical prediction error, in a similar way as to what happens in the sample standard deviation (the $a, b_1, b_2, b_3, \dots, b_k,$ estimated from the data, fit the data too well to appropriately measure average error size). If we had our Fairy God Mother's help again and she told us the real values of the intercept α and the slopes $\beta_1, \beta_2, \beta_3, \dots,$ then we would not have to use the data to estimate them and could devote all of the data to estimate the size of a typical error. In the absence of a Fairy God Mother, a more accurate estimate of the size of a typical prediction error, than $RMSE,$ is given by the standard error of estimate $s:$

$$\begin{aligned} RMSE &= \sqrt{\frac{e_1^2 + e_2^2 + \dots + e_n^2}{n}} \\ s &= \sqrt{\frac{SSE}{n-k-1}} = \sqrt{\frac{e_1^2 + e_2^2 + \dots + e_n^2}{n-k-1}} \sqrt{\frac{e'^2_1 + e'^2_2 + \dots + e'^2_{n-2}}{n-k-1}}. \end{aligned}$$

The $RMSE$ from Table 2 was 5.0990, while the standard error of estimate s from the printout was 8.0623, and 8.0623 would be a more accurate measure of typical error size. The same symbol s is used both for the sample standard deviation and the standard error of estimate, the context tells you what situation you are in.

If the error terms ε in the regression data are independent and have normal distributions with mean zero then $e'_1, e'_2, e'_3, \dots,$ and e'_{n-k-1} are uncorrelated and have normal distributions with mean zero. In SSE you are squaring and

adding uncorrelated normal mean zero random variables and so the chi-square distribution with $n - k - 1$ degrees of freedom makes an appearance, as is detailed in textbooks. When statisticians talk about degrees of freedom in this regression context also, they are referring to the degrees of freedom in the generated chi-square distribution.

THE DEGREES OF FREEDOM IN THE REGRESSION ANALYSIS OF VARIANCE TABLE

In a regression printout, such as in the Excel printout in Figure 3, one will often see an Analysis of Variance (ANOVA) Table of the form:

ANOVA	SS	df
Regression	$SSR = \sum(\hat{Y} - \bar{Y})^2 = b_1'^2 + b_2'^2 + b_3'^2 + \dots + b_k'^2$	k
Error (or Residual)	$SSE = \sum(Y - \hat{Y})^2 = e_1'^2 + e_2'^2 + \dots + e_{n-k-1}'^2$	$n - (k + 1) = n - k - 1$
Total	$SSY(\text{also called } SST) = \sum(Y - \bar{Y})^2$	$n - 1.$

That SSY has $n - 1$ degrees of freedom is the topic of the first section. The b_i' have not been defined yet in the paper, so to do this note that SSR is based on \hat{Y} and \bar{Y} . Since by definition $\hat{Y} = a + b_1X_1 + b_2X_2 + \dots + b_kX_k$ for each set of X_1, \dots, X_k and since statisticians can prove that $\bar{Y} = a + b_1\bar{X}_1 + b_2\bar{X}_2 + \dots + b_k\bar{X}_k$, it is the case that $SSR = \sum(\hat{Y} - \bar{Y})^2 = \sum[b_1(X_1 - \bar{X}_1) + b_2(X_2 - \bar{X}_2) + \dots + b_k(X_k - \bar{X}_k)]^2$, so that SSR is a somewhat complicated function of $b_1, b_2, b_3, \dots, b_k$. In the cell phone data you can compute that $SSR = 46b_1^2 + 52b_1b_2 + 16b_2^2$. For that data $b_1 = 3$ and $b_2 = 5$, which results in $SSR = 1594$, as is verified in the Excel printout in Figure 3. In this form it is not exactly clear how SSR behaves or more specifically what distribution SSR has. As in previous situations this behavior is complicated since b_1 and b_2 are correlated in general. However here if we define $b_1' = 2\sqrt{10}b_1 + \sqrt{10}b_2$ and $b_2' = \sqrt{6}b_1 + \sqrt{6}b_2$ then $SSR = b_1'^2 + b_2'^2$ and it is also the case that b_1' and b_2' are uncorrelated and therefore separate SSR into its uncorrelated parts. This is not just good luck, such transformations exist in every regression data set. In the cell phone example then: $b_1' = 11\sqrt{10}$ and $b_2' = 8\sqrt{6}$ so that $SSR = b_1'^2 + b_2'^2 = (11\sqrt{10})^2 + (8\sqrt{6})^2 = 1210 + 384 = 1594$. [This will be true no matter what the Y 's are. If $Y_1 = 36$, $Y_2 = 40$, $Y_3 = 54$, $Y_4 = 74$, $Y_5 = 86$, then $b_1 = 4$, $b_2 = 4$, $SSR = 46(4^2) + 52(4)(4) + 16(4^2) = 1824$, $b_1' = 12\sqrt{10}$, $b_2' = 8\sqrt{6}$, so that $SSR = b_1'^2 + b_2'^2 = (12\sqrt{10})^2 + (8\sqrt{6})^2 = 1440 + 384 = 1824$.] The b 's can also be expressed in terms of the Y 's and for the X 's in the cell phone data it can be shown that:

$$b_1' = -(2/\sqrt{10})Y_1 + 0Y_2 - (1/\sqrt{10})Y_3 + (1/\sqrt{10})Y_4 + (2/\sqrt{10})Y_5$$

$$b_2' = 0Y_1 - (2/\sqrt{6})Y_2 + (1/\sqrt{6})Y_3 + (1/\sqrt{6})Y_4 + 0Y_5.$$

It is possible to get b_1 and b_2 back from b_1' and b_2' , so that the set $\{b_1, b_2\}$ and the set $\{b_1', b_2'\}$ contain the same information, just from a transformed perspective.

In the general case with k predictors there always exist $b_1', b_2', b_3', \dots, b_k'$ which are functions of b_1, b_2, \dots, b_k , and such that $SSR = b_1'^2 + b_2'^2 + b_3'^2 + \dots + b_k'^2$. If the Y 's have normal distributions then under the null hypothesis $\beta_1 = 0, \beta_2 = 0, \dots, \beta_k = 0$, you can show that $b_1', b_2', b_3', \dots, b_k'$ are all uncorrelated independent normal and mean zero, and when squaring them in SSR , SSR 's behavior is obtained from a chi-square distribution with k degrees of freedom. The entirety of the information in the data about the stated null hypothesis is contained in $b_1', b_2', b_3', \dots, b_k'$. This hypothesis test involves both SSR and SSE , the signal in SSR compared to the noise in SSE . The F -statistic in the printout in Figure 3 is $F(Stat) = [SSR/k]/[SSE/(n - k - 1)]$ which is an appropriately scaled ratio of chi-square distributions and has an F -distribution. An F -distribution simply means that someone found a formula for calculating the probability that $F(Stat)$ will be a small number, a big number, or something in between. In an F -test these probabilities can be used to decide if $F(Stat)$ provides evidence for or against that null hypothesis.

In ANOVA the quantity SSR , in total, has k degrees of freedom, one for b_1 , one for b_2, \dots , and one for b_k . The Y_1, Y_2, \dots, Y_n have n degrees of freedom. The sum of squares SSR and SSE combined have $k + (n - k - 1) = n - 1$ degrees of freedom. The remaining one degree of freedom is for the intercept a . The intercept is not represented in this type of ANOVA Table but is represented in other forms of Regression ANOVA Tables (such as in Draper and

Smith, 1966). Finally in the above table the word “Residual” is another name for “Error”. Residual represents what is left of Y after you make the prediction, i.e., after you take away the predicted value \hat{Y} from Y you get a residual, in other words: $Residual = Y - \hat{Y}$.

The theory of regression writes regression models in terms matrices and the well-developed mathematics of matrices was used to compute the funny numbers in the paper. This theory can ultimately be used to prove the properties specified in this paper and put forth in statistics books.

DEGREES OF FREEDOM IN ANALYSIS OF VARIANCE PROBLEMS

Analysis of Variance Problems consist of One Way ANOVA, Two Way ANOVA without replications, Two Way ANOVA with replications with or without interaction terms, Three Way ANOVA with or without two way interactions with or without three way interactions, Four Way ANOVA, etc. The same logic as in the previous sections of the paper apply to this case as well. Consider a Two Way ANOVA problem without replications with the data and model presented in Table 3. A Two Way ANOVA has two different factors that affect the data and each factor will have multiple levels. For the hypothetical data in Table 3, on weights of two week old piglets, the two factors are gender and type of feed.

Table 3: Weights of Piglets

Factor A:		Factor B: Gender	
Feed Type	Weight	Female	Male
Feed Type 1	$Y_{11} = \mu + \alpha_1 + \beta_1 + \varepsilon_{11} = 13$	$Y_{12} = \mu + \alpha_1 + \beta_2 + \varepsilon_{12} = 19$	
Feed Type 2	$Y_{21} = \mu + \alpha_2 + \beta_1 + \varepsilon_{21} = 9$	$Y_{22} = \mu + \alpha_2 + \beta_2 + \varepsilon_{22} = 11$	
Feed Type 3	$Y_{31} = \mu + \alpha_3 + \beta_1 + \varepsilon_{31} = 14$	$Y_{32} = \mu + \alpha_3 + \beta_2 + \varepsilon_{32} = 12$	

For a Two Way ANOVA without replications, with r levels of Factor A and c levels of Factor B, the general form of the ANOVA Table is as follows:

ANOVA				
Source of Variation	SS	df	MS	F
Rows (Factor A)	SSA	$r - 1$	$SSA / (r - 1)$	MSA / MSE
Columns (Factor B)	SSB	$c - 1$	$SSB / (c - 1)$	MSB / MSE
Error	SSE	$(r - 1)(c - 1)$	$SSE / [(r - 1)(c - 1)]$	
Total	SSY	$rc - 1$		

The data in Table 3 has $r = 3$ and $c = 2$. Below is ANOVA Printout from Excel for that data:

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Rows (A: FeedType)	SSA = 36	2	18	2.25	0.307692	19
Columns (B: Gender)	SSB = 6	1	6	0.75	0.477767	18.5128
Error	SSE = 16	2	8			
Total	SSY = 58	5				

If we let $\bar{Y} = \frac{Y_{11} + \dots + Y_{32}}{6}$, $\bar{Y}_i = \frac{Y_{i1} + Y_{i2}}{2}$, and $\bar{Y}_j = \frac{Y_{1j} + Y_{2j} + Y_{3j}}{3}$, then $SSY = \sum \sum (Y_{ij} - \bar{Y})^2$, $SSA = \sum \sum (\bar{Y}_i - \bar{Y})^2$, $SSB = \sum \sum (\bar{Y}_j - \bar{Y})^2$, and $SSE = \sum \sum (Y_{ij} - \bar{Y}_i - \bar{Y}_j + \bar{Y})^2$.

Consider the transformation of this data defined by:

$$\bar{Y} = Y_{11}/6 + Y_{21}/6 + Y_{31}/6 + Y_{12}/6 + Y_{22}/6 + Y_{32}/6 = 13,$$

$$a'_1 = 2Y_{11}/\sqrt{12} - Y_{21}/\sqrt{12} - Y_{31}/\sqrt{12} + 2Y_{12}/\sqrt{12} - Y_{22}/\sqrt{12} - Y_{32}/\sqrt{12} = 18/\sqrt{12},$$

$$\begin{aligned}
a'_2 &= 0Y_{11} + Y_{21}/2 - Y_{31}/2 + 0Y_{12} + Y_{22}/2 - Y_{32}/2 = -3, \\
b'_1 &= Y_{11}/\sqrt{6} + Y_{21}/\sqrt{6} + Y_{31}/\sqrt{6} - Y_{12}/\sqrt{6} - Y_{22}/\sqrt{6} - Y_{32}/\sqrt{6} = -\sqrt{6}, \\
e'_1 &= 2Y_{11}/\sqrt{12} - Y_{21}/\sqrt{12} - Y_{31}/\sqrt{12} + 2Y_{12}/\sqrt{12} - Y_{22}/\sqrt{12} - Y_{32}/\sqrt{12} = -\sqrt{12}, \\
e'_2 &= 0Y_{11} + Y_{21}/2 - Y_{31}/2 + 0Y_{12} - Y_{22}/2 + Y_{32}/2 = -2.
\end{aligned}$$

Given \bar{Y} , a'_1 , a'_2 , b'_1 , e'_1 , and e'_2 you can get back Y_{11} , Y_{21} , Y_{31} , Y_{12} , Y_{22} , and Y_{32} . This transformation has the property that no matter what the Y 's are, in this three levels for A and two levels for B example, it is the case that: $SSA = a_1'^2 + a_2'^2$, so that SSA has two degrees of freedom, $SSB = b_1'^2$, so that SSB has one degree of freedom, and $SSE = e_1'^2 + e_2'^2$, so that SSE has two degrees of freedom. For the above Y 's this is verified since: $SSA = (18/\sqrt{12})^2 + (-3)^2 = 36$, $SSB = (-\sqrt{6})^2 = 6$, and $SSE = (-\sqrt{12})^2 + (-2)^2 = 16$. If the Y 's are normal, the behavior of SSA , SSB , and SSE can be determined from chi-square distributions with the reported degrees of freedom.

The above ANOVA Table has four rows of effects. A complete Three Way ANOVA will have nine rows of effects (Scheffé 1959, 123) including main effects and interactions. Statisticians have proved that such transformations as above exist for every ANOVA problem. In ANOVA, if SSZ has m degrees of freedom there will always be m transformations of the Y 's, z'_1, \dots, z'_m , such that $SSZ = z_1'^2 + \dots + z_m'^2$. Using this method it can be proved that the degrees of freedom for the main effects, the two way interactions, the three way interactions, the measurement errors and so on, are those degrees of freedom that are detailed in textbooks. Systematic procedures exist for finding the appropriate transformations in each ANOVA case (Haberman, 1974, pp. 150-153) and they then can then be used to determine the behavior of SSA , SSB , etc. through the chi-square distribution. While we have only done proof by example in this paper, all of this has been made mathematically precise in the general case.

CONCLUSION

The words "Degrees of Freedom" are used all the time in statistics. For most people who have had a statistics class, the idea of degrees of freedom still remains a mystery. This paper shows where degrees of freedom come from at a relatively elementary level, for both the standard deviation and in regression and finally in ANOVA. The paper does this by considering the sample average, the sample standard deviation, and regression coefficient estimates as transformations of the data. By appropriately defining transformations of the data, the number of degrees of freedom in each situation is revealed and from that their properties are discerned. If the data comes from a normal distribution then squaring things, as in the standard deviation, leads to chi-square distributions. When statisticians talk about degrees of freedom they are really referring to the degrees of freedom of the chi-square distribution that each statistical situation brings about. Everything you ever wanted to know about degrees of freedom was discussed in the paper.

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Using Monte Carlo Simulation with Oracle© Crystal Ball to Teach Business Students Hypothesis Testing Concepts and Type I Error

David Weltman, Texas Christian University, Texas USA

ABSTRACT

This article explains a basic Monte Carlo simulation workshop applied to teaching fundamental hypothesis testing concepts. The workshop can be conducted in a classroom or lab where students have access to a Monte Carlo simulation tool such as Oracle© Crystal Ball. To our knowledge, this is the first time a workshop has been conducted and documented utilizing Monte Carlo analysis to teach students basic ideas regarding hypothesis testing and type I error theory. The results of a post-workshop survey showed that the majority of students found the workshop to be effective and useful. Furthermore, for an end-of-semester project where students could choose any business statistics topic, the majority picked hypothesis testing and demonstrated competence regarding the theory and application.

Keywords: Teaching Hypothesis Testing, Monte Carlo Simulation, Business Statistics, Type I Error

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. Students should easily be aware of potential problems that could occur when organizations make claims that turn out to be untrue (lawsuits, liability, loss of goodwill, and the like). In more technical terms, this problem (referred to as committing a type I error) involves rejecting the null hypothesis and supporting the alternative or research hypothesis when the null is true. In performing business statistical test, we certainly want to avoid such issues. Many analysts commonly set the likelihood of committing this kind of mistake at 0.05 or 5% (Nuzzo, 2014).

This manuscript is the second part of a series in using Monte Carlo analysis to demonstrate foundational business statistics concepts (Weltman, 2015). We have found aspects of several foundational concepts (sampling distributions, confidence intervals, degrees of freedom) in a basic business statistics course to be somewhat difficult for students to understand. Being able to use tools that demonstrate and reinforce “abstract theory” has proven to be helpful to students in our experience. Hypothesis testing concepts are certainly no exception to these observations of conceptual difficulties (Holland, 2012; Dambolena, I., et. al., 2009; Sotos, et. al., 2009; Aguinis & Branstetter, 2007; Loosen, 1997).

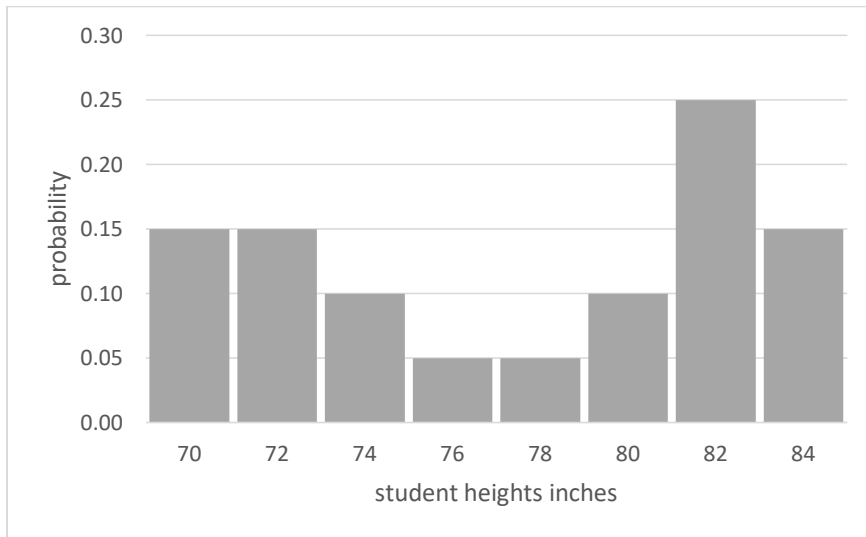
The use of Monte Carlo simulation with Oracle Crystal Ball has shown to be an enjoyable and effective way to reinforce theory. Moreover, many students report continued use of the tool in subsequent course projects, internships, and full-time positions. Introducing Monte Carlo analysis early in a student’s college career (a typical Business Statistics course is sophomore year) thus fulfills many productive purposes.

Monte Carlo simulation is an iterative mathematical technique that is used to approximate the likelihood of outcomes by running many thousands of “trial” scenarios. The technique numerically quantifies and graphically depicts potential results (along with their associated likelihoods) based on provided uncertain inputs. Kersten (1983) states that by performing simulations in introductory statistics courses, non-mathematically oriented students can have an inductive learning experience in a time-efficient manner. Kennedy (1998) stresses the importance of sampling distributions and calls for instructors to spend a considerable amount of time on this topic with Monte Carlo simulation. Tools are available for instructors to answer these calls more easily as Monte Carlo applications have evolved greatly over the past several years. Currently, the technique is widely used in numerous business applications (see “Who Uses Monte Carlo Simulation” at www.microsoft.com; “When to Use Monte Carlo Simulation” at www.ibm.com, or Winston, 2004; Kwak, & Ingall, 2007; Engle, Granger, & Hallman, 1989). Valle & Norvell (2013) use Oracle Crystal Ball in the area of forecasting demonstrations and cite numerous instances of businesses using Monte Carlo simulation analysis. In the present research, the technique is used in a hands-on environment to provide students an experience in core business statistics concepts: hypothesis testing, type I error, and the central limit theorem.

THE WORKSHOP

In the scenario employed in our workshop, students download an Excel file that contains a worksheet that shows the population distribution of student heights (Figure 1) at a hypothetical large university of 20,000 students.

Figure 1: The Population Distribution



The mean and standard deviation of heights for all students are $\mu=77.50$ and $\sigma=5.13$ inches, respectively. The students are asked to set up a research hypothesis that the mean height for all the students is under 77.5 inches:

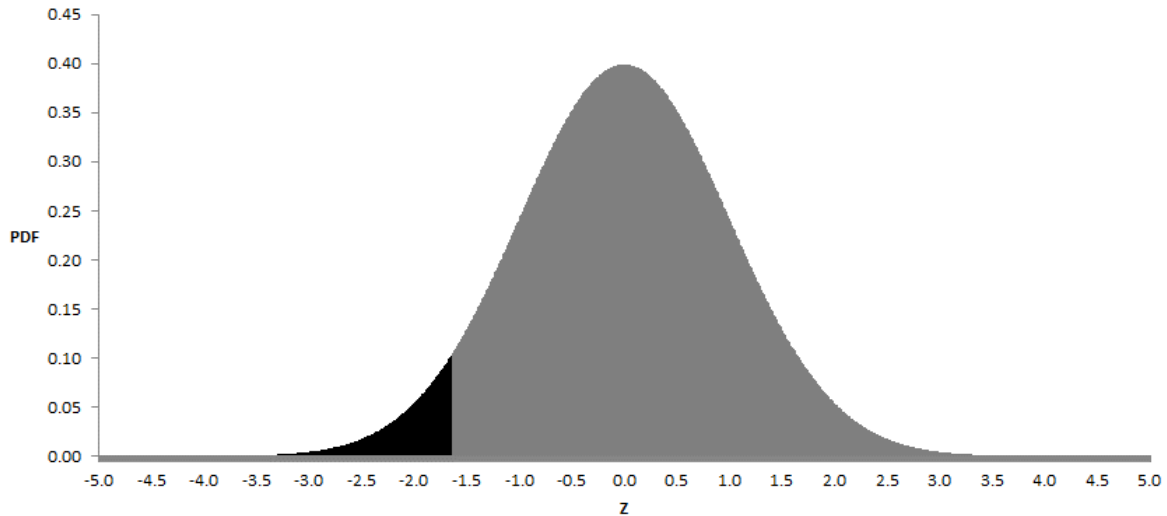
$$H_0: \mu \geq 77.5$$

$$H_1: \mu < 77.5$$

Clearly a mistake would be made if an analyst were to arrive at this conclusion since the true mean height is 77.5 inches. This kind of mistake is called a type 1 error. Using the typical 5% ($\alpha=0.05$) level of significance to control for this error, we would expect that only about 5% of the time would we obtain sample means where our research hypothesis is supported in error, i.e. concluding H_1 is true when it is not. Next, the students are asked to use statistical theory to determine the sample mean height from a sample of size 30 that would cause this kind of mistake, using a 0.05 level of significance where σ is known and is 5.13 inches, the standard deviation of the population distribution of Figure 1.

When the population standard deviation is known the Z distribution is the appropriate sampling distribution to determine this value. Figure 2 below shows the sampling distribution with the critical value for the hypothesis test being -1.645.

Figure 2: The Sampling Distribution



The central limit theorem expresses that the sampling distribution will be approximately normally distributed with;

$$\mu_{\bar{x}} = \mu$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Mathematically, the result is determined by solving the formula below for \bar{x} .

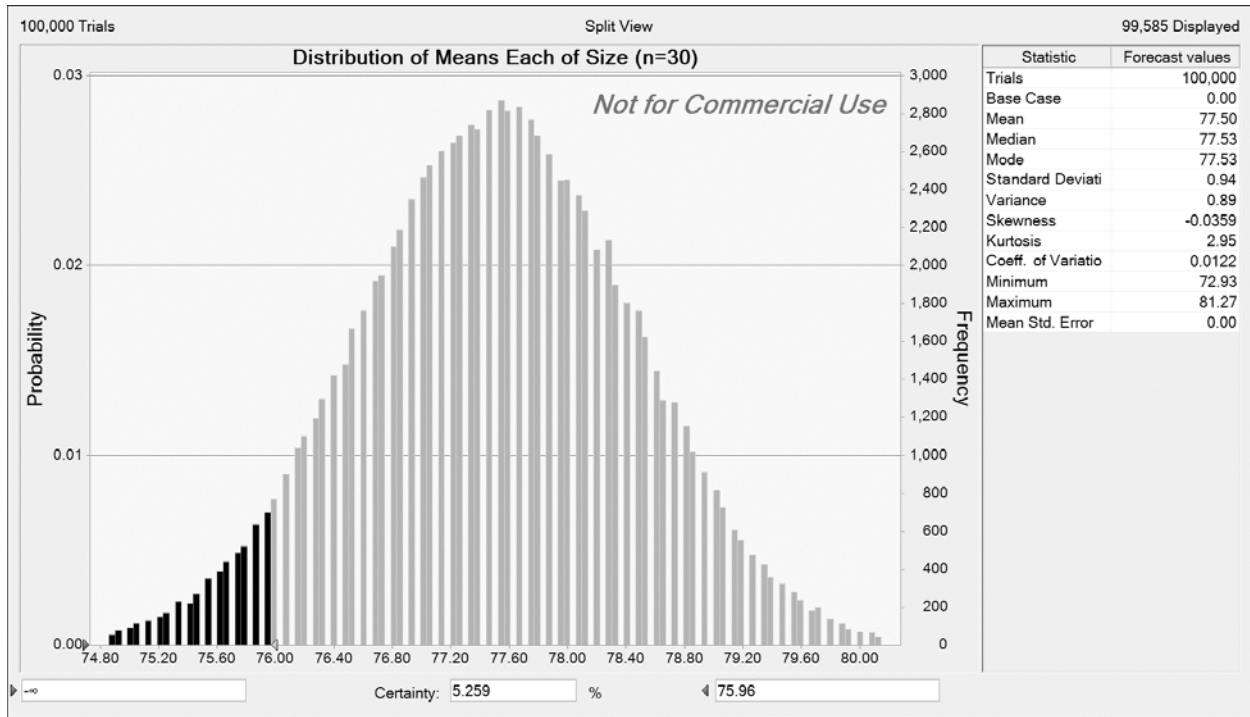
$$Z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

$$-1.645 = \frac{\bar{x} - 77.5}{5.13 / \sqrt{30}}$$

$$\bar{x} = 75.96$$

Thus, if a random sample of 30 students is taken from the population specified and yields a sample mean of 75.96 inches (or smaller), one would incorrectly conclude the true mean height is less than 77.5 inches, when it is not. Now students are asked to see if Monte Carlo simulation supports their result. Specifically, students are asked to use Monte Carlo simulation to generate 100,000 samples, each sample of size 30, from the specified population distribution (Figure 1) and generate a plot of those sample means. Following the generation of this plot, use the application to specify the sample mean height values that would cause a type 1 error, and approximate the percentage of samples in which these results would occur. Figure 3 below shows an example Monte Carlo simulation plot with the shaded area illustrating obtained sample means that cause a type 1 error. All other sample means would result in the analyst making a correct conclusion of not supporting H_1 .

Figure 3: Example Monte Carlo Simulation Estimate of the Sampling Distribution



The Monte Carlo simulation trials approximately match the statistical theory. The distribution is normal in shape even though the population distribution is far from normal. In this set of 100,000 samples, 5.259% of the sample means obtained were less than 75.96 inches. Approximately 95% of the time the sample means were greater than this amount, so we would only make an incorrect conclusion about 5% of the time (sample means obtained that were in the dark-shaded left portion of Figure 3), a match to hypothesis testing statistical theory. Further, notice that the mean of the Monte Carlo estimated sampling distribution is 77.5 inches and the standard deviation of the sampling distribution is 0.94 inches, also matching statistical theory from the central limit theorem, which states that the mean of sampling distribution is equal to the mean of the population and the standard deviation of the sampling distribution is equal to the population standard deviation divided by the square root of the sample size.

$$\mu_{\bar{x}} = \mu = 77.5$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} = \frac{5.13}{\sqrt{30}} = 0.94$$

SUMMARY

We have used Monte Carlo simulation to demonstrate the validity of hypothesis testing statistical theory. Further, we have developed a workshop that enables students to gain “hands-on” understanding of concepts by using a popular general-purpose, commercial software tool. Students work with the tool to understand how a type I error occurs and how often it occurs in sample from a population of interest. Through this hands-on approach, students seem to assimilate hypothesis testing concepts well as was demonstrated in a final class project involving three course sections. In our post workshop survey (74 Business Statistics student participants), 95% of the students said that they now have a basic understanding of Monte Carlo simulation analysis, and 74.3% of the students agreed that this kind of workshop was an effective way to learn concepts in hypothesis testing. 97.3% of the students achieved

success on a key hypothesis testing concept question following the workshop. With easy to use Monte Carlo simulation tools readily available, we continue to explore powerful ways of deployment in which students can actively experience business statistical theory.

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Book Review: *The Better Business Book*

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ABSTRACT

The book titled *The Better Business Book: Volume 1--100 People, 100 Stories, 100 Business Lessons To Live By* consists of narratives by numerous authors who provided advice and shared lessons they learned in their business lives. There are several positive features of *The Better Business Book*. First, the reader has the advantage of receiving quality advice, not from only one author, but from many. The advice and lessons are instrumental in sharpening one's view on how to be successful in multiple lines of businesses, including entrepreneurship, marketing, sales, and management. A second attraction is a reader has the choice of reading the book from cover-to-cover or selecting specific chapters that apply to his need or interest. Another strength is the book can serve as an excellent supplement for college business students, granting them the opportunity to build onto their talent as future business leaders. The book is also a benefit to a professor of business who may choose to use one or more of the book's chapters in the classroom as an innovative means of launching a lecture topic or class activity.

Keywords: Book Review, Business Stories, Business Lessons, Authors Unite

Following the Table of Contents and preceding the chapters of the book is a page titled "Wanna Chapter in The Next Better Business Book?" As the title suggests, it is an invitation for anyone interested in writing a narrative for the next published volume. The reader is directed to the following link: <http://authorsunite.com/waitinglist> for more information.

On the final page of the book is a second invitation to the reader: (1) send a review of the book to Authors Unite if the reading were enjoyable; and (2) feel welcome to contact and/or join the community of Authors Unite. To act upon the invitation, the reader is referred to the following link: <http://www.facebook.com/groups/TheAuthorsUniteLounge/>

Interestingly, the individual responsible for coordinating the chapter narratives into a book does not immediately identify himself. In the "Introduction," he speaks as one in union with the contributing authors when he stated, "We hope you enjoy reading this book, half as much as we enjoyed creating it for you" (p. xv). Not until the final narrative, "Your Story Can Move Mountains," does the reader learn that Author Tyler Wagner is the creator of *The Better Business Book*.

In Wagner's chapter, the reader gains an appreciation of the author's previous work and of his interest in other writers' success. He explained how he, as a college dropout, initially encountered significant failure in starting a couple of businesses but due to personal endurance was eventually able to find success when he began writing and marketing a book named *Conference Crushing*. Wagner recalled the overwhelming excitement he felt when he first held a copy of the book in his hands. The book soon became a top seller in its subject category at Amazon.

Wagner also discussed in his chapter the assumption that there were potentially many individuals who would like to engage in the writing and publishing business but unfortunately had not found a suitable means by which to pursue that goal. He recalled his interest in helping them fulfill their dream of being authors [of stories that potentially could move mountains for themselves and others]. He wrote, "I want people to have the support they need to get through the writing and marketing process. I want as many people as possible to achieve their goal of becoming a successful author. I want there to be one place where all authors go to have fun, support each other, and create a positive impact for society. I call this place Authors Unite" (p.332).

Wagner ends his chapter by sharing the website of Authors Unite and encourages the reader to visit the following link: <http://www.authorsunite.com>

Wagner's chapter, along with the other chapters of the book, is written with a strong spirit of enthusiasm and conviction. Although the chapters are only two- to three pages in length, they are substantive in content and directed toward all employed in or aspiring to work in a business environment. To understand the value provided in the authors' lessons, an overview of a few of the chapters is addressed below.

In a chapter titled “The Power of a Single Step,” Author Megan Lyons began with the following quotation by Richard Branson: “If your dreams don’t scare you, they are too small” (p. 5). In her narrative, she discussed the importance of setting and working toward worthy goals. However, she reminded the reader that working to achieve high goals is not enough. In addition, one must be prepared to handle two main obstacles that can potentially interfere with the accomplishment of goals. The obstacles are (1) handling hardships as they occur and (2) knowing how to overcome the fear of failure.

In terms of hardships, the author shared an example of an individual who sets a goal to lose 20 pounds of body weight and believes that with an advertised product promising “over-night success” that he can lose the weight very quickly. Shortly, though, he is disappointed in having minimal or no positive results. Lyons noted there are usually few or no shortcuts but plenty of hardships that can discourage a person from continuing to work towards his goals.

Regarding fear of failure, Lyons noted the fear is often manifested when an individual gives excuses for his inaction. As an example, the author referenced a person who is interested in starting a new business but is afraid that he will be unable to get the business going. As a result, he offers excuses, some which may include: “[I’ll] take the first step in a few months, or once [I] have the business plans finalized, or once [I] feel just a bit more confident, or once [I] research 800 other businesses and figure out the exact statistically proven formula for sure-fire business success” (p. 6). To overcome the fear of failure and inaction, the author advised the reader to take one small step at a time toward reaching a goal and reward himself after completion of each step. Lyons noted this practice allows one to see progress, which in turn, instills an individual with greater self-confidence in being able to move forward and attain his goal.

The chapter ends with the author challenging the reader to take five minutes to determine a worthwhile goal and to decide upon the first step that he or she can take today toward reaching that specific goal. The author wrote, “Go out and do it, and know that you are well on your way: (p. 7).

More information can be learned about Author Megan Lyons at her website found at <http://www.thelyonsshare.org>

In an overview of a chapter titled “Lessons from the Dark Side: What Entrepreneurs Can Learn from Hackers” Author Stas Verberkt began by noting cybercrime is a global problem, impacting the world economy by \$500 billion. He explained that the reason why cybercriminals are very successful at their trade is due to the following principle—to study and respond to the behavior, needs, and mindset of specific individuals whom they plan to manipulate in ways that will allow them [the criminals] to successfully execute their crime. By sharing the following personal story, Verberkt strives to teach the reader that a person operating an ethical business can also benefit by a similar principle--studying and responding to the behavior, needs, and mindset of his customers, thereby allowing him to provide quality goods and services to his customers and a successful business operation for the business owner/manager/entrepreneur.

Verberkt’s story was from his college days when he was Master’s student in the field of computer security and learned to implement the principle of cybercriminals. His professor required the students to group in pairs to “join the dark side” (p. 95) for a brief time. Verberkt and his teammate were assigned to act the part of cybercriminals who were to take possession of a confidential university asset. They chose to take a computer file from a research professor’s computer located in the professor’s office.

During this exercise, the author realized “to truly be effective, [he] needed to position himself in the shoes of his target group,” (p. 95) i.e., to understand the behavior, needs, and mindset of those individuals that stood in the way of his retrieving the electronic file. The plan was to take the computer file during evening hours. However, he knew that the building manager, who supervised the building in which the research professor’s office was located, would not allow entrance of an individual(s) unknown to him unless a legitimate reason were offered.

Thus, prior to Verberkt and his teammate’s planned entry during the upcoming night-hours, they researched “with great attention for detail” and drafted a fake, but authentic looking, email addressed to the building manager from the university’s security office. The email stated that there was a security issue in the building, and a student worker would drop by shortly to pick up spare security badges for security officers who would be entering the building during evening hours. A few hours after the email had been sent to and received by the manager, Verberkt dropped by the manager’s office, playing the role of a student worker with a fake work order in hand to request pick-up of

the badges. Because the building manager believed in the authenticity of the email and work order, he gave the badges to Verberkt, the student, and provided authorization for entry that evening.

To make a long story short, Author Verberkt and his partner successfully gained access to the building during evening hours, made entry into the research professor's office, hacked into the professor's computer by overriding the password, and acquired the university confidential asset—the computer file. All was successfully accomplished by Verberkt and his teammate due to their understanding the behavior, needs, and mindset of the building manager. In summary, the author's story is a strong, yet an entertaining, lesson for many.

For additional information about Stas Verberkt, the reader may find his website at <http://www.stas.verberkt.net>

The next chapter is titled “After the Age of 50, Your Life Experience Is Your Resume” by Kim Kirmmse Toth. Based on statistical findings that older women are often unable to financially support themselves outside the traditional workplace, the author recommended that senior women consider becoming entrepreneurs. Toth advised that in starting a business, there are some items to address. For example, money is needed to purchase a few items, including a computer and a phone, set-up of a website for marketing, and possibly hiring someone to coach oneself as a new entrepreneur in the initial stages. The author further directed focus to a new entrepreneur's need of self-confidence to achieve goals, patience to grow a business, willingness to work hard, independence to make decisions, and professionalism to interact with others.

For seniors who question what it is that they are qualified to do in a start-up business, the author encouraged them to think about their many life experiences, skills, and talents. Based on these personal resources, they will be able to construct a satisfactory and acceptable business.

Finally, the author emphasized some of the principal benefits of being an entrepreneur: (1) the freedom to decide how many hours to work each day, (2) at what hour to begin and close the work day, and (3) the freedom to schedule personal activities around business tasks.

Toth ended by sharing the following thought with the reader: “What a huge benefit this is for women ‘after 50.’ This is a time that you can take your employability back—on your own terms. Did you realize that this was even possible? I promise you, it is” (p. 159).

To gain more insight from the author, check her website at the following link: <http://positiveaginginc.com>

The final overview is on the chapter titled “Embracing the Spontaneous, Childlike and Playful Messiness of Dreams.” The author Terril Van Hemert advised the reader to approach his business goal like a child with a fun-loving and creative spirit that allows one to naturally become proactive and unafraid of making mistakes or looking “stupid” in the process of striving to acquire his quest. Although there are times when one fails, at least he has learned that which does not work. The reader is reminded of the well-known adage by Thomas Edison in his quest to create a light bulb: “I have not failed. I've just found 10,000 ways that won't work” (p. 306).

Van Hemert further encouraged the reader to break out and escape from the mental “box of control” and be aware of and act upon the potential greatness that lies inside oneself. To reinforce his point, the author used the simile that the potential greatness within a person “is like a pilot light on a stove. It's unable to ignite a flame without a spark but once that spark hits the pilot light, the potential is released and the flame is ablaze” (p. 307). To establish the author's faith in the potential greatness of each reader, Van Hemert ends the narrative with the words: “I believe in you” (p. 307).

The author provides information about *The Better Business Book* on the website at the following link <http://Terril.me>

There are several positive features of *The Better Business Book*. For example, the reader has the advantage of receiving quality advice, not from only one author, but from many. The advice and lessons are instrumental in sharpening one's view on how to be successful in multiple lines of businesses, including entrepreneurship, marketing, consulting, sales, management, perseverance, confidence, and the spiritual self. A second attraction is that a reader has the choice of reading the book from cover-to-cover or selecting specific chapters that apply to his need or interest. Another strength is the book can serve as an excellent supplement for college business students, granting them the opportunity to build onto their talent as future business leaders. The book is also a benefit to a

professor of business who may choose to use one or more of the book's chapters in the classroom as an innovative means of launching a lecture topic or class activity. A final aspect of the book is that it offers the reader an invitation to join Authors Unite and contribute one's own personal business experience to the upcoming version of Volume 2. In summary, the book is an outstanding read for its purpose—to share lessons on how to move forward, how to be successful, and how to reach goals in one's business journey.

REFERENCES

Sheets, B. H. (2017). Book Review: The Better Business Book. [Authors: Authors Unite].
Title: *The Better Business Book: Volume 1----100 People, 100 Stories, 100 Business Lessons To Live By*
Copyright: 2016 by Tyler Wagner
Authors: Authors Unite
Publisher: Authors Unite
Paperback: 333 pages
ISBN: 9781540728241

Brenda Hayden Sheets is an Associate Professor in the Department of Management and Marketing at Murray State University. Her range of interests include research in the business of the golf industry, plagiarism, and action learning.

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.

Manuscript review

- 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.
- If your paper is not accepted, the evaluation may contain comments from reviewers. You are invited to rewrite and submit again.

If your paper is accepted

- Minor revision suggestions will be transmitted back to you.
- Revise and send back as quickly as possible to meet printer deadlines.
- Upon final acceptance, we will bill you publication fees. See www.beijournal.com for latest per page fees. Sole author fees are discounted.
- The fees include all costs of mailing a copy of the issue to each author via standard postal ground.
- Delivery to locations outside the continental US will cost an additional \$10 per author for 5 day delivery.
- Faster delivery methods are available for US and international delivery. Contact the editor for a specific pricing.
- All publication fees should be remitted within 10 business days of acceptance, if possible.
- If you decide not to publish your paper with BEI Journal after submitting payment, we will refund publication fees less \$200 to cover costs of review and processing.
- Cancellation cannot occur after the paper has been formatted into the final printer's file.

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...

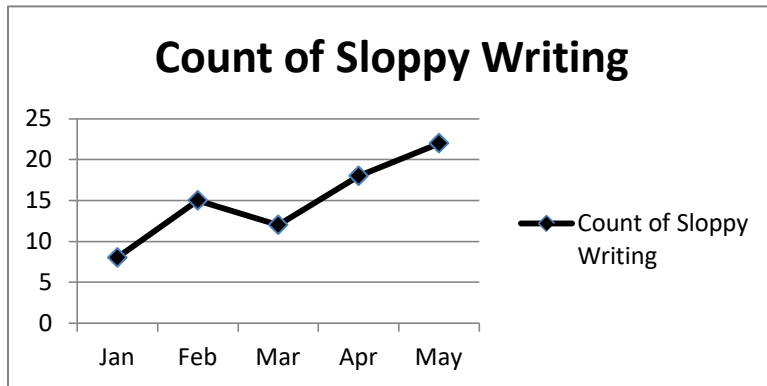
Data Analysis(Sub-heading, bold but not all caps, 10 point, aligned left, bold, no line after to paragraph)

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.
 Devad, S. and Flotz, J. Evaluation of Factors Influencing Student Class Writing and Performance. *American Journal of Farming Economics*. V. 78, Issue 3, pp 499-502.
 Druden, G. and Ellias, L. (1995). *Principles of Economics*. New York: Irwin.

(short bio section optional, can run longer than these examples; removed before sent to reviewers)

Peter J. Billington, Ph.D., is a professor of operations management at Colorado State University – Pueblo. His research interests include lean six sigma and innovative education.

Terri Dactil, Ph.D., is a professor of business communication in the College of Business at High Plains University, Alberta, Canada. His research interests include instructional methods to improve student communication skills.

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