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Introduction

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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Undergraduate Students Computer-managed Homework versus In-Class Performance for Different Testing Formats

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ABSTRACT

Significant differences between undergraduate students performance on computer-managed homework versus in-class testing exists and differs by testing format. A moderate correlation between computer-managed homework and in-class testing for quantitative problems supports computer-managed homework as a value-added activity. A milder correlation in support of learning through multiple choice questions also exists. Corresponding students' performance differs by question format as undergraduates perform better on scaffolded questions than on open or partially-open questions. By nature of the problem formatting, scaffolded questions present students with the problem solving method, open-ended questions require students to develop critical problem solving, and partial questions are a hybrid of the two. Results highlight the different levels of student learning demonstrated through computer-managed homework and performance differences by testing format, and have implications for computer-managed homework designers and instructors.

Keywords: Computer-managed homework, performance

INTRODUCTION

Administrators continue to argue that online learning performance is the same or superior to those in the traditional face-to-face (FTF) classroom (Allen & Seaman, 2013). However, critics argue that online education does not replicate the learning that occurs in the traditional FTF classroom due to intrinsic differences (Bejerano, 2008). Correctly or incorrectly, instructors assume that whenever information technology is implemented in a classroom, it contributes to student learning (Peng, 2009). Instructors should evaluate the various assessment activities used to evaluate student performance and enhance the learning environment to verify its relevance to students learning. Online techniques vary and may include computerized homework, quizzes, exams, discussion board contributions, case study evaluation, individual or group projects, and other activities.

Previously, graduate students' performance on computer-managed homework and subsequent in-class testing revealed a moderate-to-weak relationship between the two; however, student performance differed by testing format (Fish, 2013). Graduate students demonstrated a moderate level of learning between computer-scaffolded to in-class-scaffolded learning. (By the design of the problems, scaffolded questions give the logical questioning and question development, that is, one question result is used in the next question analysis, and so on.) Unfortunately, graduate student results showed that partial and open-ended in-class testing were weaker. Since previous studies show differences in performance between graduates and undergraduates (Fish, 2012), *is testing format relevant for undergraduate students as well?* This study seeks to homework's value to student learning and to evaluate the relationship between undergraduate students' performance between computer-managed homework and in-class, face-to-face (FTF) testing performance with a focus on question formatting. This study presents the complete results for a previous study (Fish, 2014).

LITERATURE REVIEW

Homework. Instructors believe homework improves student's abilities, knowledge and material retention, and educators assign homework to engage students and encourage student learning (Rayburn & Rayburn, 1999). Results of studies to evaluate homework's value are mixed as some find positive relationships (Rayburn & Rayburn, 1999; Eskew & Faley, 1988), and others finding no relationship (Peters, Kethley & Bullington, 2002). Of particular interest was one operations management study that found no relationship between required homework and performance on a multiple choice exam exists for undergraduates (Peters, et al., 2002).

Additionally, the value of online ancillary activities, such as online homework and quizzes, need to be assessed. Empirical research indicates that the impact of online homework is also mixed (Smolira, 2008). Positive results

(Biktimirov & Klassen, 2008; Arasasingham, Taagepera, Potter, Martorell, & Lonjers, 2005; Arasasingham, Martorell, & McIntire, 2011), and negative or insignificant results (Anstine & Skidmore, 2005; Bonham, Beichner & Deardorff, 2001; Bonham, S., Deardorff, D. and Beichner, 2003; Cole & Todd, 2003; Daymont & Blaue, 2008; Fish, 2013; Horspool & Lange, 2012; Topper, 2007) linking online homework systems to undergraduate student performance exist. Others note weak correlations between online homework and student performance on examinations (Fisher & Holme, 2000; Chamala, Ciochina, Grossman, Finkel, Kannan, & Ramachandran, 2006). While one study found a weak overall relationship between computer-managed homework and in-class testing, a comparison by testing format revealed that scaffolded homework and scaffolded in-class performance had a moderate correlation (Fish, 2013). This prompts the question regarding other testing formats and the associated learning for undergraduates. *Similar to graduate students, is homework related to testing measures for undergraduates? Does undergraduate performance vary by testing format?*

As for overall student course success, results are again mixed. One study found an insignificant relationship between web-based homework for undergraduate business statistics and overall performance (Palocsay & Stevens, 2008). Yet another study found student performance in a math course to be significantly better when using computer-generated math homework versus traditional methods (Kodippili & Senaratne, 2008). In a comparative study between four instructors using the same online homework system, only one instructor noted student improvements in exam performance through online homework while three others did not detect any significant gain (Dufresne, Mestre, Hart & Rath, 2002). In short, there is still a lack of consensus regarding the effectiveness of online homework which highlights the need for further investigation (Arasasingham et al., 2011). *Specific to this research, is the use of computer-managed homework related to in-class undergraduate student test performance?*

Assigning homework using an online learning environment instead of the traditional paper-and-pencil method has several benefits including immediate feedback (Kulik & Kulik, 1986), algorithmic versus static problems which may reduce cheating (Smolira, 2008), repetition, early feedback on student progress, requires less instructor time to grade, and expects students to think and understand the material through new and different problems (Arasasingham et al., 2011). Students value homework when it is carefully planned, easy to use, integrated seamlessly with course material, and supported by the instructors (Arasasingham et al., 2011). From an instructor perspective, online homework keeps the class on task, tracks progress and allows student to work at their own pace (Arasasingham et al., 2011). Some web-systems allow instructors to track individual student progress and pinpoint exactly where student difficulties lie (Mendicino, Razzaq & Heffernan, 2009). However, instructors may feel a loss of student interaction, find online instruction too time-intensive, and relationally unrewarding due to the continual e-monitoring required throughout the course (Bejerano, 2008). In general, when instructors enthusiastically embrace online education and carefully integrate assignments and course materials, the students embrace it as well (Arasasingham et al., 2011). Since all students do not benefit equally from online homework systems, educators cannot use a 'one-size fits all' approach with respect to online homework systems (Peng, 2009).

While the debate continues regarding the homework's value in general as well as the value of online homework, researchers are beginning to explore the relationship between different computerized settings and student performance. Educational settings include the number of times students may retry problems, availability of instruction manuals and ungraded problems, seeking mastery versus limited attempts, static versus algorithmic problems, unlimited versus limited completion time, and printing abilities. With respect to giving multiple re-tries for homework, some instructors feel that this encourages a 'guess-and-check' strategy instead of careful problem-solving (Pascarella, 2004). A study comparing two versus four attempts revealed that students' success decreased with more attempts (Yourstone, Krave & Albaum, 2010). Intrinsic motivation and computer efficacy, as well as other individual differences, are critical factors in determining the success of an education system, but perceived system interactivity is not a factor (Peng, 2009). Unfortunately, some students increase their homework effort not in an effort to learn, but merely to use the shortcuts to accomplish the task (Peng, 2009). Relevant to this study, academic maturity is a significant factor as freshman perform significantly worse than upperclassman (Urtel, 2009), and undergraduates performed significantly worse than graduates (Fish, 2012).

Question Format. For the purposes of this study, question format can be divided into three categories - scaffolded, partially-open, and open. By the question sequence, scaffolded questions give the logical problem development, that is, one question result is used in the next question analysis, and so on. (See Figure 1 for an example of an in-class testing scaffolded question with its corresponding answer and rubric.) Partially-open questions may include some scaffolding and some open-ended portion. For instance in the example given, while parts a, b and c relate to one

another, part b is essentially ‘open’ and requires the student to think through the process to complete the question. (See Figure 2 for an example of an in-class testing partially-open question with its corresponding answer and rubric.) Open questions are large, complex problems students develop without being given the logical questioning, essentially a ‘blank sheet of paper’. (See Figure 3 for an example of an in-class open testing question with its corresponding answer and rubric.)

Figure 1. In-class Scaffolded Question, Answer & Rubric

Two different manufacturing processes are being considered for making a new product. The first process is less capital intensive, with fixed costs of only \$25,000 per year and variable costs of \$200 per unit. The second process has fixed costs of \$100,000 but variable costs of only \$75 per unit.

- a. What is the break-even quantity? [2 points]

$$Q = \frac{100,000 - 25,000}{200 - 75} = 600 \text{ units}$$
- b. The forecast indicates that 700 units per year of the new product are expected. Which process is preferred and why? [3 points]

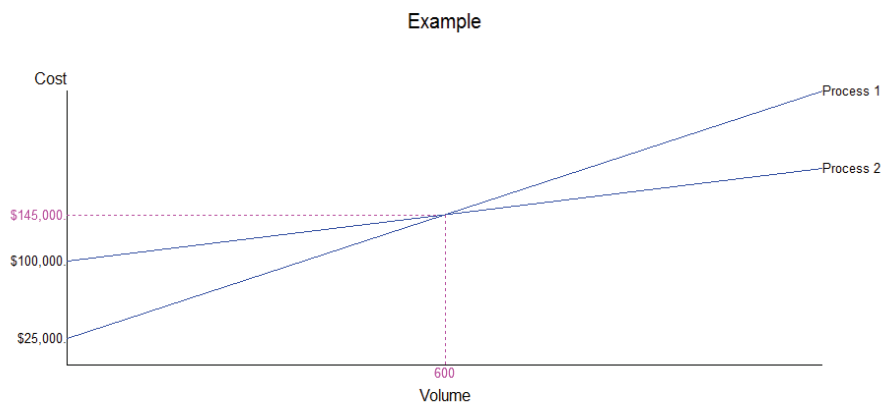
Either:

$$TC1 = 25,000 + 200(700) = \$165,000$$

$$TC2 = 100,000 + 75(700) = \$152,500$$

Therefore, since the total costs for process 2 (\$152,500) are less than the total costs for process 1 (\$165,000), choose process 2.

OR



Since $Q = 700$, which is greater than the break-even quantity of 600, process 2 costs will be less than those of process 1 and therefore, choose process 2.

Rubric:

- a. 2 points with -1/4 for setting up equation and incorrect answer.
- b. Student must either calculate both equations (1 point, -1/4 for incorrect calculation) and then answer question appropriately OR complete graph (2 points – 1 each line) and answer question appropriately. Answer to question must include correct response (process 2; -1/2 pt) with appropriate costs (- 1/2).

Figure 2. In-class Partially-Open Question, Answer & Rubric

A manager is looking to balance the following line for an output of 60 seconds per unit. Using the LONGEST TASK TIME heuristic, breaking ties randomly, balance the line for her. The following table describes the tasks necessary to produce this product:

Task	Predecessor	Time (seconds)
A	-	29
B	-	18
C	A	26
D	B	12
E	C, D	42
F	C, D	30
G	E, F	15

a. Draw the precedence diagram for this product. [1 point]



b. Assign tasks to workstations using the LONGEST TASK TIME heuristic (break ties randomly). Assume the cycle time is 60 seconds per unit. [5 points]

Station	Task	Time (seconds)	Time left (seconds)	Ready tasks	Assigned stat work time
				A,B	
1	A	29	31	B,C	
	C	26	5	B	55
2	B	18	42	D	
	D	12	30	E,F	
	F	30	0	E	60
3	E	42	18	G	
	G	15	3		57

c. What are the idle times for each workstation in (b), the total line idle time, and the efficiency of the line in (b)? [3 points]

Workstation #	Tasks	Total Time	Idle Time (seconds)
1	A,C	55	5
2	B, D, F	60	0
3	E, G	57	3

Total Line Idle Time = $3(60) - 172 = 8$ or $(5+0+3) = 8$

Efficiency = $172 / 3(60) = 95.56\%$

Rubric:

- a. Precedence diagram must include arrows indicating precedence. Partial credit for half correct. Response is used in (b).
- b. Missing ready task list = -1 point. Must indicate total cumulative time when adding each task = -1 if answer appears correct. Violation of heuristic (longest task time) but precedence is correct, + 2 ½ points. Violation of precedence in assigning using heuristic= Tasks a through d correct = +2 ½, e or f out of order = +3. If task g is assigned to workstation #1 or #2, only +1 for credit.
- c. Each question = 1 point with -1/4 for setting up correct equation and incorrect answer.

Figure 3. In-class Open Question, Answer & Rubric

A state department of tourism and recreation collects data on the number of cars with out-of-state license plates in a state park. The number of cars that enters the park varies. They record the data in the table below. Assist the department in creating an appropriate control chart(s) for a 95% confidence interval. Is the process in control? Why or why not? [5 points]

Day	1	2	3	4	5
# of Out-of-State License Plates	10	9	12	15	7

$$UCL = 10.6 + 2 \sqrt{10.6} = 17.12$$

$$CL = 10.6$$

$$LCL = 10.6 - 2 \sqrt{10.6} = 4.08$$

Since each individual sample (10, 9, 12, 15 and 7) all fall within control limits [4.08, 17.12], the process is in control.

Rubric:

- Each question = 1 point with -1/4 for setting up equation and incorrect answer; if $\neq 2$, but equation correct = -1/2.
- Answer to question must include correct response (yes; -1/2 pt); each individual sample (respective sample numbers; -1/2 pt), within limits (statement = 1/2) with correct limits (-1/2 pt).

Since research on the relationship between student online and in-class performance remains unclear, much research remains (Biktimirov & Klassen, 2008). Online homework programs encourage learning and ‘mastery’ of material through many problem attempts. Given current computer software grading abilities, problems are scaffolded, that is, one part of the question directly relates to the next, and so on. Essentially, students are ‘walked’ through the problem-solving steps to the final answer. Given today’s technological capabilities, computer-generated *and computer-graded*, open-ended problems, whereby large, complex problems are given and the student, without prompting from one logical point of the problem to another, are not possible. (Note the instructor has the ability to input customized, static questions into the computer-managed homework system, which are graded by the instructor.) *What is the relationship in student performance between computer-generated problems versus post in-class problems?* Hypothetically, to test administrators’ claims that online class results are similar to FTF class results, students who use computer-managed homework (particularly ‘mastery’ level) should achieve a similar score on post-homework in-class testing. Therefore, the specific hypothesis tested here are:

- (1) There will be a strong correlation between the computer-managed homework and the in-class testing performance, regardless of testing question format.
 $H_0: \sigma_{cmh} = \sigma_{ict} = \sigma_{scaffold} = \sigma_{partial} = \sigma_{open-ended}$
 $H_1: \sigma_{cmh} \neq \sigma_{ict} \neq \sigma_{scaffold} \neq \sigma_{partial} \neq \sigma_{open-ended}$
- (2) Average student performance on the computer-managed homework will equal the average student in-class testing, regardless of testing question format.
 $H_0: \mu_{cmh} = \mu_{ict} = \mu_{scaffold} = \mu_{partial} = \mu_{open-ended}$
 $H_1: \mu_{cmh} \neq \mu_{ict} \neq \mu_{scaffold} \neq \mu_{partial} \neq \mu_{open-ended}$
- (3) Student computer-managed homework variance will equal the student variance for in-class testing, regardless of testing question format.
 $H_0: \sigma_{cmh}^2 = \sigma_{ict}^2 = \sigma_{scaffold}^2 = \sigma_{partial}^2 = \sigma_{open-ended}^2$
 $H_1: \sigma_{cmh}^2 \neq \sigma_{ict}^2 \neq \sigma_{scaffold}^2 \neq \sigma_{partial}^2 \neq \sigma_{open-ended}^2$
 (Note: cmh = computer-managed homework; ict = in-class testing; scaffold = scaffolded questions; partial = hybrid of scaffolded and open question; open-ended = open-ended questions.)

Research that considers the question format may have some insight into student performance. For example, one study did not find a relationship between homework questions and in-class multiple choice testing (Peters et al., 2002), but yet another study demonstrated differences in graduate student performance between online homework

and in-class testing question format (scaffold, partially-scaffolded and open) (Fish, 2013). Therefore, question format is another area ripe for research, and the focus here.

METHOD

Over the fall 2013 semester, two sections (54 students) of an undergraduate introduction to operations management class (for non-management majors) at an AACSB-accredited university in the northeast used a computer-managed homework system as part of their course work. *The intent of this research is to evaluate student performance when using a computer-managed homework system versus their in-class performance and **not** to evaluate the performance of the computer-managed homework system and corresponding textbook used in the course.* Therefore, other than to note that the specific package and textbook are very popular in the operations management arena, the specific one used is not noted.

Homework comprised 8% of each student's grade and was due on the evening prior to a corresponding in-class quiz. A student's homework grade included all homework assignments as none were dropped. The best seven out of nine quizzes counted for 23% of the student's final grade. Three, non-cumulative exams that included multiple choice, short answer, interpretation and quantitative analysis (with formulas provided) were each worth 23% of the student's final average. In developing the quizzes and the final exam, the instructor developed similar problems to the computer-managed system and tracked the corresponding student results throughout the semester.

The computer-managed homework uses 100% scaffolded, quantitative questions whereby the numbers are randomized between each student. Open-ended grading capability does not exist at this time, but the instructor may create customized questions. The customization option was not utilized for this study. The instructor designated specific homework problems corresponding to in-class material and the impending quiz. Each homework assignment consisted of two to four problems (potentially with sub-sections) and ten multiple choice questions that corresponded to similar text problems and took the student roughly 30 to 60 minutes to complete. Although the instructor can develop customized questions, this option was never used. In keeping with current best practices, additional suggested problems with solutions were available on the university's course management system for the student. The instructor encouraged students to review these prior to attempting the computer-managed homework. For each assignment, the student had three tries on each problem to encourage mastery, problems were algorithmic not static, could not be printed out to work offline, and had unlimited time.

For this study, the database includes student scores for 3 scaffolded questions (2 quiz and 1 exam question), 5 partially-open questions (2 quiz and 3 exam questions), and 8 open questions (3 quiz and 5 exam questions). Scaffold in-class testing concepts include economic order quantity (EOQ), facility layout and linear programming graphing. Similarly, partial in-class testing concepts include project management, quality management, and break-even. Open in-class testing concepts include linear programming formulation, aggregate planning, Material Requirements Planning (MRP), capacity, Master Production Scheduling, and EOQ with discounting. Student scores for the corresponding problems were gathered from the computer-managed grade book to complete the database. Fifty-four undergraduate students completed the course and are included in the study. Five students who began the course and withdrew were not included. The computer grade is based upon the percent correct within each problem and an internal weight scheme developed within the system. Students were notified that their course performance would be used in a study and given the chance to opt out of the study. No student requested to be withdrawn from the study.

ANALYSIS

Overall undergraduate student performance on the computer-managed homework is significantly different than in-class testing results ($p=.00$). As shown in Table 1, students average 87.42 ($\sigma = 13.86$) on the computer-managed problems; however, students in-class testing average 72.2 ($\sigma = 9.91$). As shown in Table 2, correlation analysis indicates moderate correlation between the computer-managed homework performance and in-class testing ($\sigma = .46$). The computer-managed homework variance is significantly different than the in-class performance variance ($F=.02$). Note, only corresponding computer-managed homework problems that matched the specific topic tested in class are included in the analysis.

The averages and standard deviation for scaffold, partial, open, mathematical problems only, multiple choice and overall are shown in Table 1 for the computer-managed homework and in-class testing. Regardless of the category, student performance on the computer-managed homework is higher than the corresponding in-class testing. As shown in Table 2, student paired t-test comparisons on the computer-managed homework versus in-class testing indicates a significant difference for all categories - scaffold concepts ($p=.00$), partial ($p=.00$), open ($p=.02$), problems only ($p=.00$), and multiple choice questions ($p=.00$). Interestingly, correlation between computer – managed homework performance and in-class testing decreases as the questions become more ‘open-ended’. That is, the correlation for scaffold questions is moderate ($\sigma=.58$), is even weaker for partial questions ($\sigma=.28$), and slightly weaker for open questions ($\sigma=.26$). Moderate correlations between the online homework and in-class performance on quantitative problems ($\sigma=.51$) and a more modest correlation for multiple choice questions ($\sigma=.31$). With respect to variance, other than the overall variance ($F\text{-test}=.02$), variances for other categories were not significantly different.

Table 1. Students Average and Standard Deviation Results for Computer Homework and In-Class Performance

Computer Homework						
	Scaffold Topics	Partial Topics	Open Topics	Problems Only	Multiple Choice	Overall
Average	88.35	91.81	82.60	85.72	95.42	87.42
Standard Deviation	12.74	13.92	19.39	15.24	9.56	13.86
In-Class Performance						
	Scaffold Topics	Partial Topics	Open Topics	Problems Only	Multiple Choice	Overall
Average	76.92	74.48	75.57	75.66	69.05	72.20
Standard Deviation	15.52	15.54	16.29	12.73	10.06	9.91

Table 2. Statistical Comparison of Computer Homework versus In-Class Testing Performance

	T-Test	Correlation	F-test
Overall	0.00*	0.46	0.02*
Multiple Choice	0.00*	0.31	0.71
Problems Only	0.00*	0.51	0.19
Scaffold	0.00*	0.58	0.16
Partial	0.00*	0.28	0.78
Open	0.02*	0.26	0.20

* $p<.05$

DISCUSSION

As shown in Table 3, direct comparison of computer homework versus in-class performance by operations management topic indicated a significant difference in student performance for forecasting ($p=.00$), quality ($p=.01$), facility layout ($p=.00$), aggregate planning ($p=.00$), and MRP ($p=.00$). Differences for project management ($p=.06$), linear programming ($p=.99$), and inventory management ($p=.39$) were insignificant. A moderate relationships between the computer homework and in-class testing for MRP ($\sigma=.45$); however, other topic areas were weak ($\sigma <.3$)

Results support previous research (Bejerano, 2008; Fish, 2013) that online education does not necessarily replicate the learning that occurs in the traditional FTF classroom. Since the homework is set up to achieve ‘mastery’ of the specific unit objectives by allowing multiple attempts, in-class performance should reflect this ‘mastery’. For purposes of this discussion, mastery level implies that students who complete the homework satisfactorily would then demonstrate a similar level of achievement in the classroom. Unfortunately, this is not the case as statistically significant differences exist for undergraduate students – regardless of the question type, and in-class ‘mastery’ is not demonstrated. Perhaps students did not complete enough problems to perform to the mastery-level on the test, merely ‘guessed-and-checked’ their way through the program, ‘cheated’ in some manner or any number of possibilities as to why the same level of performance is not exhibited in-class at the same level. However, as shown

by the moderate correlations, learning - while not at the mastery level – occurs through using the computer-managed homework system.

Table 3. Computer Homework vs. In-Class Testing Performance Comparison by Topic

TOPIC	Average		Std Deviation		TTEST	Correlation	F-test
	Computer	In-Class	Computer	In-Class			
Project Mgt.	93.19	88.14	14.82	17.33	0.06	0.28	0.25
Forecasting	98.42	82.95	6.13	9.73	0.00	0.03	0.00*
Linear Programming	81.38	81.32	23.93	18.02	0.99	0.22	0.04*
Quality	81.64	69.68	30.59	22.38	0.01	0.29	0.02*
Facility Layout	80.89	65.05	27.52	21.81	0.00	0.24	0.09
Aggregate Planning	92.28	33.55	21.72	14.01	0.00	0.12	0.00*
Inventory Mgt.	74.80	71.50	26.36	18.52	0.39	0.23	0.01*
MRP	96.73	72.36	13.73	20.45	0.00	0.45	0.00*

* p<.05

As outlined in the literature review, while other researchers demonstrated positive relationships with homework (Rayburn & Rayburn, 1999; Eskey & Faley, 1988) or no relationship (Peters et al., 2002) or even negative or insignificant results (Anstine and Skidmore, 2005; Bonham et al., 2001; Bonham et al. 2003; Cole & Todd, 2003; Daymont & Blaue, 2008; Horspool & Lange, 2012; Peters et al., 2002; Topper, 2007), and others noted weak correlations between online homework and student performance on examinations (Fisher & Holme, 2000; Chamala et al., 2006), these results demonstrate that student learning through the computer-managed homework occurs and there may be a missing item to understanding these studies – question format. This study demonstrates a difference in performance between online and FTF performance based upon testing format for undergraduates, which replicates a similar result for graduates (Fish, 2013). While graduate students tend to perform significantly better than undergraduates on computer-managed systems (Fish, 2013; Urtel, 2009), these results demonstrate that a moderate relationship exists between computer- managed homework and in-class testing for undergraduates. Similar to graduate students (Fish, 2013), undergraduate students performed better on in-class scaffold questions than open or partially-open questions. Therefore, differences in student learning by question format results in both studies. Therefore, this leads to the question: what type of student testing existed in the other studies? Insight into the different testing formats may help to explain differences in the study’s results.

Computer-managed homework systems using scaffolded questions are able to assist students to learn the technique at the scaffold level; however, when testing at the open-ended level, students are unable to replicate the more complex problem-solving. Perhaps, since the computer-managed homework did not require them to fully develop the problem-solving logic, students may not be able to replicate this performance in-class. Scaffolded problems lead the student through complex, problem-solving. Students demonstrate that they understand the basic techniques that they learned through the computer-managed homework by their in-class performance, but they are unable to develop the logic on their own.

Therefore, *what level of learning is the instructor expecting to attain? What level of student learning is the instructor testing? What level of learning – and assurance of learning - is the instructor interested in the student demonstrating?* Integrating this discussion with Bloom’s taxonomy, which is a framework for classifying testing and learning goals and objectives (Krathwohl, 2002), instructors should consider question format in their testing. Unfortunately, the ability to change this testing format online currently does not exist. For example, relative to Bloom’s Taxonomy (Krathwohl, 2002), if an instructor is seeking for the lowest levels of understanding or comprehension, then using scaffolded homework and scaffolded follow-up testing would be acceptable. However, if an instructor wants the student to attain a higher level of learning such as analysis or synthesis (typically demonstrated through open-ended activities), then scaffolded homework (that does not require critical thinking due to its intrinsic nature) is not appropriate.

Unlike a previous study (Peters et al., 2002) that explored the relationship between computer-managed homework and multiple choice questions, this study demonstrates that students can learn quantitatively and qualitatively through computer-managed homework. Interestingly, students performed better on multiple choice than problems in their homework; however, in-class they performed better on the quantitative problems than the multiple choice. Perhaps, since students were given 3 opportunities (with only 4 choices) in the computer-managed homework, they were able to read their notes or book and find the correct answer or 'guess-and-check' the result until they picked the correct answer online.

While other studies indicate a negative value to computer-managed homework (Peters et al., 2002) for multiple choice questions, this study indicates that computer-managed homework is related to student learning for multiple choice and quantitative questions. However, one should note that a direct comparison of multiple-choice to multiple-choice or quantitative problem-to- quantitative problem learning of concepts may not have been the intent of the previous study as it was here. That is, perhaps the entire testing format for the previously cited exam – whether qualitative or quantitative material – was multiple choice. Regardless of the format, this further strengthens the argument that one needs to be aware of the question format in ones' interpretation of the results.

The topic-by-topic comparison reveals significant differences between online and FTF performance. *If 'mastery' was expected for all topics, why did student performance differ?* Perhaps the online or in-class questions were too easy, students cheated, students short-cut the online system merely to complete the homework, or the instructor's methods differ from the textbook methods. Studies to evaluate the parameters (e.g., the number of tries, time limits, or difficulty factors) for online systems are still needed to guide instructors as to best practices and encourage student learning. For the last possibility, differences in philosophies between the instructor and the textbook authors may exist and contribute to student misunderstandings. Instructors need to consider changing methods to make these differences clearer to students or adding customized questions that fit the FTF methods better.

In conclusion, these results show that undergraduates learned both qualitative and quantitative material through the computer-managed homework system, but did not 'master' the material. Also, as demonstrated at the graduate level, undergraduate performance varies by question format. Students learn at the scaffold-level online and are able to replicate this learning level in the classroom. Scaffolded learning 'walks' the student through the logic to solve the problem. When students are faced with open or partially-open questions, they are unable to replicate the complex, problem-solving necessary. As artificial intelligence improves and computer-managed homework grading capabilities improve, the ability of computer-managed homework to grade open and partially-open question formats will change. However, at this point in history, instructors and administrators need to be aware that differences in the students' learning exist between online and FTF performance. These results support the idea that the computer-managed activities – and format of the testing questions to demonstrate that learning - that an instructor chooses may impact upon the level of learning that a student attains. Obviously, much work remains in this developing area!

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The Puzzle Exercise: Interactive Teaching Strategy for a SCM Course

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ABSTRACT

This paper discusses a group exercise where participants are challenged to put together a jigsaw puzzle. Once the puzzle is completed, participants will learn to make decisions concerning Supply Chain Management concepts including lead time, profit margin, cycle time, capacity, productivity, pricing strategy, quality, and buyer-supplier negotiations. This is a tool that is excellent for the first or second day of class when teaching Supply Chain Management students or students enrolled in an introductory Supply Chain Management class. It does not require many resources and the resources can be reused in future classes. The exercise can be modified to be completed during a 50 minute class session or a 75 minute class session with additional time allotted for an out of class assignment and a 20 minute debriefing. Participants will learn the importance of working together in teams, making business decisions, solving problem, communicating with others, and gain an understanding of concepts that will be used in their supply chain management courses.

Key words: Interactive learning, teaching with games, supply chain concepts

INTRODUCTION

The use of games, simulations, and exercises are commonly used in business classes to reinforce or enhance learning of concepts and to add more realism to the class materials (Onofrei and Stephens, 2014; Visich, Gu, and Khumawala, 2012; Zeng and Johnson, 2009). Today's classroom experience for students requires more hands-on learning and a move away from the lecture only method of teaching. Adding a sense of realism to the course content is challenging and often takes a while before the instructor can comfortably deliver the material. There are computer simulations available that can be used to accomplish this (Vos, 2014), yet there is a need for mastering these types of experiential exercises before they can be delivered effectively. A number of faculty members have created their own experiential exercises that are delivered in the classroom (Mahahan, 2012). The contribution of this paper is that it offers a hands-on exercise that can be utilized to engage student learning at the beginning of a supply chain management course at minimal costs. This paper adds to the body of existing literature on experiential learning by providing an easy method to introduce students to some basic supply chain management concepts using a jigsaw puzzle exercise. Throughout this paper, the use of the word puzzle refers to a jigsaw puzzle.

Some basic concepts taught on the supplier selection decision are the quoted price for the supplier's product, the cost of doing business with the supplier, the supplier's ability to meet delivery requirements, the supplier's flexibility to meet demand requirements, and the quality of the supplier's product (Johnson and Flynn, 2015). Other considerations for supplier selection include management, technology, financial stability, location, and social and environmental impact. For the purpose of this paper, we will focus on the basic concepts of cost, price, delivery, and flexibility to meet demand. The theory that learning is improved through hands-on practice has been shown to be valid in research studies (Kilmann, 1975). Rather than covering the definitions and working textbook problems regarding these supplier selection concepts, the students are co-creators of the data that is used to determine if their "supplier" team can meet the buyer's requirements. By combining theoretical concepts for evaluating suppliers with a practical exercise in the classroom, more effective learning on these concepts can occur for the students. This method of making abstract concepts concrete translates theory into practice whereby students gain a clearer understanding of what each concept means in the supplier selection decision (Bliemel and Ali-Hassan, 2014).

At the beginning of the semester, it is good to use a classroom experience that will provide an interactive learning experience for the students. The Puzzle Exercise has been used for the past few years in the Purchasing/Supply Management course at Bowling Green State University (BGSU). This course is taken by students who are specializing in Supply Chain Management at Bowling Green State University. The course is open to other students at the University. The one prerequisite is our Introduction to Operations and Supply Chain Management course which can be taken concurrently along with the Purchasing/Supply Management course. Most of the students enroll in the course having some business exposure through other course work and/or some work experience through internship experiences. Most of the students are at the junior or senior level in their degree completion. While it is

good if the students come to the class with at least an introduction to business course in their background, the Puzzle Exercise is valuable for teaching students at any level and can be modified to fit the experience level of the students.

Other faculty demonstrated the use of puzzles in class during a workshop at ISM's North American Research and Teaching Symposium (Fawcett and McCarter, 2006). The puzzles consisted of a picture printed on cardboard and cut into various pieces of different shapes that had to be fitted together. During the workshop, participants were able to take part in the exercise as though they were students in the classroom. The purpose of using the puzzles during the workshop had more to do with developing negotiation skills involving strategies for getting others to assist with the completion of the puzzle through a give and take and a bidding process for missing puzzle pieces. It was a fun exercise and the take away was a reinforcement of team work, effective communication, and the art of persuasion.

Using puzzles is an inexpensive way to make the class fun and allow the students to learn the material at the same time. A decision was made to experiment with the use of puzzles to add more excitement and realism at the beginning of the Purchasing/Supply Management course at BGSU. Overall, it was found that the basic version of the exercise was doable during a 50 minute class with 45 students in the class. The basic version of the exercise will be discussed in the next section. Larger or smaller classes are doable as well. Since the exercise involves a bit of competition among the students, it is best to have at least 10 students in the class so they can be separated into groups and work as a team. Overtime, additional components were added to the exercise, as shown in Table 1 and Table 2, which extended the class exercise to a 90 minute class period along with an out of class assignment. The extended version of the exercise will be discussed in the next section.

THE PROCESS FOR CONDUCTING THE PUZZLE EXERCISE

The exercise consisted of a number of puzzles that could be purchased from the local retail store where children's toys and games were sold. The puzzles were purchased for the class at the local Wal-Mart store for about \$5.00 each. There were enough puzzles for 12 teams. The puzzles had on average 100 pieces, a few have 150 pieces. The puzzles were designed for children ages 5 years old and up. Thus, the puzzles could be completed within a reasonable amount of time by College aged students with no experience in putting puzzles together. Other supplies for the Puzzle Exercise included a deck of cards, a timer, a calculator, and a marker to write on the board. It was helpful to have a computer in the classroom with audio-visual equipment to project a power-point slide outlining the important aspects of the exercise for the students to visualize. Hand-outs could be used as well. In addition, students needed an area where they could put the puzzles together. This could be a clear space on the floor or a table top.

In the basic version of the exercise, the exercise was limited to putting the puzzle together, calculating the group time for each group, calculating the production cost for each group, determining a selling price, calculating the profit for each group and determining which group was most efficient and effective. Based on the outcomes, there was time to discuss how to improve productivity and reduce cycle time for each team. Key concepts for the basic version of the exercise included team work, cycle time, productivity, efficiency, effectiveness, quality, supplier selection, and negotiations between a buyer and supplier.

In the extended version of the exercise, the exercise was expanded to include more calculations such as production capacity, monthly demand, pricing strategy, sourcing strategy, negotiations, and communications skills. Also, an out of class reflection paper was incorporated for feedback and reinforcement of the learning objectives (Lawrence, 2013). Students were engaged to discuss what they wrote in their reflective papers during the next class period.

THE EXERCISE

With a class of 45 students, the exercise begins by selecting 9 people to serve as the team leaders. The number of team leaders depends on the size of the class. Smaller classes would have fewer team leaders. The puzzles are placed on a table in no specific order. Each leader is allowed to select the puzzle of their choice. Next, the leaders are told to select team members with as many people as they want to be on their team. For this class, the team sizes range from a low of 2 people to a high of 6 people per team. No comments are made to the leaders about the consequence of selecting to few or too many people to be on their team. This is an important teaching point and an interesting dynamic that will have an impact on the outcome of the overall exercise.

Once each team is formed, the teams are given a minute to assemble themselves before opening their puzzle. After everyone is set in the place where they will work within the same classroom, the students are told to begin putting their puzzle together as quickly as possible and to signal when they are complete so their time can be recorded. It is

helpful to have an assistant to watch the teams and to make sure that the correct time is recorded once the teams finish. As the exercise progresses, multiple teams will signal that they have completed their puzzle. It is important to accurately record each team's completion time. Once the timer is started, the start time is written on the board and the completion time for each team is written on the board as each team signals that they have completed their puzzle.

The deck of cards is used as part of the exercise. Jokers are removed from the deck. The entire deck of cards is not necessary for the exercise, but there needs to be enough cards to allow for some variation in the cards that are used for the exercise. Students are not told the purpose of the cards until they have selected their card. The cards are turned over so the team leaders do not see the face value on card. The cards are spread out on a table top. As each team completes their puzzle, the team leader is told to come to the front of the room and randomly select a card from the cards located on the table. The number on the randomly selected card becomes the lead time in "days" for the student's team to ship their completed puzzle products to their customer (the buying company). Students are told to calculate the cycle time in minutes that it took them to complete their puzzle. The cycle time is explained to be the time to complete one puzzle which is calculated by subtracting the finish time from the start time. The students are told that they should calculate their cost by multiplying the number of workers on their team by \$1.00 per minute for each minute that it took for them to complete the puzzle. So, if a team has 3 workers and it took them 3 minutes to complete their puzzle, their cost would be $\$1.00 \times 3 \text{ minutes} \times 3 \text{ workers}$ for a total of \$9 to make one puzzle. Note that student labor cost will vary depending on the number of team members they selected. This becomes a teaching point that labor cost will impact the cost of making a product. The cycle time for completing one unit of the product is another teaching point for an understanding of production efficiency. Next, students are told that they should write down on a piece of paper how much they are willing to sell their puzzle for and to make sure they allow for a profit margin in their determination of the selling price of their puzzle. (Note that the only cost considered in the Puzzle Exercise is the labor costs). No team's price is revealed until all teams have written their amount down on a piece of paper and collected by the instructor. At this point, the information is recorded on the board to reflect the cycle time for each team to make a puzzle, the lead time in "days" for a team to ship a puzzle to the buyer, the cost for making each team's puzzle, the price the team set for selling their puzzle. The questions in Table 1 represent an assignment given to the students to calculate additional information to complete the Puzzle Exercise. An example of the information collected from each team is shown in Table 2.

Table 1: Calculations for the Puzzle Exercise

Attempt to do the calculations below:

1. Calculate the output per day for each "supplier" team's puzzles (8 hour day minus 1 hour for lunch & breaks).
There are 60 minutes in 1 hour. There are 420 minutes available per work day.
(420 min/cycle time= output per day)
2. Calculate the number of days to make 1000 units (1000 units/output per day produced)
3. Assuming you make products to order and you do not keep inventory on-hand, determine if you can make and ship 1000 units per month. Note: You must consider your team's lead time.
(Calculate the number of days to make 1000 + the number of "days" for your lead time)
4. Calculate the total available capacity for one month (30 days in one month).
(multiply 30 days by the output per day)
5. If the buyer needs 1000 units per month, determine which suppliers are qualified to compete for the buyer's business; what about 1500 units per month? Determine which supplier(s) can compete for the business?

Table 2: Display of Calculation Results

Puzzle Exercise: start 12:50 pm										
Group Team Leader	Finish Time	Lead Time	Cycle Time	Team Size	Cost/unit	Profit/unit	Price/unit	Output/day	Days to make/1000 unit	Capacity/month
Tony	1:17 pm	9 days	27 min	2 people	\$ 54	\$16.00	\$ 70.00			
Mary	1:16 pm	3 days	26 min	4 people	\$104	\$46.80	\$150.80			
Charles	12:59 pm	1 day	9 min	5 people	\$ 45	\$21.67	\$ 66.67			
Daniel	1:05 pm	4 day	15 min	3 people	\$ 45	\$ 7.00	\$ 52.00			
Mark	1:01 pm	10 days	11 min	4 people	\$ 44	\$11.00	\$ 55.00			
Larry	12:58 pm	1 day	8 min	4 people	\$ 32	\$18.00	\$ 50.00			
Jerry	1:02 pm	3 days	12 min	5 people	\$ 60	\$50.00	\$110.00			
John	1:12 pm	9 days	22 min	5 people	\$110	\$26.50	\$136.50			
Susan	12:59 pm	9 days	9 min	6 people	\$ 54	\$ 6.00	\$ 60.00			

The reflection paper was due at the beginning of the next class period. Highlights from the student reflection papers are provided in the section below. During the class, a few minutes were taken to go over some of the highlights of the reflection papers to reinforce the relevance of the puzzle exercise to the Purchasing/Supply Management class and upcoming topics that would be discussed during the semester. As a thank you to those students who did the reflection paper assignment, students were given “1” point extra credit on their exam for completing the reflection paper by the due date. The extra credit point was not announced at the time the assignment was given. Surprisingly, the extra credit point served as an incentive to the few students who did not complete the assignment by the due date to turn it in even though they were too late to receive the extra credit point. Somehow, the students self-determined that they would be starting the semester off poorly if they did not at least try to make-up turning in this assignment, especially at the beginning of the semester.

Highlights from the student reflection papers

A. General Comments

- Students would gather more information before accepting the task and making team decisions to acquire a clear understanding of the process, such as the difficulty the task, size of the puzzle, or building space for the puzzle
- With more information and the clear understanding of the purpose of the task in mind, organization or planning could be easier, such as the correct number of resources needed, such as the appropriate number of members for the puzzle exercise

- Look for the purpose of the puzzle exercise (i.e., get shipment in time and make profits on each shipment to sustain for the long-term) and develop a plan before you beginning to assemble the puzzle. Determine who will assemble what part of the puzzle, and execute the plan
- Plans enable us to get a clear picture of what we want to achieve and how we're going to achieve it before we start working on something in order to be successful
- Many students talked about leadership. Leaders don't have to be only one person. Many times, the stress of deadlines could be alleviated by the helpfulness of having a great set of teammates

B. What would you do different if you could re-do the puzzle exercise?

- Pick easier-looking puzzles, 100 pieces instead of 150 pieces, more identifiable pieces, to reduce cycle time and cost
- Choose the appropriate number of team members: 3 are preferred by most people. Too many, may reduce time, but increase the cost, and can talk over each other, not effective communication
- Some groups chose 5 people but they would choose 4 people if they could re-do the exercise because losing one person doesn't mean adding more time since each person has his responsibility. Too many people would end up with people working against each other: as when each corner team member was still looking for the correct pieces despite the 5th member's efforts
- Have team members introduce themselves and get to know one another this would have allowed for better defined tasks to improve efficiency and help team members' concentration since different people have different specialties. It would have been better to know ahead of time so teams could assign different people different tasks according to their specialty and develop a positive relationship. This can transpose into positive working atmosphere and outcomes
- Assemble the puzzle differently and come up with better strategies.
- Sort pieces based on color schemes before trying to put together each section then place the all pieces together
- Complete the border first and sort each piece based on color to finish in less time. From the outside in (i.e. sort the puzzle pieces by end pieces, then by color and properly divide the puzzle pieces into different areas of responsibility: end pieces, corner pieces, inner pieces).
- Make the puzzle on a flat, long table, to work comfortably, for other team members to jump in and out of various sides to help team members complete the puzzle faster. This would lead to more productivity and better business results.
- Change the team's attitude: do not need to hurry, try to just calm down, do not think too much of the time, stop working against each other. Workers need to be efficient under pressure. May require worker training.

C. What did you learn from your team members in doing the exercise?

- Communication is a vital key. Basically, almost all the group was talking through the entire process. Team members were constantly asking where to place a puzzle piece or asking to switch pieces because they thought they knew where the other piece went. It is important to vocalize what you need, what puzzle pieces other members have, and what other members are looking for. This will help the team to work more efficiently and increase the group's speed.
- Always try something because it just may be the solution to your problem. If you never try an idea, then you will never know if your solution would have worked.
- Team work focuses on pace and dynamics. Working with people that have similar levels of motivation and goals makes working in a group much easier and more enjoyable

D. What did you learn from yourself in doing the exercise?

- Plans can change any time, so do people. Just follow the big picture and adapt to changing working conditions and you'll end up fine.
- Voice your opinion in a group setting when necessary. Don't be afraid to be rejected, it's normal that other people disagree with you or your proposal may be rejected. It just means you have more to work on to find a good solution.
- By voicing your ideas, you won't miss opportunities even if you receive rejection. You can still contribute.
- You can still be a leader in the workplace without having the title of boss. It is not always necessary to have a strong leader. All team members can be a bit competitive and want to beat the other teams. This helps teammates stay on task while putting the puzzle together. Interact with the other members and do a

good majority of the work. It is critical to be clear and concise when giving direction. In conjunction with this, it is equally as important to be a good listener. Not only hearing what the other team members are saying, but actually processing and understanding the motives is of utmost importance.

E. What knowledge did you gain from the exercise that relates to business?

- Must have the exact right number of employees, to maximize profits. Having too many or not enough employees could greatly cost a firm.
- Before agreeing to purchase, the buyer should thoroughly review the company and their financials
- The buyer should know how much the manufacturer stands to make off of them at the current price. This will give the buyer the power to negotiate.
- The buyer should also take the supplier firm's monthly capacity into account so they will know if they can order more if the need arises.
- The size of your business matters. Take time to evaluate the efficiency of your business.
- The lead-time could affect the buyer's opinion of the supplier's company or even the ability to have them as an option for making the purchase decision.
- A typical supply chain manager makes many decisions such as: whether or not there is a need, translating the need into commercially equivalent description, search for suppliers, selecting a source, contract details, delivering products and payment of suppliers. In addition to those decisions, supply manager's responsibilities could include: receiving, inspecting, warehousing, inventory control, scheduling, transportation, and disposal.
- Every supplier can have different attractions from potential customers. Teams had varying numbers of members, different strategies and diverse puzzle difficulties. All these things affected the supplier's cost of production, lead times, and profits. As a buyer in the real world, there will be many things to consider when choosing a supplier that is the best fit for your company's needs. This activity showed how a company may choose the best supplier by comparing price, lead time, potential price changes and confidence in their strategy.

Discussion of the student reflection papers

In assessing the exercise, the student reflection papers provided details of what could be improved to allow the students a more enriching experience. Students felt that they needed more information about the exercise with respect to the task and the number of people they should have on their team. Some information was purposefully withheld as part of the exercise to provide for a learning experience on decision making and resource requirements for completing a job. It has been suggested that introducing some aspect of uncertainty in the exercise provides for more realism in student decision making (Kwong, Thompson, Cheung, and Manzoor, 2012). However, it was important for the students to develop an understanding that they should ask questions before beginning a job or an assignment. Ultimately, the students realized that having too few resources or too many resources had an impact on productivity in terms of output per unit of time as well as efficiency in terms of cost per unit of product produced. This learning experience would be missed if the students were informed of the upfront risks of selecting too few or too many team members. Also, students found that the number of resources and the allocation of resources needed to be better managed. For example, discussing the division of labor prior to beginning the exercise was mentioned as a critical decision point for some teams. Communicating between team members was mentioned as an important behavior trait for all of the teams. While some teams communicated well, other teams were less successful at establishing good communication among their team members. One of the interesting reflections that the students had was that understanding concepts such as cost, capacity, and pricing strategy were important for the company to be able to sell their product. The students indicated that they gained meaningful knowledge from the exercise that they could apply to their coursework and in their work environment. This outcome supports prior research on student reflection papers (Wills and Clerkin, 2009)

CONCLUSION

The puzzle exercise is a good tool to initiate discussion in the class. It causes the students to focus on the important concepts as they are working through the puzzle exercise, computing their costs and capacity. During the class discussion, the instructor can bring out additional topics that will be discussed during the semester. The activities from the puzzle exercise can be referred back to during the course as it relates to future topics. It is believed that this exercise energizes students to pay attention and to help them to take theoretical concepts and think of them in

real terms as a result of doing the puzzle exercise. Further, this exercise is not very complex to administer and the cost to conduct the exercise is low since the puzzles can be reused each semester. One limitation of this exercise is that it does not include all of the cost factors a company must consider in making decisions. Future expansions of this exercise could be to factor in the overhead costs, machine costs, and material costs as well as the current labor costs.

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The Applications of Online Technologies and Excel Spreadsheets in Teaching Undergraduate Introductory Business Finance Course

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ABSTRACT

This paper examines applications of online technologies and Excel spreadsheets in teaching Business Finance. The evidence garnered from both a formative assessment and a summative assessment suggests that the web-enhanced instruction mode certainly possesses potential benefits to students enrolled in the course. The evidence also suggests that Excel should be an important and useful tool of teaching and learning. Therefore, the conclusion drawn is that a good method to deliver Business Finance is utilizing the web-enhanced instruction mode, with Excel being the primary tool for financial analyses. Hence, university administrators should provide encouragements and incentives for finance faculty members of teaching Business Finance to use Internet-based technologies and Excel spreadsheets in face-to-face instructions.

Keywords: web-enhanced instruction mode, online technology, Excel spreadsheet, formative assessment, summative assessment

INTRODUCTION

Teaching an introductory business finance course is no easy job. On one hand, the majority of business students do not like the idea of taking a finance course delivered solely through distance-learning technologies because they consider finance to be too difficult a subject to comprehend without face-to-face classroom instructions and interactions, e.g., Peng (2011). In other words, technological advancements do not change the fact that finance remains a relatively difficult subject for most business students. On the other hand, it is challenging for an instructor to cover various fundamental concepts in this course given the seat time constraint. How could this dilemma of teaching and learning business finance in a traditional face-to-face (F2F) class be dealt with efficiently? Evidence of one line of research suggests that delivering this course through the web-enhanced instruction mode should be a good solution, e.g., Peng (2011). According to this line of research, the web-enhanced instruction mode is defined as a pedagogy applied to traditional F2F instructions that all course materials are available online and multifaceted applications of Internet-based technologies are used without any seat time reduction. It is noteworthy that all pedagogical advantages of a F2F course are retained with this instructional mode.

The education literature generally supports the premise that computer-assisted instruction contributes positively to students' learning experiences and outcomes, and there are many publications related to using Excel as a teaching tool in finance pedagogy. Examples of such research include MacDougall and Follows (2006); Cagle *et al.* (2010); McDermott (2010); Peng and Dukes (2010); Hull (2011); Chen and Jassim (2013); Livingston (2013); Butt (2014). However, very few research papers have included a discussion about how the web-enhanced instruction mode is applied to teaching business finance, let alone any discussion about incorporating Excel spreadsheets heuristically into teaching each fundamental concept of the course with the F2F delivery method. Therefore, the aims of this paper are twofold: (1) The author presents how various online technologies and Excel spreadsheets are applied to teaching the course to improve students' learning experiences and their learning outcomes. (2) The author analyzes students' feedback from an online survey administered in the spring semester of 2014 as well as results of the official faculty evaluation done by the university.

INTEGRATING ONLINE TECHNOLOGIES WITH EXCEL SPREADSHEETS IN THE CLASSROOM

The rapid growth of the Internet is creating almost limitless opportunities for improving financial education. Thus, finance faculty members are increasingly encouraged to use Internet-based technologies in teaching. Innovative and integrative teaching should be valued. For instance, as mentioned previously, this course is delivered by traditional face-to-face (F2F) instructions with all course materials online and with multifaceted applications of Internet-based technologies while no seat time is reduced. In a finance class delivered by this method, all pedagogical advantages of a F2F course are retained. It is the job of a finance professor to show students financial concepts and necessary algebraic principles behind them. Strong emphasis is put on the preparation and the organization of the professor's

lecture notes to ensure that these concepts and principles are presented in a clearly understandable and straightforward manner. Although the professor has spent extra time and effort of delivering a course in this way, students have benefited the most from his willingness and ability to constantly adopt pedagogically accepted instructional technologies. Empirical results obtained from an end-of-semester survey generally indicate that most students enjoy taking the course delivered by this pedagogical method. Detailed analyses of the survey will be given in the next section of the paper.

Table 1 contains various online technological teaching tools used by the author.

Table 1: A List of Technological Teaching Tools Used

Purposes of Using the Technology	Technologies Used
Real-World Practices of the Course Content	Students can easily access information regarding current financial market conditions and the structure of the U.S. financial system through the constantly updated hyperlinks contained in the class website created by the author.
Course Design	The following technological tools are successfully applied to course teaching and assessment methods: <i>Excel</i> , <i>PowerPoint</i> , <i>Adobe Acrobat Professional</i> , <i>Blackboard Learn 9.1</i> , <i>iPad</i> , <i>Online Wall Street Journal</i> , <i>Online Wall Street Journal Videos (WSJ Live)</i> , <i>Netop Vision Classroom Management Software</i> , <i>Connect Finance</i> , and <i>ExamView Assessment Suite</i> .
Instructional Delivery	

Let us elaborate how these tools are applied to teaching Business Finance.

1. It is important that we should demonstrate real-world practices of various financial topics covered in the course. The author has collected a list of many hyperlinks pertaining to finance information available on the web since he was a doctoral student. For example, a hyperlink contained in the list refers to The Bureau of the Public Debt's *The Debt to the Penny*, <http://www.treasurydirect.gov/NP/debt/current>, and it gives the amount of the daily public debt outstanding of the United States. Other examples are that students could find up-to-the-minute currency exchange rates, the target Fed Funds rate, public companies' SEC filing information, or holding period returns of a mutual fund by clicking on pertinent hyperlinks of the list. The list is contained as a hypertext markup page on the professor's website through Blackboard. What a student needs to do is one-click away from the professor's website to obtain the information desired. Besides, using examples from the real business world helps students realize that finance knowledge is essential for the success in their future professional business career. The list is constantly updated by the professor.
2. Excel spreadsheets: It is a consensus in the literature that Excel is an extremely important and useful tool to be used in financial analyses. For example, Benninga (2006) states that the "combination of Excel and finance will enhance your employment opportunities. Excel is practically the only financial tool used by business today." There are three major advantages of teaching Excel spreadsheet modeling in finance listed by Holden and Womack (2000). These advantages are as follows: (1) conquering math-phobia; (2) bridging from concepts to problem solving; (3) providing students with the real-world tools needed in the workplace. Holden and Womack (2000) also conclude, "it is probably safe to say that there is no finance function in a post-college job that does not use a spreadsheet program, such as Excel, regularly. Teaching students how to actually build financial models using a spreadsheet program like Excel is the best way to prepare them for the business world." Similarly, Balik (2009) contends that "to solve finance problems that require multi-step calculations, Excel is (or should be) replacing the calculator."

It is recognized that a financial analysis is, by its very nature, quantitative, and spreadsheets are used to analyze most problems in the author's classes. Students learn a great deal by going through the *Excel* models, seeing how they are structured, looking at the formulas and functions, and thinking about the implications of the models' output. Excel spreadsheets are used extensively in the coverage of each major topics in the course, such as financial statement analyses, cash flows, U.S. corporate taxable incomes, time value of money, bond valuation, stock valuation, capital budgeting, as well as risks and returns. Except for

the coverage of Chapter 1, which is an overview of financial management, students are emailed a partially completed Excel file prior to each class session. Subsequently, this file is used in class to solve a set of selected end-of-chapter problems that are pertinent to the topic(s) discussed for the day. Once the file is completed in class, the completed Excel file is posted to Blackboard every day after the class session ends.

We will use an interest rate risk problem to illustrate how to guide students building an efficient financial model with Excel. For more details regarding an introduction to efficient financial modeling with Excel, the interested reader is referred to Balik (2009). Interest rate risk is the risk of a decline in bond values due to rising interest rates. Interest rates vary over time, and an increase in interest rates leads to a decline in the value of outstanding bonds. Although a bond's maturity and coupon rate both affect interest rate risk, a measurement called "duration" is not introduced in this introductory business finance course. Therefore, apart from the intuitive reason that bonds with lower coupons have a greater interest rate risk, a problem is solved in class by using an Excel spreadsheet to give students a better understanding of this relationship. It is Problem #17 contained on Page 202 of Ross, *et. al.* (2014). The problem is stated as follows: *Bond J has a coupon rate of 4 percent. Bond S has a coupon rate of 14 percent. Both bonds have 10 years to maturity, make semiannual payments, and have a YTM of 8 percent. If interest rates suddenly rise by 2 percent, what is the percentage price change of these bonds? What if rates suddenly fall by 2 percent instead? What does this problem tell you about the interest rate risk of lower-coupon bonds?*

Figure 1 contains information of the partially completed Excel file emailed to students before class. In a semester of 15 weeks excluding the final-exam week, students begin in the second week to receive a partially completed Excel file prior to each class session. Bond valuation is usually a topic to be covered in the middle of a semester; hence, students have been used to using Excel as a tool in financial analyses by the time when this topic is introduced. The class meets in a computer lab. During the seat time, each student downloads the file from his/her email account, opens it in Excel, and works on it simultaneously when the instructor is illustrating from the podium system how to solve the problem by completing the file. A what-if analysis tool of Excel called **Data Table** is used. A data table is a range of cells in Excel that shows how changing one or two variables in the formulas will affect the results of those formulas. Data tables provide a shortcut for calculating multiple results in one operation as well as a way to view and compare the results of all the different variations together on the worksheet. It is noteworthy that an Excel formula is a sequence of values, cell references, names, functions, or operators in a cell that together produce a new value. An Excel formula always begins with an equal sign (=). Figure 2 contains information of the completed Excel file, and Figure 3 contains all the formulas used in this completed file.

Figure 1: The Partially Completed Excel File Emailed to Students before Class

	A	B	C	D	E	F	G
1	Effective Maturity	10	years		The effective maturity quoted in # of six months	20	six months
2	Annual Coupon of Bond J	\$40	per year		The periodic Interest Rate	4.00%	every six months
3	Annual Coupon of Bond S	\$140	per year		PMT _J	\$20	every six months
4	The YTM of Both Bonds	8.00%	per year		PMT _S	\$70	every six months
5					The maturity value of the bond	\$1,000	
6							
7	The YTM	The Price of Bond J	The Price of Bond S	The Price Change of Bond J	The Price Change of Bond S	% Change in the Price of Bond J	% Change in the Price of Bond S
8	at 8%	\$728.19	\$1,407.71				
9	4%						
10	6%						
11	10%						
12	12%						

Figure 2: The Solutions Contained in the Completed Excel File Posted to Blackboard after Class

	A	B	C	D	E	F	G
6							
7	The YTM	The Price of Bond J	The Price of Bond S	The Price Change of Bond J	The Price Change of Bond S	% Change in the Price of Bond J	% Change in the Price of Bond S
8	at 8%	\$728.19	\$1,407.71				
9	4%	\$1,000.00	\$1,817.57	\$271.81	\$409.86	37.33%	29.12%
10	6%	\$851.23	\$1,595.10	\$123.03	\$187.39	16.90%	13.31%
11	10%	\$626.13	\$1,249.24	-\$102.06	-\$158.47	-14.02%	-11.26%
12	12%	\$541.20	\$1,114.70	-\$186.99	-\$293.01	-25.68%	-20.81%

Figure 3: The Formulas Contained in the Completed Excel File Posted to Blackboard after Class

	A	B	C	D	E	F	G
					The effective		
1	Effective Maturity		years		maturity		six months
		10			quoted in # of	=B1*2	
2	Annual Coupon of Bond J	=1000*4%	per year		The periodic	=B4/2	every six
					Interest Rate		months
3	Annual Coupon of Bond S	=1000*14%	per year		PMT _J	=B2/2	every six
							months
4	The YTM of Both Bonds	0.08	per year		PMT _S	=B3/2	every six
							months
5					The maturity		
					value of the		
6					bond	1000	
7	The YTM	The Price of Bond J	The Price of Bond S	The Price	The Price	% Change in	% Change in
				Change of	Change of	the Price of	the Price of
8	at 8%	=PV(B4/2,F1,-F3,-F5)	=PV(B4/2,F1,-F4,-F5)	Bond J	Bond S	Bond J	Bond S
9	0.04	=TABLE(.B4)	=TABLE(.B4)	=B9-\$B\$8	=C9-\$C\$8	=D9/\$B\$8	=E9/\$C\$8
10	0.06	=TABLE(.B4)	=TABLE(.B4)	=B10-\$B\$8	=C10-\$C\$8	=D10/\$B\$8	=E10/\$C\$8
11	0.1	=TABLE(.B4)	=TABLE(.B4)	=B11-\$B\$8	=C11-\$C\$8	=D11/\$B\$8	=E11/\$C\$8
12	0.12	=TABLE(.B4)	=TABLE(.B4)	=B12-\$B\$8	=C12-\$C\$8	=D12/\$B\$8	=E12/\$C\$8

- Blackboard Learn 9.1: Blackboard Learn is an online learning management system widely used in higher learning institutions, and 9.1 is its latest version. *Blackboard Learn 9.1* is fully utilized in each course that the author has been teaching. These utilizations include the following: (1) Making all course materials available through Blackboard; (2) Giving each student homework assignment, quiz or examination online, i.e., the teaching mode of “face-to-face instructions + online assessments” is implemented successfully; (3) Using the full functions of “Grade Center”, e.g., each student’s score of a homework assignment, a quiz or an examination is returned timely and securely (usually within two hours after an assessment is given) along with detailed solutions posted on Blackboard.
- iPad: Internet-based instructional technologies are constantly being updated. For example, an instructor now may choose to have students use an e-textbook through iPads. We have seen attempts to explore classroom applications and to determine the viability of expanding faculty and student access to this tablet technology, e.g., Keeling (2012). An iPad app that is used in the classroom of this course is *Wall Street Journal (WSJ) Live*. The financial market conditions and the structure of U.S. financial system are constantly changing. *The Wall Street Journal* is, therefore, an important part of the class, as it describes and discusses many of these changes. It is the author’s belief that undergraduate business students should have daily access to the Journal, so they can keep current with regard to the changing and evolving financial landscape.
- Netop Vision Classroom Management Software: It is used daily in class by the author. The software appears to be user-friendly. For the instructor’s in-class assessments, i.e., quizzes and examinations, it is primarily used as an effective proctoring tool. During the seat time of daily class lectures, it has been used in the following ways: (1) From the podium computer system, the author does “remote desktop” to a student’s PC without interrupting the rest of the class should it appear that the student may be having difficulty following the discussion; (2) Helping students to improve their skills of using Excel for financial applications by the author’s demonstrations from the podium computer system, i.e., by sharing the instructor’s PC screen with the whole class; (3) From the podium computer system, helping students navigate video or audio files embedded in the author’s PDF lecture notes; (4) Using it as an effective tool to verify students’ daily attendance records that the author keeps in his own Excel spreadsheets.
- Connect Finance: *Connect Finance* is an online learning tool provided by McGraw-Hill, the publisher of Ross *et al.* (2014). It is the author’s belief that this tool would be beneficial to students’ studies in this course. To encourage students’ use of this tool, at least 40% of questions of each quiz or examination are

chosen from selected *Connect Finance* problem sets listed in the syllabus. However, this arrangement does not apply to questions appearing in each homework assignment.

7. ExamView Assessment Suite: *ExamView* is a test generator program. The author has been using the program to prepare for every test in his teaching for more than ten years. A test generated by the program can readily be exported to several leading course management software systems such as *Blackboard Learn 9.1*. The author is of the opinion that it is much easier to create a test in *ExamView* and export it to Blackboard rather than creating it directly in Blackboard. In addition, it is the author's observation that *ExamView* is one of few test generator programs that have the capability of including the answer-numbering format of answers attached to each multiple-choice question when an multiple-choice test generated by the software is exported to Blackboard.

EVIDENCE FROM UNDERGRADUATE BUSINESS STUDENTS

The Rationale

As mentioned previously, it is the author's view that the dilemma of teaching and learning business finance in a traditional face-to-face (F2F) class can efficiently be resolved in part by utilizing various online technologies and Excel spreadsheets. Obviously, evidence is needed to lend credence to this viewpoint. One way of seeking evidence is to conduct assessments of both teaching and learning. It is a consensus in the education literature that teaching and learning assessments should be complementary and overlapping activities that seek to benefit both the quality of students' learning and the instructor's professional development. An assessment can be either formative or summative in nature. A formative assessment focuses on an instructor's teaching effectiveness, whereas a summative assessment primarily focuses on students' learning experiences and outcomes. In addition, these two assessments should be done in tandem. As mentioned earlier, these two separate assessment activities may be overlapped. For example, the outcome of a summative assessment can be used formatively, i.e., results of the summative assessment can guide efforts and activities of teaching and learning in subsequent courses or semesters.

Data Descriptions

A formative assessment was done through an online survey. Students' opinions about using Excel as a tool in financial analysis were collected by means of an end-of-semester online survey in the spring semester of 2014. Participants were students enrolled in *FIN 3713 Business Finance*, a junior level introductory finance course required in the core business curriculum. They were undergraduate business students at the college of business of a regional state university in the southwest United States. The college's business programs were AACSB-Accredited. During the last class session of the semester, the professor announced in class that there would be an online survey available through Blackboard after the final course grade had been released and encouraged students' participation. Each participant's response was submitted anonymously.

A summative assessment was done through the university's official course evaluation process. Approximately three weeks prior to the last date of class and after the deadline of dropping a course in the semester, official faculty evaluations were made available to students. Students received an email notification from the university indicating that the evaluations currently were available through a secured website. The email encouraged the student to participate in the evaluation process and provided instructions for locating and completing the evaluations online. Results of faculty evaluations were not available to instructors before final course grades had been released.

The author was teaching two sections of Business Finance in the spring semester of 2014, and the combined enrollment of these two sections was 44. Out of these 44 students, there were 25 students responding to the formative assessment, and there were 29 students responding to the summative assessment. Thus, the response rate of the formative assessment was about 57%, whereas the response rate of the summative assessment was about 66%.

The questionnaire of the formative assessment is contained in Exhibit 1.

Exhibit 1: The Questionnaire of the Formative Assessment

1. Please provide an estimate of the average (mean) amount of time that you spent studying this course besides attending class per week.
 - a. Within an hour
 - b. Between one hour and two hours
 - c. Between two hours and three hours
 - d. Between three hours and four hours
 - e. More than four hours
2. Please provide an estimate of the average (mean) amount of time that you spent studying this course besides attending class per week *with the use of Excel*.
 - a. Did not use it at all
 - b. Within an hour
 - c. Between one hour and two hours
 - d. Between two hours and three hours
 - e. Between three hours and four hours
 - f. More than four hours
3. After taking this course, how would you rank the improvements of your Excel skills?
 - a. Did not improve at all
 - b. Somewhat improved
 - c. Moderately improved
 - d. Had a good improvement
 - e. Had a great improvement
4. Please provide an estimate of the average (mean) number of visits per week that you used the website on Blackboard under *Getting Started* --> *Finance Related Web Links* besides your using it in class.
 - a. Did not use it at all
 - b. 1 – 3 times
 - c. 4 – 6 times
 - d. 7 – 9 times
 - e. 10 times and more
5. If you used the website mentioned in Question #4 besides your using it in class, is (are) there any hyperlink(s) contained in it that you would like to recommend to others?
Note: This is an open-ended question.
6. If you worked, did you use Excel in your job as well? If “yes”, how did you use Excel at work? If you did not work, would you anticipate using Excel at work in the future?
Note: This is an open-ended question.
7. This course was taught with the traditional face-to-face lecture plus utilizing online technologies. Please provide your comments and suggestions about this format. In addition, please provide any other comments that you may have so that the teaching and learning process of this course may be improved.
Note: This is an open-ended question.

Data Analyses

Due to the grant of anonymity to respondents of both assessments, it appears that any testing for nonresponse bias of the surveys may not be doable. However, a formal test of any nonresponse bias would have been critical if the response rates were low, e.g., less than 10%. Given that both response rates were greater than 50%, let alone there was not any incentive for students to participate in either survey, it alleviates concerns that conclusions drawn from the survey results might be due to any nonresponse bias.

The estimated weekly average amount of time that a student studies Business Finance besides attending class is 104 minutes with the standard deviation of 50 minutes. The estimated weekly average amount of time that a student spends studying the course besides attending class with the use of Excel is 64 minutes with the standard deviation of 47 minutes. In other words, on average during each week of a semester, a student spends a bit over an hour using Excel to study Business Finance for about one hour and 45 minutes outside of the seat time.

In the formative assessment, students were asked to rank the improvements of their Excel skills after taking this course. The results are summarized in Table 2. Each student indicated that she or he had at least some improvements of Excel skills after taking this course, and 52 percent of the respondents had either a good improvement or a great improvement.

Table 2: Students' Perceived Improvements of Excel Skills after Taking the Course

	Number of Students	Percentage of the Students
Did not improve at all	0	0%
Somewhat improved	6	24
Moderately improved	6	24
Had a good improvement	8	32
Had a great improvement	5	20
Total	25	100%

As mentioned previously, students can easily access information regarding current financial market conditions and the structure of the U.S. financial system through the constantly updated hyperlinks contained in a class website created by the author. The estimated weekly average number of visits that a student used the website besides using it in class is 2.60 times with the standard deviation of 2.86 times. The hyperlinks contained in the website that students would like to recommend include *Bloomberg*, *Investopedia*, *SEC*, *MorningStar*, *NYSE Euronext*, and *WSJ Live*. One student wrote, "I used some websites to find information for projects in other courses." Another student stated, "All of them. I wish I had access to them all the time."

With regard to Question #6 of the questionnaire, all respondents considered Excel to be useful and important in their future professional career. Here are what some students had said:

- *In today's workplace the use of Microsoft Office, especially Excel, Word, and PowerPoint, is important and essential. These three tools are greatly useful in almost everywhere, i.e. work, school, and even play. I believe my workplace requires some basic use of Excel as well. So in the end I'm glad taking the course with Dr. Peng. It will help me in the future work.*
- *I did not use Excel in my job, but others use it where I work. I anticipate that I will have to use it eventually, and I know it will help me figure out numerical problems I might encounter.*
- *No, I have never found the need to work with Excel in my workplace. However, that is because I'm a server, and I would never have to use any computer other than one to input customer's orders. If I worked in a business profession, I would very much assume I would have to use Excel at some point in my career.*

As mentioned previously, this course was delivered through the web-enhanced instruction mode. The web-enhanced instruction mode is defined as a pedagogy applied to traditional F2F instructions with all course materials available online and multifaceted applications of Internet-based technologies are used without any seat time reduction. With regard to Question #7 of the questionnaire, all respondents indicated that they liked the format of the course delivery. Here are students' comments:

- *I thought that this is easily the best way to teach material like Business Finance. It provides continual, hands-on use of Excel as well as a knowledgeable instructor present to answer any questions that students may have during the learning process. I believe the only reason I received a C in the class fell solely upon*

my shoulders. If I had used my time after class to study, and attend every class, I would easily have acquired an A or a B. I thought all class policies were fair and the instructor obviously provided as much help as he could to the class. Anybody complaining about poor grades obviously did not try hard enough, as the instructor was always there to help, in class and after.

- *I thought the combination was a great style of teaching. I believe the use of Excel helped me to learn the material as well as understand it better than if the class had been taught without Excel.*
- *I think this teaching method works great because it integrates theoretical learning, and then an actual application of the material through Excel. This has helped me understand the formulas a little bit better and compute calculations faster.*
- *I like the combination of being in class and the use of technology. I feel it enhances the overall learning environment and the use of Connect helped me understand some of the more difficult problems.*
- *I loved the format of this class. It made it convenient and allowed quick and easy feedback.*
- *It helps a lot to be able to use the computer during class to follow along with the teaching.*
- *I enjoyed the face-to-face as well as the online technologies, and I feel like the online technologies makes the class easier to understand with some of the lengthy formulas. I feel like there is a good balance between the technology and the face-to-face lecture.*
- *Face-to-face is vital! Very necessary to go over the things we need to discuss and focus on. Ask questions and see the problem being done by hand and Excel.*
- *Overall, I enjoyed the use of Excel in solving Finance problems that were introduced into the class. The face-to-face lectures were helpful as well. Please keep the format the way it is. I also like how we do homework problems together in class. The test format was good, I know what to expect during test time before enter classroom. I'm happy with the open notes/book during quiz/test as well. If there's one thing to add, you can go over the chapter PowerPoint because I know many of students don't read it unless you're going over it. Otherwise, the rest was good for me. Thank you!*
- *I like how the class was set up. I struggled at times but being able to use notes helped a lot. The only thing is if you could go a little slower at times, mainly with Excel spreadsheets. I enjoyed your class. Thank you and have a great summer.*

As mentioned previously, the summative assessment that was the official faculty evaluations was done by the university. The instructor's total scores are presented in Table 3 along with those of the university and the college, respectively.

Table 3: Scores of Student Evaluations of Faculty

	Total
FIN 3713-0D1	4.52
FIN 3713-0D2	4.70
College of Business	4.47
University	4.50

Selected questions of the summative assessment are presented in Table 4 along with pertinent scores of student evaluations.

Table 4: Scores of Selected Questions of Student Evaluations of Faculty

Question #	Question Wording	Average Score
3	I found the course content challenging.	4.45
5	The course syllabus clearly stated the course requirements and learning objectives.	4.62
6	The material taught in the course was relevant to the learning objectives stated in the course syllabus.	4.61
17	The instructor used a variety of teaching methods that engaged students in the course.	4.59
22	The instructor provided helpful and timely feedback on graded tests and assignments.	4.65

Selected students' general comments on the course are provided below:

- *I really liked how we were allowed to use Excel in this course because that is how we will solve problems in the real world. I also liked that we could use our notes on quizzes and tests because I was able to focus on learning the material and its use rather than just memorizing a bunch of formulas. The only suggestions I have are to move a little slower of a pace and to have more grades/homework so it is easier to see how well you understand the material along the way. Overall, I really enjoyed the class and hope to have him as a professor again in the future.*
- *Dr. Peng is a very good professor who is truly passionate about what he teaches. I would recommend him to anyone who is considering taking a course he is instructing.*
- *Excel is my new best friend.*
- *This was by far one of the most difficult courses I have had at UAFS, and I was very sketchy about how effectively I would learn the material from Dr. Peng, but he proved himself to be an incredible instructor. Of all the courses I have taken this semester, I have probably learned more from Business Finance than the rest. Dr. Peng's method of explaining the material combined with his in-class use of Microsoft-Excel prove to be one of the best teaching methods I have ever experienced.*
- *Overall, I enjoyed Dr. Peng's Business Finance class. The materials of this class are very similar to my Intermediate Accounting class therefore both of them are useful for me.*

Another thing, I appreciated it that Dr. Peng allowed us taking a test and quiz with open notes, open book. This has helped me a lot. In addition, Dr. Peng provided the Exam, Quiz, and Homework solutions after the due date. That way I can review them.

One last thing, Dr. Peng introduced the useful and powerful tool of Microsoft Excel to calculate the business statements, or finance formula. I'm starting to like using this Excel tool. I will use it in my future academic work. Thank you.

CONCLUSIONS

The web-enhanced instruction mode refers to the course delivery method of having all course materials online and with multifaceted applications of Internet-based technologies while no seat time is reduced. In this paper, applications of online technologies and Excel spreadsheets in teaching Business Finance are discussed. The evidence obtained from both a formative assessment and a summative assessment indicates that the web-enhanced instruction mode certainly has potential benefits to students enrolled in Business Finance. In the meantime, the evidence also suggests that Excel should be an important and useful tool of teaching and learning. Therefore, we can conclude that a good method to deliver Business Finance is utilizing the web-enhanced instruction mode, with Excel being the primary tool for financial analyses. To sum up, more approval and stimulus should be given by university administrators to finance faculty members teaching Business Finance for a reasonable balance between

traditional teaching methodology and Internet-based technologies marked by Excel spreadsheets in face-to-face instructions.

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A Class Exercise to Explore Crowdfunding

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ABSTRACT

This article presents an exercise in which students explore crowdfunding, a financing alternative that is gaining increased attention from entrepreneurs with start-up ideas. An entrepreneur financing a start-up business often faces choices driven by innovations and regulations in the finance industry. In this exercise, students have the opportunity to build a description of crowdfunding, compare how it works relative to traditional methods of financing, and consider the suitability of crowdfunding for a specific entrepreneur's situation. The exercise is designed for undergraduate classes in entrepreneurship or small business management. By completing this work, students should be able to explain how crowdfunding works and how entrepreneurs can research financing sources for a start-up business. This experience will apply to the broader context of examining trends and developments in the business environment that affect an entrepreneur's ability to bring new products and services to the market.

Keywords: entrepreneurship, crowdfunding, start-up financing, class exercise

INTRODUCTION

Entrepreneurship has been defined as the pursuit of opportunities without regard to the resources that the entrepreneur currently controls (Stevenson & Jarillo, 1990). When turning the idea of a business into a reality, one resource that entrepreneurs often must obtain from others is capital for starting, establishing, or growing the business. Investigating financing options and evaluating the suitability of a source of funds are important skills for entrepreneurs in developing their plan to convince investors or creditors that the business will generate a return. Yet it can be difficult in the classroom to give students experience dealing with the complexities of evaluating and securing financing. In this article, we present an analytical exercise in which students actively research and evaluate the developing source of financing known as crowdfunding.

Traditional sources of credit such as banks often find lending to start-up businesses to be problematic due to their limited history and uncertain cash flow projections. During economic downturns such as the crisis that began around 2007, it becomes even more challenging to borrow. Although venture capitalists (VCs) are high profile sources of equity, only about 1% of businesses raise capital from VCs (Mulcahy, 2013). A recent innovation in the finance sector that offers increased opportunities for financing is crowdfunding, with roots in the technological and cultural trends of social media. Crowdfunding allows entrepreneurs and business founders to raise capital for their ideas by inviting a large number of individuals to contribute various and, often, relatively small amounts through internet campaigns without the use of financial intermediaries (Mollick, 2014). We have selected crowdfunding as a context for this exercise because this funding approach is accessible to students. Students could, in reality, choose to invest in campaigns on crowdfunding websites or to establish a campaign of their own with relative ease. Further, because the concept of crowdfunding is emerging and still changing, even practicing entrepreneurs would need to research the current developments to evaluate the suitability of this approach. Thus, this exercise serves as virtual experience (Bliemel, 2014) in which students participate in activities that entrepreneurs would do but remain within the safe confines of the classroom so that they receive direction in processing that experience.

With the connection to social media, students may readily see potential benefits in crowdfunding. There are also challenges and potential pitfalls in funding through a social context. Research investigating this combination of financial and network considerations has noted that the social network effect may take precedence over traditional economic explanations of financial capacity and efficiency ratios in determining whose requests are funded (Saxton & Wang, 2014). The implications of social network as a success factor in financing allows students to contemplate whether and how entrepreneurs could be successful with this new funding mechanism. Both the potential benefits and pitfalls of financing in a social media context are creating an evolving legal climate for crowdfunding. Given the recognition of entrepreneurship as a driver of job growth in the United States, Title III of the Jumpstart Our Business Startups (JOBS) Act, the CROWDFUND Act, made it permissible for entrepreneurs to sell limited amounts of equity to large number of investors via the internet (Stemler, 2013). Prompted by an intrastate provision in the act,

individual states, such as Georgia, Kansas, and Washington, have begun to pass legislation permitting intrastate equity sales through a crowdfunding model. Yet the Securities and Exchange Commission that sets rules to implement the CROWDFUND Act is moving to restrict the broad solicitation of investors using the Internet, viewing communications in that manner as incompatible with the intrastate exemption (Guzik, 2014). The combination of unsophisticated investors and risky business ideas is giving regulators pause and continues to lead to modified regulations and an evolving landscape for crowdfunding (Stemler, 2013).

A description of an example entrepreneur is used as the framework for this exercise. The exercise develops a process for learning more about crowdfunding and examining whether the example entrepreneur should participate in this type of funding campaign. Students conduct current research through internet searches to build the body of information the class will use to make its assessment. By having students do independent research to contribute to the whole, the exercise serves as a practical example of the power of the contributions of a crowd to accomplishing a large, challenging goal. It reveals the challenges a business person working alone would encounter in dealing with the sizeable amount of information about emerging issues. As specific objectives, students who complete this exercise will be able to (a) explain how crowdfunding works as a financing mechanism and (b) search for and interpret information about financing options for entrepreneurial initiatives. The exercise is designed for undergraduate students in courses about entrepreneurship and small business management. The online nature of crowdfunding and the ongoing conversation about it make this exercise accessible for classes either in the classroom or taught online. The framework example can be modified by the instructor to present entrepreneurs with different businesses or life situations relevant to a particular course. The example is based on the experiences of a real entrepreneur, but a fictional name is used and some details have been modified to maintain anonymity.

FOUNDATION FOR THE EXERCISE: OUR EXAMPLE ENTREPRENEUR

The exercise begins with students reading a brief description of the situation an entrepreneur is facing in trying to fund his business idea. The description is designed to be short enough to be read either during or before class, allowing time in class for a research plan and instructions to be developed for bringing data at a later date for discussion. Suggestions for that plan are provided in the teaching note. In the following five paragraphs, the students meet an entrepreneur who is mulling over what he knows about financing options for his business:

"Donations, equity investments, securities, and the list goes on," Alton Sims thought as he wandered through the fall expo sponsored by a major crowdfunding association in his state. Crowdfunding associations work to educate their members on current crowdfunding regulations and to give them access to a pool of investors. He was not yet a member, but was considering whether he should join. He was aware that there are also crowdfunding websites that are open to anyone and allow entrepreneurs to share their ideas with the crowd and seek small funding contributions from a variety of people. For entrepreneurs today, funding options were becoming more creative. Yet the confusion of it all caused some entrepreneurs to wish for the "old days" when a handshake from a banker would seal the deal.

After retiring from a successful career in government service, Alton chose to use his expertise to create an oil disposal system that would catch oil leaking from older model vehicles before it was deposited on roads, driveways, parking lots, or land and contaminated the ground. His product would be attached underneath each vehicle to catch the oil and facilitate environmentally-friendly disposal. His primary target market was comprised of companies who owned fleets of vehicles, such as delivery vans or sedans for a sales force. Individual owners of older model cars and trucks made up his secondary market. Through research, Alton found that legislation directed at preventing toxic oil leaks had been proposed and, if passed, would align well with his product. The current business environment seemed favorable for ideas such as his that offered protection for the physical environment and supported sustainability of business operations. He had always been interested in starting a business and acquired useful skills in management, budgeting, and innovation before retiring. He knew from talking with a consultant providing free services through his local business incubator that it is estimated that entrepreneurs and small businesses provide jobs for 70% of Americans (Gorman, 2011). Job growth and sustainability were both key in the success of this business, and Alton had hoped to create more opportunities in addition to his current staff of two employees. The obstacle standing in the way was funding. His current need was for \$500,000 to fund inventory. He had already built a prototype that had generated interest among potential customers. Some of those were ready to place an initial order to determine how the product would work on a large number of vehicles. Alton could make a sale if he could deliver 300 of the products. However, these potential customers were not willing to take the risk themselves in fronting Alton the money for building the products. They would pay on delivery.

At one time, banks were a viable source of advice and funding for entrepreneurs, particularly the local bank assisting the local business. A bank that could not meet the need of a small business owner might refer the customer to other banks. The economic downturn changed the dynamics of the relationship between bankers and entrepreneurs. Start-up businesses, in particular, have uncertain cash flows that present a challenge for commercial banks. The increase of bank failures and the limited capacity of the survivors to lend have left entrepreneurs feeling that they have no options with banks. Venture capitalists and angel investors are associated with start-up financing. But the downsides that surround this type of financial support for entrepreneurs can be disheartening. “Arrogance is often a product of the inverse of this approach, where the venture capitalist thinks the CEOs or founders work for him” (Feld, 2009). Quality angel investors are typically not found at the local chamber of commerce event and if you happen to meet a good one, entrepreneurs may have to give up a large share of their business.

As Alton continued to ponder other means of financial support, he realized that the viable choices were limited. He had already used most of his retirement, and his close family and friends that were able made early contributions to the business. One of the prevalent issues of entrepreneurship is funding. Although your business idea may be solid with evidence of market support, not having enough capital can prevent your success. Traditional bank financing is no longer a viable solution to the startup’s funding issues. However, crowdfunding has given hope to the startup that funding is possible. Crowdfunding is typically done through internet campaigns on websites such as Indiegogo and Kickstarter. Once a funding appeal is created through writing or through a video, the request can be viewed by many individuals using social media. People can contribute various amounts towards the campaign’s funding goals.

Banks were out for Alton as of now and venture capitalists/angel investors did not seem like attractive options for his business. So, what about crowdfunding? Could this really work for him or should he reassess the more traditional options of funding? He realized that he needed a better understanding of crowdfunding. “There is a lot of information out there,” Alton thought. “I need to get started.”

TEACHING GUIDE FOR INSTRUCTORS

The following questions can guide the analysis and class discussion. The teaching suggestions provided below demonstrate how the class can build the analysis through research.

1. What is crowdfunding?
2. What facts in the example allow us to understand Alton’s position?
3. What factors affect the success of crowdfunding campaigns?
4. If Alton pursues crowdfunding, what recommendations would help him develop a successful campaign? If a successful campaign is unlikely, what alternative should he consider?

Teaching note question 1: What is crowdfunding?

To approach this broad question and explore the topic of crowdfunding, the instructor may narrow the focus for students with more specific questions: (a) What definitions, explanations, and examples of crowdfunding can students find? (b) What are upsides and downsides of using crowdfunding? (c) What are the categories or types of crowdfunding (i.e., what do contributors receive in return for their contribution)?

The power of using social media to raise money is proving to be a legitimate alternative with practical results (Saxton & Wang, 2014). As a relatively new financing phenomenon, crowdfunding lends itself to research with business press, academic, and social media sources. Students can use online or print resources such as business research sites, crowdfunding sites, crowdfunding association sites, social media sites, journals, magazines, and newspapers to summarize the most recent information to describe crowdfunding as it presently stands. Categories into which their research findings could be grouped include crowdfunding websites, legislation, success stories, challenges/downsides, and trends. This research will guide students through a process entrepreneurs might use to investigate how crowdfunding works and the pros and cons of using crowdfunding to fund projects. Instructors could direct the students in their search with some of the following suggestions.

Among the more well-known crowdfunding sites are Kickstarter.com and Indiegogo.com, but there are many others (e.g., RocketHub.com). Some are specific to countries or industries, such as AqarFunder for real estate crowdfunding in Egypt (Yoshimura, 2015). Others provide a platform for certain types of firms or investors. Sterlingfunder and Sparkmarket, for example, facilitate the equity funding that is currently legal in some states

(Kass, 2013). Creating a list of sites and some distinguishing features about them (number of active campaigns, types of projects typically funded through the site, etc.) as an initial step of research could illustrate the scope and nature of crowdfunding. An internet search for “crowdfunding associations” will provide the names and web addresses for organizations that are often non-profit entities working to educate and connect the crowd with start-up businesses and to track and advocate for regulations supporting crowdfunding. Examples include the Crowdfunding Professional Association (www.cfpa.org) and the National Crowdfunding Association (www.nlcfa.org).

With crowdfunding grounded in the Internet and social networks, students should find social media tools to be useful sources of information. There are public groups and interest groups for crowdfunding on Facebook or LinkedIn that could make for interesting class discussions. Students could search websites such as Twitter to find trends and tweets about crowdfunding, identifying hashtags related to the topic. There are many videos on YouTube about how to launch a crowdfunding campaign or to secure venture capital or small business lending that could be helpful in understanding how crowdfunding is similar to or different from other sources of funds. Students could use search engines to find books on crowdfunding and compare to other sources of funding such as angel investors and venture capitalists. For example, a search for “venture capital” in the Books category of Amazon.com returns over 25,000 results while a search for “crowdfunding” returns over 600 results. The “look inside” feature on many books on Amazon.com would allow students to investigate the introduction or early chapters in some crowdfunding books.

Business magazines, in either print or online, offer articles about crowdfunding trends and stories of entrepreneurs who have used the funding approach. Sources to consider include *Entrepreneur* (www.entrepreneur.com), *Fast Company* (www.fastcompany.com), *Inc.* (www.inc.com), *Fortune* (www.fortune.com), or *Forbes* (www.forbes.com). Blogs focused on crowdfunding would offer yet another perspective. Blog sites often offer tips for successful campaigns, such as Crowdfundingdojo (crowdfundingdojo.com), or industry-specific information, such as Launch and Release (launchandrelease.com) that specializes in the music industry. These blogs can illustrate the scope of the industries and types of projects that are using crowdfunding. Students may also be able to assess whether there is consistency or contradiction in the advice given across different sites.

Students can be directed to academic research journals through their school’s library or Google Scholar. Academic research in crowdfunding can be used to compare current, broader findings with our example entrepreneur’s situation. For example, one study investigating approximately 50,000 crowdfunding projects with a combined funding of over \$273,000,000 found that personal networks, project quality, and geography play important roles in the success of fundraising (Mollick, 2014). The amount of information available about the entrepreneur has been identified as a factor of concern to some investors (Cumming & Johan, 2013). The availability of audited financial statements has been mentioned as a subject of possible regulations in the future (Cumming & Johan, 2013). A major driver of the regulatory concern is that equity investors through crowdfunding sites might not have adequate skills for evaluating the risk of a start-up business. Further, it could be difficult through crowdfunding to obtain and review all of the documentation and disclosures that typically accompany an equity sale. As noted earlier, individual states passed legislation to permit intrastate equity funding. But the SEC is concerned that businesses who generally solicit for their offerings by advertising their campaigns on the Internet reach beyond the intrastate intention of the laws (Kass, 2013; Guzik, 2013, 2014). Students investigating regulations will find interesting insight into the efforts to balance the protection of unsophisticated investors against the enthusiasm of those investors for equity and the needs of businesses for equity.

This exercise can serve to illustrate the different purposes and audiences for the variety of sources the students investigate. For example, do the students perceive that a blog or an article is attempting to persuade an audience that crowdfunding is promising? Or does the source present an unbiased study? How reliable is the information if they are trying to evaluate the merits of crowdfunding for an individual entrepreneur? Addressing these issues can help students understand the premise underlying evidence-based entrepreneurship and management (Frese, Rousseau and Wiklund, 2014). Connecting research with practice, the evidence-based approach uses research and analysis to identify evidence that particular choices, structures, or techniques are associated with success in business.

Students could search for definitions of the different types of crowdfunding strategies. To focus their search, the instructor might provide the labels for the types and ask students to bring a definition to class. They should cite which source they used, since definitions may differ and the differences could make for informative discussion. According to Sally Outlaw’s book *Cash from the Crowd* (2014) there are five main crowdfunding strategies:

- Donation- the crowd gives a monetary contribution towards the project or cause and receives intangible, intrinsic rewards for the donation.
- Reward-the crowd receives some perk or reward for a contribution. Crowdfunding campaigns using this approach may send a sample of the product as the reward if the contribution meets a minimum requirement. Other rewards could include personalized thank you notes, your name on the entrepreneur's website, etc.
- Debt- the crowd actually acts as lenders with this approach and expects their contribution back over time with accrued interest. This is also known as peer to peer lending.
- Royalty- the crowd expects a percentage of the revenues or royalties for the contribution. Campaigns may stipulate that royalties will not be received until the business makes a certain amount of money.
- Equity- the crowd has ownership of businesses in exchange for their equity investment. This newest type of crowdfunding is still the subject of regulatory changes as the interpretation and application of the permissions in the JOBS Act continue to be debated.

Teaching note question 2: What facts in the example allow us to understand Alton's position?

This question can be segmented into three focus areas: (a) Alton's financial resources, (b) his experience and ability to run the business, and (c) the pros and cons of the business. Students should consider how each category would affect an evaluation by investors of Alton's prospects for success with this business idea.

Alton's financial position as an entrepreneur is not uncommon. As a retiree, Alton's monthly income is probably limited. The instructor may wish to discuss the different ways that people supplement their income during retirement. Because we know that Alton worked for the government, we might assume that he receives some type of state or federal pension for his service time. There are other retirement vehicles such as individual retirement accounts that Alton may have invested in. It is possible to borrow against certain types of retirement accounts to fund business ideas. Social security may come up in a discussion on monthly retiree income. It may be of interest for students, in their research, to find information about the age requirements for social security and how the amount of funds distributed can increase over time. This portion of the discussion also offers an opportunity to consider the different stages in a career when an individual may choose to become an entrepreneur and the resources that would be available at those points in time. The idea of becoming an entrepreneur after retiring from a career may be unexpected to some students or they may personally know someone who has. It is not uncommon as individuals find that they need supplemental income after retirement or that they desire a challenge for purposefully filling their time. Other transition points such as ending military service or being involuntarily displaced from a job may also lead individuals to consider entrepreneurship (Hoppenfeld et al., 2013; Moran, 2012; Singh & De-Noble, 2003).

Alton's personal financial resources have already been put into the business to the extent possible. We know from the description of Alton's situation that investments from friends and family are not an option any longer because they, too, have already invested as much as they can afford. The details of the example do not state specifically if these contributors are expecting to be repaid. The instructor can ask the students about the ethical obligation Alton owes to these initial investors. How long should friends and family be willing to keep their money tied up? This discussion can consider similar time-in-life issues that were mentioned above for Alton. Perhaps these investors are retired or have contributed assets they could use for other important purchases. If family and friends are in a position to need their money back, Alton is already facing some repayment questions.

Because Alton has industry experience pertinent to his product, potential funding sources beyond family and friends may be convinced to invest. An angel investor may understand the position of the retired entrepreneur. Some angel investors could be retirees themselves. Venture capitalists would find value in the entrepreneur's experience, but VC's typically fund businesses with aspirations for significant growth to generate sizeable returns. Students can be asked to speculate about whether or not Alton wants the business to grow large and to grow quickly. If the instructor wishes to use this case exercise to cover angel investors and venture capitalists in greater detail, too, then students could be directed to research the operation of venture capital firms and various angel networks.

Moving from a discussion of Alton's personal situation to a discussion of the characteristics of the business, students will likely note that the business has an environmental safety and resource conservation focus. This focus could appeal to crowdfunding investors, as there is a cultural trend and interest in "green" issues. His business might also appeal to crowd members interested in the potential contribution to job growth and economic development. Research has noted that investors look for information about the entrepreneur in crowdfunding (Cumming & Johan,

2013). The class discussion could consider whether explaining a plan to increase the number of jobs would provide insight that crowdfund investors would value.

At this time, the business' focus is primarily industrial rather than consumer-level. Although Alton's potential commercial clients will benefit if Alton is funded, is it currently not likely that a company will surf crowdfunding sites to invest. However, the case mentions that in preliminary research Alton found that regulations may be enforced to protect the environment from hazardous oil leaks. In an effort to prove that his product is a necessity, Alton could solicit funding from corporations. Even with crowdfunding, some entrepreneurs have found the option of presales to aid in raising capital (Belleflamme, Lambert & Schwienbacher, 2014). However, according to the case, he has had no success convincing a commercial customer to pay prior to delivery of the product. Would individual consumers be interested in presales and pay in advance for this oil disposal product for their own family vehicles? Other relationships with corporations that could help a start-up get its footing include bartering or even private loans from corporations. The case mentions Alton's challenges in getting customers interested in funding the production, but might some of his suppliers be willing to take that risk?

Teaching note question 3: What factors affect the success of crowdfunding campaigns?

To develop the discussion of how crowdfunding campaigns work, we provide structure for students to investigate actual crowdfunding campaigns. There is an opportunity with crowdfunding for students to experience the process of developing evidence, since the campaigns are publicly visible. Data can be gathered from crowdfunding sites about not only campaigns that were fully funded but also campaigns that were not. Many of the articles and blogs that students encountered in Question 1 likely presented success stories but offered little insight into campaigns that struggled. Focusing on campaigns that have ended (i.e., those that have met the goal or for which the open period has expired) allows for the conclusion to be drawn about whether they were successful or not. Dividing the workload, students can retrieve descriptive data for projects from crowdfunding websites and assemble a dataset for the class. This dataset can be analyzed using regression, with multiple independent variables predicting a dependent variable such as the percent of funding the project received. Software for conducting regression analysis may vary across schools, but includes the data analysis add-in for Excel or statistical analysis packages such as SPSS or SAS.

Among the more popular crowdfunding sites for fundraising are Kickstarter, Indiegogo, Crowdfunder, RocketHub, Crowdwise, Somolend, appbkr, AngelList, Invested.in, and Quirky (Barnett, 2013). Some of these sites could serve as the source of projects for this research. Depending on the number of independent variables and the size of the class and length of time allowed for data collection, the dataset compiled by the class should target at least 150 – 200 projects. An even larger number would be desirable, as the greater the number of cases, the greater the number of variables that can be included in the regression. Several variables students might collect are categorical, requiring $n - 1$ number of variables for n categories of the variable (rapidly increasing the number of variables in the equation). The table summarizes variables that might be collected and coded for analysis, and detailed explanations are presented in the following paragraphs.

Project. A brief text name or a number to identify each project will help to avoid duplicates. For analysis purposes, one characteristic that could be coded as a variable is whether the project involved a product or service. Services are typically location-specific, while products could be shipped to funders who contribute to the campaign.

Presentation type. Various methods are used to present the project – videos, pictures, text. One variable could indicate whether the campaign presents a video or not. Did the entrepreneur provide only text for potential investors to understand the venture? If there is a video, other variables could note how professional and polished it appears to be or how long it is. Information about the content of text or pictures could be coded as variables. For example, is the presentation focused on the entrepreneur or on the product? With this information, students can investigate whether individuality or standardized approaches fare better with potential investors (Belleflamme, Lambert & Schwienbacher, 2013). Are people drawn to personal stories as they relate to the campaign? Crowdfunding research suggests that traditional economic explanations (e.g., a solid business idea with evidence of a true target market) can be overshadowed by a social network effect in crowdfunding (Saxton, 2014). Will a project presentation that does not meet the expectations of frequent users of popular social networks find it more difficult to get funded?

Project category or description. The class could choose an identification scheme to categorize projects. For example, categories could be defined around industry and include arts (e.g., art, music), manufacturing (products), personal services, or health/fitness among others. Discussion about the industry could consider whether certain

types of projects or industries are more suited for crowdfunding. Instead of pre-selecting categories, students could develop their own observations while collecting data about categories that could be important to contributors. Or, this variable could focus simply on whether the project mentions an environmental, conservation aspect or not.

Table 1: Suggestions for Variables to Include in Students' Data Collection

Variable	Explanation	Coding for Analysis
Project	Is the project a product or service?	A categorical variable (1=product, 0=service)
Type of presentation	Did the campaign use a video or other presentation? Is the video professional or amateurish? How long is the video? If there are only pictures, how many? If only text, how long (number of words)? Is the presentation (video or text) serious in tone or light and humorous?	Categorical variables for issues such as video or not (1=Yes, 0=No) or professional or not. Continuous variables for length of video (e.g., time in minutes) or number of pictures.
Category	A variable indicating industry of the project (ex: artistic, sports/fitness, industrial/manufacturing, etc.); Environmental aspect or not?	The categories will depend on the dataset. One option is simply to use one variable indicating if there is an environmental protection angle or not (1=Y; 0=N). Or the category could be for-profit vs. non-profit.
Crowdfunding strategy used	What type of crowdfunding strategy was used (e.g., reward, donation, etc.)?	A set of categorical variables indicating if is a donation campaign (1=yes, 0=no), a royalty campaign (1=Y, 0=N), etc.
Number of contributors	How many contributors (a.k.a backers, funders, investors) are participating?	Number of participants funding the campaign
Entrepreneur	Who proposed the project: a student, a business, a non-profit organization?	A categorical variable coded as student =1, professional = 0; or coded as for-profit=1, non=0
Crowdfunding site	Which crowdfunding website was used? A categorical variable	Possible control variable; Could code as Kickstarter or not, Yes = 1; No = 0
Funding time	How many days did it take to fund the project?	Number of days the campaign was open
Amount requested	How much money is the campaign seeking?	The actual dollar amount. Consider as a control variable.
Percent of project funded	The percentage of the amount requested that was pledged (often exceeds 100%) is the recommended dependent variable.	Actual percentage of the original request that was received

Crowdfunding strategy. Earlier in Question 1, a list of crowdfunding strategies was discussed. A categorical variable could indicate which strategy was employed for the project – donation, reward, debt, royalty, or equity. If all projects found by the students use the same strategy, the instructor may wish to turn the discussion toward why that set of projects would have followed the same strategy.

Number of contributors. The premise of crowdfunding is a large number of contributors who each provide a small amount of money. But a campaign could also be successful with few contributors who give large amounts.

Entrepreneur. Characteristics of the entrepreneur who proposed the project may affect funding. Some of these characteristics may be discernible from viewing the crowdfunding campaign, such as whether the entrepreneur is already in business or is a student. Another characteristic of interest might be whether the project is being started by a for-profit business or a not-for-profit organization. Years of experience in the industry might be available.

Crowdfunding Website. Some of the more well-known sites to date are Kickstarter and Indiegogo. The site's popularity could attract viewers and affect the opportunities the campaign has to be viewed and, consequently, to be funded. A disadvantage associated with their popularity is that the number of campaigns could be overwhelming to a contributor visiting the site. Strategies to catch the eye of potential investors would be needed. Websites may

specialize in certain types of projects. Sites like crowdfunder are donation-based for causes and charities, while others such as appbackr and AngelList focus on technology projects (Barnett, 2013). A series of categorical variables could indicate exactly which site is being used. Alternatively, one variable could be used to indicate whether or not the site used is Kickstarter. Another possibility is to use a variable indicating if the site is general or specialized with a focus on a particular type of campaign. The “crowdfunding website” variable could be a control.

Length of time for campaign. The length of time the campaign actively accepts contributions could also be included as a control variable. A project that is open longer is providing a longer opportunity for contributors to see the project and decide to participate. However, some projects are funded in a very short time.

Amount requested. The amount of money requested should be included in the analysis. Theoretically, it should be easier to fund small amounts than large amounts. But many large projects do receive full funding. The amount requested could serve as a control variable.

Percent of project funded. A dependent variable that is available through the crowdfunding websites is the percentage of funding the project received. Many projects receive far more than requested (well in excess of 100%), while others fall short. Including the percentage rather than just a yes/no indication of whether the project reached its funding target can give insight into what types of projects contributors will overfund beyond the original goal.

Students may notice other factors in the crowdfunding sites that could be included if the class chooses. Importantly, it should be noted that the analysis may not produce any significant results. No variables in the analysis may generate a significant p-value. Even significant results may not be reliable, since the analysis has limitations. The limitations can support interesting class discussion about possible reasons for the results. For example, was the dataset too limited? Should the search have been wider and included more varied projects? Patterns may not emerge unless there is a large dataset. A study by Mollick (2014) was based on 48,500 projects. Still, the process demonstrates the complexity of accumulating and interpreting evidence about recommended courses of action in business decisions. The instructor may use an academic research article to show that there are many steps taken to improve the reliability of results, but that numerous limitations exist and are acknowledged in even rigorous studies.

Teaching note question 4: If Alton pursues crowdfunding, what recommendations would help him develop a successful campaign? If a successful campaign is unlikely, what alternative should he consider?

The information collected from the search in earlier questions can now be used to build some conclusions. To guide students through this step, the instructor may offer these more specific questions: (a) Which crowdfunding strategy would make the most sense for Alton and what factors should he emphasize in his campaign? (b) What are some challenges he might encounter with crowdfunding and how could he address them? (c) How do other financing options compare with crowdfunding in addressing his financing challenges?

After taking part in the data collection process, students should be able to offer an opinion as to the approach that could lead Alton to develop a successful campaign. What factors do the students consider important? Is one crowdfunding site more appropriate than another? Does he need a video? Should he create his own campaign or pay someone with technical expertise to develop a video or edit the text? The description of Alton’s business idea that was provided to begin this exercise provided limited information about the product concept. In determining what factors might contribute to a successful campaign, students should consider what additional questions they would have and information they would need if they were contemplating investing in Alton’s business.

Regarding the crowdfunding strategy, you could make the case that any of the strategies listed might work for Alton. The instructor may choose to ask students to identify how those strategies could be employed in this case. For example, with a *donation-driven* strategy, donations do not have to be repaid, but it could be challenging to secure enough donations to fund the project. Could Alton expect to obtain his targeted funding amount with donations? On what message should he focus his campaign in order to obtain sufficient donations? Using the *reward-based* model, the founder provides a reward, such as a product, when investors give a certain amount. A challenge here is making sure that the contribution amount is high enough for the entrepreneur to actually make good on the promise without losing money on the reward. Would crowdfunding investors be interested in actually having Alton’s product? Alton must also be proactive in assuring the timely delivery of the product. Studies show that some investors may receive products later than expected, with the degree of delay predicted by the level and amount of

funding a project receives (Mollick, 2014). Alton needs funding in order to build inventory. Would he be able to deliver on the reward for early contributors if he had not yet received all of the funding?

In order for Alton to use the *debt-based* or *royalty-based* approaches, he would need to be able to rely on the commitment of potential clients with some certainty. Though it is difficult to get potential clients to guarantee sales, Alton could request letters of intent from those who are most serious about the product and present those letters as a part of campaign to show the potential sales. Alton may also produce some type of debt-to-income analysis to show the crowd his projected repayment ability for debt or his ability to generate sufficient revenues to support a royalty campaign. The evident disadvantage of debt based funding is the assurance that the entrepreneur can pay the money back over time. Although the clear advantage is that the entrepreneur will more likely receive the needed funds, the pressure to make the operation work increases as many investors will be expecting payment.

Regarding *equity* campaigns, there is debate about whether the Crowdfund Act permits equity sales through websites. Individual states such as Georgia, Kansas, and Washington passed state laws facilitating equity crowdfunding, yet the Securities and Exchange Commission's interpretation of the rule may still work to prevent it. If web-based sales of equity are permitted, would investors be interested in shares of Alton's company? With equity campaigns, there may not be immediate pressure for a payback, but as the business grows, the founder shares control and profits with investors. Given the regulatory uncertainty surrounding equity crowdfunding, should Alton pursue it quickly or wait to see if it continues?

The discussion can also approach the question by identifying reasons that crowdfunding might not work at all for Alton's current situation. At the same time, however, students can consider whether there are ways to modify the funding request or develop the campaign to make crowdfunding feasible. Answers that may emerge (or that can be prompted by the instructor if students do not mention them) include:

- (a) One limitation of crowdfunding is that there is no guarantee that all funds will be received. Can he generate interest for the amount of financing he needs? Does the amount of money Alton needs fit with the typical size of successful crowdfunding campaigns? What levels of contribution would the students recommend (and how many participants would be needed at each level)?
- (b) Does he have the personal network to get enough support? Given the importance of a social network in connecting to contributors, how should Alton go about evaluating his personal network to determine if it will support his campaign and provide enthusiasm and exposure for the venture?
- (c) Will Alton's business be something that visitors to crowdfunding sites will understand or appreciate? Is his idea too complex for basic crowdfunding? Does it require an experienced investor who can evaluate the business plan? How would the students recommend explaining the business to crowdfunding contributors?
- (d) Another consideration is whether using crowdfunding will make it difficult to tap into other sources later. When using crowdfunding, the entrepreneur is not building a track record with any single financier. On the other hand, money obtained through crowdfunding could prove that the concept is viable and provide a foundation sufficient to get the business started and to appeal to other financing sources later.

Would crowdfunding introduce downsides that Alton could avoid by using other types of funding? With the instructor's assistance, the class could develop a list of potential funding sources for entrepreneurs, in order to identify how crowdfunding fits in among the options. The list could include: the entrepreneur's own money, friends and family, crowdfunding, angel investors, banks, and venture capitalists. Each funding source offers different possibilities and limitations. Characteristics of the entrepreneur and the business opportunity make some options more viable than others. As students will have discovered in answering the previous questions, the business model of crowdfunding consists of creating the online funding campaign and accepting investments from numerous individuals in various amounts that in most cases will not have to be repaid. Just as crowdfunding has its business model (i.e., how the money is contributed and how the money is repaid), other financing methods have business models. For instance, a bank lends its depositors' money, not its own money. Therefore, banks expect to be repaid on a pre-determined payment schedule. A venture capitalist (VC) provides equity, not debt, and typically fund start-up businesses that require significant amounts of capital. Because the businesses are new – so new that many have not yet produced a product or earned revenue – the VC knows there is a big risk. VC's use big payoffs from some investments to cover big losses from other investments. Angel investors will likely request some ownership in the business. In Alton's case, we know that his early funding came from friends and family. One may argue that, according to the details in the description, Alton had already considered and tried other traditional models of financing and that he could not go back at this point because little about his situation has changed.

Students can also contemplate whether pursuing funding is worth the effort, or if he should, unfortunately, drop the business idea for now. If he waits, what would need to happen in order for him to resume his efforts? What developments in crowdfunding might affect Alton's potential for success? Will he find it easier or more challenging to develop a successful online campaign if he waits some period of time? There are many complex decisions to be considered in funding a start-up business. Before leaving the exercise, students should be encouraged to give an opinion about what course of action Alton should pursue and to justify their recommendation.

CONCLUSION

The exercise presented here gives students virtual experience with information-gathering and decision-making processes that entrepreneurs face. It illustrates the challenges of processing the information generated by emerging issues that affect the viability of an entrepreneur's business. The crowdfunding context is relevant because contribution amounts are small enough that students could contribute to a campaign or post an idea of their own and invite contributions.

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Teaching Innovation Skills: Application of Design Thinking in a Graduate Marketing Course

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ABSTRACT

Innovation is a principal source of differentiation and competitive advantage in the increasingly complex and rapidly changing business environment of the 21st century. Students need to be better prepared with innovation skills to not only meet the 21st century workplace requirements but also succeed in the careers of their choice. Business educators need to be mindful of the pedagogical methods that facilitate the development of desired innovation skills among students. Innovation skills include technical skills such as discipline specific expertise, personal qualities such as creativity and open-mindedness, and social and behavioral skills such as communication and collaboration. The Design Thinking approach was chosen as a pedagogical method to teach innovation skills in an elective MBA course. The experience of the course, Design Thinking and Innovative Branding, suggests that Design Thinking approach can provide instructors with a clear pedagogical process and tools to effectively instill innovation skills such as creativity, empathy, open-mindedness, experimentation, communication, and collaboration.

Keywords: Innovation Skills, Design Thinking, Creativity, Soft Skills, Self-Awareness, Empathy, Open-mindedness, Collaboration, Innovative Problem Solving, Engaged Learning, Continuous Learning, Experimentation, Experiential Learning, Project-Based Learning

INTRODUCTION

Innovation is recognized as a key strategic capability in business today. Inasmuch as industry practitioners are under significant pressure to stay relevant through strategic innovation in the constantly evolving business environment, business educators are mindful of pedagogical methodologies that help students develop the necessary skills that prepare them to become innovative leaders of the future. Innovation skills increasingly are being recognized as the skills that separate students who are prepared for the challenges of work environment in the 21st century, from those who are not. Facing the notion of preparing students with innovation skills, it is often questioned whether or not innovation skills can be taught or learned. While there are many who assume that some people are born naturally creative or innovative and others are not, many experts share the belief that most people can become more creative and innovative, given the right environment and opportunities (Brown, 2008; Wagner, 2012; Liedtka, King and Bennett, 2013). Furthermore, it has been increasingly emphasized that efforts must be made to facilitate development of innovation skills in higher education (Wagner 2012; Sherman 2011; Hoidn and Karkkainen, 2014).

Despite the importance recognized by both employers and educators, most business programs appear to fall short of equipping students with such desired innovation skills. Considering the importance and the need, it is imperative for business educators look into pedagogical tools, processes and techniques that can help students develop personal qualities and skills conducive to learning and innovation. In so doing, it is necessary to understand what constitutes innovation skills and how one might instill them in student learning experiences. There have been many suggestions made as ways to facilitate development of innovation skills, ranging from what to teach (i.e., the important categories and elements to be focused) to how to teach what needs to be taught (i.e., the process, tools and the projects to be considered).

In an effort to teach innovation skills, the Design Thinking approach was adopted as an underlying pedagogical method in a graduate level marketing elective course. A special topics seminar course was offered with the course title, Design Thinking and Innovative Branding. The goal of the course was to instill innovation skills in the context of brand management. The purposes of this paper are to present the course experience and to discuss the effectiveness of Design Thinking process and tools in cultivating a set of innovation skills to a group of MBA students. This paper presents a brief summary of the background, describes the course in detail, and reports on the impact as well as the effectiveness of the course.

BACKGROUND

Importance of Innovation Skills

Innovation is recognized as a key driver of growth in the 21st century economy. Organizations increasingly rely on innovation for their success in the constantly changing, globally competitive business environment. Innovation calls for a large number of people equipped with diverse skill sets that are not only conducive to continuous learning and change but also contribute to a multifaceted approach. It has been acknowledged that business programs need to do a better job in teaching and preparing students with innovation skills. A couple of important questions arise as we contemplate teaching innovation skills – what we need to teach and how we can teach them.

It has been suggested that innovation skills can be taught by focusing on the primary criteria that include creativity, critical thinking and problem solving, and communication and collaboration. In the process of learning to innovate, students need to be prepared to think creatively, work creatively with others, learn to implement innovations, reason effectively, use systems thinking, make judgement and decisions, solve problems, communicate clearly, and collaborate with others (Partnership For 21st Century Skills, 2015). In a more simple description, one might say that innovation skills cover three basic areas: Thinking (customer focused thinking and problem solving), Telling (getting others on board and storytelling), and Doing (learning through experimentation).

Hoidn and Karkkainen (2014) identify three overlapping set of skills necessary for innovation. They include Technical Skills, Thinking and Creativity Skills and Social and Behavioral Skills, which are described as follows:

- Technical Skills including disciplinary know-what and know-how. Innovative or creative people often require specialist skills in their field – both in terms of knowledge and methods.
- Thinking and Creativity Skills such as curiosity, critical thinking, problem solving and making connections.
- Social and Behavioral Skills such as interest, engagement, self-directed learning, self-confidence, organization, communication (cross-cultural) collaboration, teamwork, and leadership.

Of the Thinking and Creativity Skills, creativity is noted to be an important source of innovation. Innovation tends to also require open-mindedness and critical questioning of well-established ideas or practices. While Technical Skills require specialist skills, Thinking and Creativity Skills and Social and Behavioral Skills require training in the way of questioning, thinking, listening, engaging, collaborating and communicating. It should be noted that two out of three major categories of innovation skills identified by Hoidn and Karkkainen, Thinking and Creativity and Social and Behavioral Skills are related to soft skills which are founded upon attitudinal and personal qualities of individuals such as open-mindedness, self-confidence, communication, and collaboration.

In a search of desirable soft skills for improving business education, studies have noted that employers perceive attitudinal qualities as important as knowledge and skills reported in previous studies and that many of the desirable attitudinal qualities are related to the ability to change and skills to innovate. For example, a study of marketing professionals found that employers looked for personal qualities such as openness, flexibility, and creativity as well as other desirable qualities such as communication, teamwork, and analytical and problem solving skills in marking hires (Lee, 2006). Another study identified listening skills and customer orientation as important factors for success in marketing career along with communication, analytical skills and tools, market research, and application skills (Walker et al., 2011). This implies that empathy, as the ability to listen to and relate with customers, is an important quality as well as creativity, open-mindedness, communication, and teamwork.

A study of UK employers found flexibility, willingness to learn, customer orientation, self-awareness, and confidence among the top employability attributes in marketing graduates (Heffernan et al., 2010). In a broader study of top ten marketing managers' competency, Montoya et al. (2010) found that half of the top ten competencies were classified as attitudes such as open-mindedness, anticipation, flexibility, developing others, and leadership. From an in-depth studies social innovators, Sherman (2011) identified seven important competencies that were essential for success. They include leadership (taking initiative and action), optimism (confidence and self-efficacy), grit (a combination of perseverance, passion, and hard work), resilience (in the face of adversities, obstacles, and failures), creativity and innovation (ability to think in unconventional way), empathy (ability to put themselves in the shoes of others), and emotional and social intelligence (ability to connect with others and building strong relationships).

In a more recent assessment of top 25 business programs, Ghannadian (2013) reported that while top 25 business schools have been successful in building graduates with business and leadership skills that employers consider

important, they have not always been successful in teaching ‘softer skills’ that employers prize. For example, in checking against important skills that employers identify as important, top 25 elite business schools have shown to have done a good job of equipping graduates of their MBA programs with skills such as Leadership, Business Ethics, Social Responsibility, Business Speaking, Change Management, Business Writing, Teamwork, Power and Responsibility, Decision Making, Organizational Behavior, Imagination and Creativity, and Employee Management. However, they have not shown to be successful in teaching other employer-desired skills such as Self-Awareness, Ability to Learn, Management of the Future, Perseverance, Time Management, Persistence and Empathy. The study further points out the importance of teaching these softer skill sets emphasizing the new AACSB accreditation standards that encourage business schools to give more weight to teaching the soft skills going forward (Ghannadian, 2013). It is noted that many of these soft skills are related to the ability to change and innovate. Essentially, attitudinal qualities of self-awareness, open-mindedness, flexibility, willingness to learn, and empathy reflect the necessary qualities of individuals and organizations in coping with changing business environments, which leads to continuous learning and to innovation with relevance.

The growing importance coupled with the persisting needs of employers indicate that business educators must be engage in developing the innate qualities of creativity, open-mindedness, flexibility, empathy, and confidence from students in addition to building the disciplinary competence and be mindful of instructional methods that may foster the desired outcomes. One of the challenges in this endeavor is identifying pedagogical methods that educators can use to help students develop these personal qualities and soft skills in the context of the topical interests.

Suggestions have been made with regards to methods and tools that enhance development of innovation skills such as problem solving, critical thinking, and collaboration. For example, student-centric approaches such as Project-Based Learning (Markham, 2013; Saurbier, 2014) and Problem-Based Learning (Hoidn and Karkkainen, 2014) can enhance development of innovation skills as students benefit from the direct engagement in problem solving. In addition, the hands-on problem solving experience can provide lasting impact on student learning as it builds confidence in the process (Lee, 2012; Wagner, 2012). While there are many other suggestions for improving student engagement (Sharbrough III and Fekula, 2014), critical thinking and confidence (Hart and Mrad, 2013), process orientation and team building (Lugar-Brettin, 2014), it is viewed that these suggestions are not necessarily mutually exclusive and that they can be incorporated into a more inclusive approach that covers the process, tools, and the project experiences. Design Thinking has been gaining notable attention from educators as well as practitioners as an effective and inclusive way of providing the process and tools for innovative problem solving (Brown, 2008; Liedtka, King and Bennett, 2013; Wagner, 2012; Coakley, Roberto and Segovis, 2014).

Design Thinking to Teach Innovation Skills

In search of pedagogical process and tools to instill the innovation skills, the Design Thinking approach came across as a potentially effective way for a number of reasons. The Design Thinking approach has been increasingly recognized for its effectiveness in bringing out innovation and change in various sectors. Design-oriented firms such as Apple and IDEO have demonstrated how design thinking can improve business results. Managers of various companies have creatively solved pressing issues by applying design thinking (Liedtka, King and Bennett, 2013). Educational institutions and programs of various types and sizes have successfully incorporated Design Thinking to foster innovative leadership education. In addition, there seems to be a “kinship” between the innovation skills and essential Design Thinking elements such as empathy, listening, collaboration, and experimentation (Wagner, 2012). Furthermore, the Design Thinking approach has been known to provide “a clear and teachable set of tools and processes” that can be used to solve business problems (Liedtka and Gilvy, 2011).

Design Thinking is a process of creating and developing new and innovative ideas in order to solve problems. According to Tim Brown (2008), the CEO and the president of IDEO, Design Thinking is a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business can convert into customer value and market opportunity. In this matching process, Design Thinking combines empathy for the context of a problem, creativity in the generation of insights, and collaborations and rationality in analyzing and fitting various solutions to the problem context. Design projects, according to Tim Brown, must ultimately pass through three spaces of “Inspiration, Ideation, and Implementation”. “Inspiration” is labeled for the circumstances (such as a problem, or opportunity, or both) that motivate the search for solutions; “ideation,” for the process of generating, developing, and testing ideas that may lead to solutions; and “implementation,” for the charting of a path to market. Projects will loop back through these spaces – particularly the first two – more than once as ideas are refined and new directions taken.

It is noted that Design Thinking, as a problem solving process, can have variations in specific number and labeling of steps, but by and large, go through the process of definition and research, ideation, prototyping, choosing, implementation, and learning. The entire cycle begins all over, with the previous ending point becoming the beginning of the next iteration. It is noted that the circular nature of the process enables managers to engage in continuous learning and stay relevant in the changing environment with strategic innovation.

Liedtka and Ogilvie, in their book *Design for Growth* (2011), view that Design Thinking fosters creative problem solving by bringing a systematic end-to-end process to the challenge of innovation and offer a process that examines four basic questions, which correspond to the four stages of design thinking as follows:

- *What is?* -- Explores current reality
- *What if?* -- Uses what one learns to envision multiple options for creating a new future
- *What wows?* -- Makes some choices about where to focus first
- *What works?* -- Takes one into the real world to interact with actual users through small experiments.

While going through the process, managers can use various tools for different purposes including visualization, journey mapping, value chain analysis, mind mapping, brainstorming, concept development assumption testing, rapid prototyping, customer co-creation, and learning launch.

Essentially speaking, Design Thinking is considered a way to do the research that generates deep insights, translate these insights into new ideas, and get these ideas in front of people who will react to them and act with us to make them real (Liedtka, King and Bennett, 2013), all of which is the very foundation of disciplined creativity which leads to innovation with relevance. Furthermore, the circular nature of the Design Thinking process offers a built-in mechanism for continuous learning and innovation.

Considering the effectiveness of Design Thinking in fostering innovative problem solving, the Design Thinking method was adopted as a pedagogical approach to teaching the graduate course on Innovative Brand Management. The course was developed with the goals to equip MBA students with a Design Thinking toolkit and help them utilize tools and processes of Design Thinking in the context of innovative brand management. In addition, several aspects of Design Thinking seem especially appropriate for use in marketing courses.

Marketing is a business discipline that relies heavily on creativity and innovation from creating and branding products and services to promotion strategies. Marketing is also a discipline that is keying in on customer orientation and empathy. A disciplined creativity is a foundation for marketing relevance and a vital ingredient for successful marketing. One of the main teachings of Design Thinking is that *everyone* is a designer. What makes students creative is that they are not working in a vacuum; they are building off the Design Thinking principle of empathy with the user and engaging in the customer-oriented process of learning. Students are taught that it is absolutely imperative to see the world the way the customers do. The critical insight or ‘aha moment’—the hallmark of Design Thinking done well—makes for deep understanding of and communication with the user.

Other aspects of Design Thinking make it uniquely effective in teaching and developing empathy skills to marketing students. For instance, Design Thinking is a process that uses human-centered direct observation to develop products, services and strategies. Design Thinking relies on making empathetic connections with users, ideation, rapid prototyping, and testing and refinement—all in a continuum that may be more circular than linear.

The circular process encourages the students to engage with open-mindedness while assuring empathy. For example, one of the most powerful questions in Design Thinking is: “How Might we?” By nature, Design Thinking has the power of the question as part of the framing of the change. For example, it is not “how can we design a chair?” but “how can we suspend someone?” Reframing the problem leads to unexpected, new, impactful discoveries. Any product, service or strategy can be enhanced or completely upgraded using Design Thinking. It is believed that by teaching Design Thinking, we may not only equip students with a powerful skill set for changing the world but also inspire them to become better students, team members and professionals.

COURSE AND LEARNING EXPERIENCE

The Course

The course, Design Thinking and Innovative Branding, was developed to provide a basic foundation of the principles of Design Thinking and to teach students how those principles can create innovative brands. This 10-week

course wove Design Thinking and Branding together. Branding consisted of learning by key segments in branding: Identity vs. Image vs. Reputation; Leader vs. Challenger; The Value Proposition; Differentiation; Positioning; and Naming. Design Thinking elements worked through the six steps that include Empathy, Define, Ideate, Prototype, Test, and Refine. A number of student learning expectations were identified as follows:

The Course Learning Outcomes

Upon completion of this course, students were expected to:

- Apply Design Thinking empathetic skills to view target audiences in new ways
- Use the power of coaching to better understand audiences in developing powerful stories
- Apply Design Thinking techniques for team ideation and winnowing of potential ideas
- Build working prototypes for testing and refinement
- Work in a team format to achieve a greater success than working alone
- Understand Design Thinking's unique contribution to branding
- Come away with a skill set they can bring to their workplace

Over the course of the quarter, the instructor encouraged students to think from a customer-centric point of view. Also, developing a product was not enough; this class was about developing a product that would solve very specific problems. Throughout the entire process, students learned three very important rules of design thinking: 1) fail often and fail early, 2) do not be married to the outcome and 3) always keep the user in mind. Students were given opportunities at every class to learn these rules through hands-on activities, tasks, and projects to build their Design Thinking toolbox and utilize techniques learned in the classroom. Each class had a different activity designed to equip students with a different Design Thinking tool.

Tasks and Projects

Tasks, projects and activities were designed to equip students with Design Thinking tools and hone students' skills. A couple of examples of tasks and projects used in the course include the Marshmallow Project for rapid prototyping and the Donor Project for ideation and testing. For the Marshmallow Project, students were given spaghetti noodles, tape, string, and a marshmallow to build a free-standing structure that would put the marshmallow at the top. The purpose of this challenge was not only to foster collaboration, innovation, and creativity but to also give students their first taste of how rapid prototyping is extremely useful in product development.

For the midterm Donor Project, students were told there was a (faux) donor giving an undisclosed amount of money to the university. These funds were to be used to serve students' interests and attract students to the university. Groups were instructed to move through the process of interviewing and use the variety of tools out of their design thinking toolbox in order to develop a concept that was truly "born out of student thinking" and "designed for students". Specifically, students were instructed to present an ideation on concepts, initial "working" branding, a profile of the target audience, how he/she would use the concept, the critical insight that makes this project stand out, how this could be used to attract other University students, and what kinds of testing and refinement needed to further the idea.

Course Prop Materials

This course used prop materials that replicate on a small scale, the Stanford d.School approach to Design Thinking including white boards, posters, stickies, and many low-cost materials to help students "think with their hands" for prototyping. The low-cost aspect of prototyping materials is essential to that process as the essence of Design Thinking is to fail fast and fail often. In addition to hands-on projects, the course also used texts including a case study approach of Design Thinking in the real world (e.g., IBM, 3M, Toyota, Intuit, SAP, etc.). These comprised written homework assignments between classes and became part of class discussion.

Impact of the Course

With the course still ongoing, a preliminary informal assessment was made through direct questioning to students regarding how well the course helped them achieve the aforementioned course learning objectives. Students were asked to indicate how well they felt that the course helped them achieve the goals on a five point scale where 1 being "not at all helpful" and 5, "very helpful." Table 1 presents the summary of their responses. Eighty percent of the class students responded.

Table 1: Summary of Ratings on the Course Learning Outcomes

Course Learning Objectives	Students	Instructor
Apply DT empathetic skills	4.9	4
Use the power of coaching/story telling	4.6	3
Apply DT for team ideation and winnowing of ideas	4.6	5
Build working prototypes for testing/refinement	4.9	5
Work in teams/collaboration	5	5
Understand DT's contribution to branding	4.9	5

As shown in the table, students perceived that the course helped them achieve all of the learning objectives with high marks. The instructor's assessment was similar to those of students in most of the learning objectives with an exception of the course's ability to help students "use the power of coaching to better understand their audiences in developing powerful stories." This was due to the time limitation felt by the instructor.

In addition, students were also asked to list three most valuable takeaways or lessons learned from the course. Responses confirmed that the course was effective in developing attitudes of 'Open-Mindedness and Flexibility,' 'Empathy and Customer Orientation,' and helped them appreciate 'Design Thinking as an innovative problem solving approach in real-life' and 'the importance of collaboration in creative thinking.' Students were especially appreciative of their learning on the value of collaboration, indicating that the course experience changed their way of thinking about 'collaboration'. Students valued their overall class learning experiences to the extent to further suggest that a course on Design Thinking should be made available to and required of all MBA students. They felt that taking the Design Thinking course, early in their MBA career if possible, would be extremely valuable in a way that they could be more effective in team building and collaboration efforts throughout the MBA program. Students also praised the usefulness of the skills, process, and tools they gained by underlining the impact of applying Design Thinking approach in their workplace. One of the students thanked the instructor and the Chair for the job offer he received because of his experience with the Design Thinking approach.

The course instructor notes that the results of the Donor Project and the Naming Ideation activity were astounding. Both the instructor and students were astonished to find out how creative they truly were in ideation sessions. For example, in the naming exercise, students came up with over 600 names on four white boards in a short time. For the Donor Project, students were impressed by the wildly different though well thought-out solutions they came up with to address similar problems within the university. Students also found that the most exciting part of this project was developing a product of personal relevance that could truly benefit student life on campus, whereby reinforcing the power of empathy in bringing out relevant innovation. Of the notable recommendations from the course include the development of Design Thinking experience for all MBA students early in their MBA career, an MBA lounge to facilitate networking among MBA students, and a Design Thinking studio to spread and promote the learning experience at the university level.

Lessons Learned

Several key success factors should be noted for the future Design Thinking course to be successful. They are listed as follows:

- *Small class*: The class size must be relatively small so that each student gets enough time to go through each process with the instructor as in-depth as possible.
- *Classroom with flexible settings*: The facility/environment must be open to accommodate a variety of activities that teaches students through experiential learning in order to conduct proper ideation. Design Thinking is a hands-on, get dirty, mix-it-up kind of activity that is not well suited to a static classroom filled with desk/chairs.
- *Design Lab*, if possible: A prototyping room including more serious tools (i.e., hammers, saws, wood etc.) would also be beneficial.
- *Prop material support*: A full array of low-cost prototyping materials is also needed from sticky notes to pipe-cleaners to a variety of tapes and glues.
- *Instructional resource*: Most importantly, the instructor must be the exact right fit for the class. The instructor must believe in the material and have experience to pass on to students. Students noted that

anecdotal references from the instructor have the potential to make the material even more relevant and applicable to students' academic and professional careers.

- *Time requirement:* In addition, one should not underestimate the time requirement of the Design Thinking approach. Design Thinking relies on having listening and empathetic skills to evoke story in the user. Design Thinking must yield insights based on observed behavior, interviewing, prototype review with users and testing. Enough time should be allowed to help students acquire, develop, and master the skills.

CONCLUSION

Design Thinking was adopted in the graduate level marketing elective, on 'Innovative Branding', course in the belief that it is a pedagogical method that enables teaching a set of innovation skills such as empathy, flexibility, collaborative learning, and creativity. The course experience indicates that Design Thinking effectively prepares students with a toolbox that offers a myriad of ways to equip students with techniques to make relevant change through their MBA career and their professional lives. This toolbox provides students with techniques in expanding their creative thinking, critical thinking, and problem solving skills while developing solutions that serve the greater good and their clients' needs. Additionally, students believe that the Design Thinking tools and techniques truly teach them how to make a customer centric product through teamwork and collaborative creativity. The Design Thinking toolbox equips students with the knowledge of how to collaborate while also giving them a purpose set toward customer satisfaction.

As mentioned before, students scored the highest on the course learning outcome, 'Work in Teams/Collaboration.' It is interesting to note that Tim Brown (2015) in his recent article underscored the importance of community collaboration. He affirmed that by adding the realism of the relevant community to the project, one can create the system of community collaboration, which is a powerful basis for innovative solution. The idea of community collaboration can be specially valuable in a number of ways: it generates better understanding of users as users are involved in it; offers relevant place to prototype ideas; and provides built-in motivation to implement the ideas. The course experience echoes the importance and the power of community collaboration. In fact, students indicated that one of the most exciting part of the course experience was developing a product of personal relevance that could truly benefit student life on campus. Of their notable recommendations include Design Thinking experience for all MBA (e.g., core course), an MBA lounge, and a Design Thinking Studio.

A couple of these suggestions were viewed relevant, feasible, and beneficial to both students and the College and adopted by the College for implementation going forward. In response to the students' suggestions on the potential value of the course experience to all MBA students, the College developed a full-day Design Thinking workshop and began offering to all interested MBA students in Fall 2014. In addition, an MBA lounge, "The B.Spot", recommended by one of the groups in the course (for their Donor Project) has also been adopted by the College. The College's MBA lounge is in the built and is expected to open in Spring 2015. As noted above, this demonstrates the effectiveness of Design Thinking approach in helping students develop the skills and realize the power of community collaboration in an impactful way, producing innovative solutions that are relevant to the community.

Reflecting on the course experience of students and the instructor, the Design Thinking approach proves to be effective in teaching business students a number of important innovation skills such as empathy, open-mindedness, creative problem solving, experimentation, communication, and collaboration. In addition, by incorporating realism with community collaboration projects, Design Thinking can instill the lasting impact of confidence and process know-how while engaging students in hands-on, real-life, problem-solving projects. Going forward, being encouraged by the positive pedagogical impact, the Design Thinking approach has been adopted in a senior level undergraduate marketing elective course, expanded to MBA workshop, and continuing as an MBA elective course.

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Bridging the Gap: An Applied Example of the Need to Integrate a Business Curriculum

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ABSTRACT

Recent literature suggests that business schools need to do more to integrate their curricula, particularly in light of the fact that students are exposed to certain important concepts in more than one course, often from multiple business disciplines. Confusion can arise in students when they hear differing and sometimes conflicting approaches to a single topic. This paper describes an approach to mitigate confusion and enhance comprehension of topics that cross interdisciplinary lines.

Keywords: integrated curriculum, faculty development

INTRODUCTION

There exists a growing body of literature that suggests that the most efficient and effective way to present a business curriculum to this generation of students and in this current business environment is to integrate business concepts as much as possible, shying away from the historical “silo” approach found in many business programs (Athanvale, et al 2010 and Lawrence 2012). Unfortunately, this type of integration is inherently difficult for many reasons. For example, new AACSB requirements, such as writing and ethics, have already strained departmental and college resources. Similarly, professionals are asking for more extensive coverage of basic topics within business disciplines, straining syllabi and course schedules and limiting the amount of time that can be spent addressing integration and the perspective of other business disciplines. In addition, faculty training has become increasingly more focused within disciplines. As faculty members focus on their own disciplines to complete research requirements and improve their teaching, they often lose focus of the broader business perspective necessary to provide an integrated experience for students. Because of these challenges, many programs have either neglected integration or relegated it to one final capstone class, leaving students with the impression that either integration across disciplines is not important or it is not difficult to achieve.

As business educators, we need to provide our students a more accurate understanding of what business integration is and how all of the different disciplines and areas of a business work together to create value and achieve success. While it might not be possible to fully address this issue without redesigning our curricula across the business school, there are methods that individual faculty members can use to incorporate integration into their current classes. One simple method is for faculty to spend time discussing discipline-related differences in perspective and how to integrate them when addressing specific business issues.

For example, when determining whether or not to begin a new advertising campaign, the marketing perspective pushes for the extra costs in order to generate additional sales, while the accounting perspective pushes to eliminate or reduce those costs in order to generate a better profit margin on existing sales. Another example would be determining whether or not to invest in a new set of equipment. In this case, the focus of operations is to find the most effective way to meet demand and other production targets, while the focus of finance is to find the most effective way to find (and later repay) funding for various projects. In theory, these different perspectives work together to push a business towards success, each department or process helping to provide checks and balances to the other departments while finding efficiencies that will save money and improve the bottom line. By incorporating these differences into our classes and discussing, even briefly, how the different points of view can be reconciled, we begin to provide students with the tools to effectively integrate business knowledge and perspectives. This paper attempts to address this issue by providing examples of interdisciplinary conflicts and how instructors can address them in class.

In the next section, we will discuss some of the extant research on the importance of integration within the business curriculum. In the following section, we will provide examples that illustrate the problem and potential solutions.

Finally, we will offer suggestions for how similar problems can be resolved when professors from different disciplines are covering topics in their respective courses that would benefit from multiple perspectives.

THE IMPORTANCE OF INTEGRATION

Although it is more difficult and time consuming to coordinate and implement than a traditional silo-style approach, an integrated curriculum has been shown to provide several important benefits to students. First, an integrated curriculum allows students to develop a broader, more in-depth understanding of academic material, a level of understanding that allows them to readily apply what they have learned to “real-world” situations (Althavale, et al, 2010). Second, an integrated curriculum allows students to make more meaningful connections between subject areas, which in turn increases both the relevance and the retention of important topics (Contardi, et al. 2000). Third, an integrated curriculum is believed to allow students to develop other skills and “professional competencies” beyond rote memorization or learning facts (Bedford Report, 1986).

Despite the difficulties in creating an integrated curriculum, these recognized benefits have become too important to ignore, especially with the constant pressure to help our students succeed as they leave the academic setting and enter the workforce. For many administrators, it is this desire to help students prepare for their future careers that forms the primary motivation for pushing the integrated curriculum (see Athavale, et al. 2010). Yet despite the observed benefits and the desire to provide them to our students, most business schools and individual faculty struggle with *how* to integrate, and a great deal of literature has attempted to address this issue.

With such impressive benefits shown to result from integration, perhaps it is natural that the literature deal primarily with comprehensive plans for integrating programs and curricula. For example, Lawrence (2012) reports a model of curriculum integration through an executive MBA program and Messina (2010) stresses the good that can come from the integration of marketing, supply chain, and operations management. Fully integrating a business curriculum can take many forms and incorporate several processes. Berry (2009) presents several pedagogical methods for redesigning undergraduate curricula by breaking down silos by discipline and determining common themes among particular courses. Badua (2015) even argues that certain liberal arts topics be integrated into the business curriculum, suggesting that both the STEM (science, technology, engineering, and math) and ROOT (rhetoric, orthography, ontology, and teleology) disciplines are imperative to give students a broader understanding of the connections between these foundational concepts and business ideas and methods.

Unfortunately, a full integration, such as those recommended by these papers, is inherently difficult. Not only are there logistical issues in the creation and the assessment of the programs, but there are also political issues involved in passing the curricular changes and competence issues in finding or retraining faculty members to teach multi-discipline classes or lead comprehensive discussions (see, for example, Thompson & Purdy 2009).

In addition, with the economic difficulties of recent years, most programs face funding shortages for existing programs, leaving little or no funding for to meet the demands of developing new programs. A recent report released by the Center on Budget and Policy Priorities revealed that, adjusted for inflation, all but three states are spending less per higher education student in the 2014-2015 academic year than they were at the start of the recession in 2008 (Mitchell & Leachman 2015). Thirty-one states have cut funding by more than 20%. In response to these funding cuts many institutions of higher education have increased tuition and cut spending. Among the areas where spending has been cut are faculty positions and course offerings. If we cannot afford to teach the classes we currently offer, how can we add integrated courses?

However, is it essential that we convert our entire programs to a fully integrated model? Perhaps the benefits, or many of the benefits, could be accomplished through partial or within class integrations, integrations that can be done by individual faculty members in their own courses or between one or two faculty members working together. Leaby & Wentzel (2012), for example, suggest that important links can be made by comparing management accounting and managerial finance, even without adding the other business disciplines. Similarly, Carpenter and Agrawal (2008) found that information technology can be successfully infused within individual classes across an entire business core curriculum. Based on our own experiences, we believe that these smaller integrations are not only useful to starting the integration process, but essential in getting faculty members ready for the more comprehensive integration styles that seem to be coming.

EXAMPLES OF DIFFERENCES BETWEEN DISCIPLINES

Primary example

We were introduced to this idea of partial integration through two important experiences we had with our students. The first experience occurred in the Spring semester of 2014. One of the authors was walking through an example of capital budgeting techniques in an Intermediate Financial Management course. The textbook problem required students to compute an internal rate of return (IRR) for a proposed capital asset purchase:

Your firm is contemplating the purchase of a new \$730,000 computer-based ordering system. The system has a five-year life and will be worth \$75,000 at the end of that time. You will save \$280,000 before taxes per year in ordering process costs and you will be able to reduce working capital by \$95,000 (this is a one-time reduction). If the tax rate is 35%, what is the IRR for this project? – *Chapter 8, Problem 6 from Ross, Westerfield, Jaffe, and Jordan's Corporate Finance: Core Principles and Applications, 3rd Edition (2011).*

In this case, there are two different answers to the problem: one following finance methods and another following accounting methods. After the professor walked through the finance method, some of the students challenged his answer based upon the accounting methods they had learned in the other author's class. The two perspectives to which the students had been exposed - and which was the source of their confusion - are explained below.

The finance perspective

The finance perspective to this problem focuses on maximizing shareholder value. Capital budgeting is crucial to maximizing value since all long-term growth and profit goals track back to successful capital projects, i.e. investing in projects that have a positive Net Present Value (NPV) and, thus, an Internal Rate of Return (IRR) that exceeds the cost of the capital used to fund the project. In other words, the finance goal is to ensure that the project will add value to the firm and its owners.

The common method for solving this type of problem is to assess the project's IRR to determine if it is high enough to warrant the proposed investment.¹ Under this method, the first step is to determine all the relevant cash flows. For this problem, the initial outlay, the incremental after-tax annual cash inflows for the 5-year life of the machine, and the terminal cash flow at the end of year 5 are the relevant cash flows for making the IRR calculation

The initial outlay for the project is \$635,000, the \$730,000 purchase price less the \$95,000 of net working capital savings. The incremental after-tax cash inflows for years 1-5 are \$233,100. This calculation requires several pieces. The project will lead to cost savings of \$280,000 each year, less taxes of \$98,000. In addition, the new investment will lead to an additional tax savings of \$51,100 from depreciating the new asset each year (\$730,000 divided by 5, times 35%). The terminal cash flow at the end of Year 5 is a loss of \$46,250, an increase of \$48,750 (net of the 35% tax rate) from the sale of the machine less \$95,000 of increased net working capital required at the end of the investment period. These cash flows are summarized in Table 1. Please note that the terminal cash flow has been added into the Year 5 values.

After calculating the annual cash flows of the project, the next step is to determine the internal rate of return (IRR) of the proposed investment. The internal rate of return is the discount rate that equates the present value of a project's expected future cash flows to the initial amount invested. In other words, the IRR is the discount rate that elicits a Net Present Value of zero and is defined as the "compound annual rate of return that the firm will earn if it invests in the project and receives the given cash flows" (Gitman, 2009, p. 369). Based on the cash flow values presented in Table 1, the IRR for the project is 23.16%.

¹ While the use of IRR has declined somewhat since the 1970s, Besley & Brigham (2013) report that in the last decade 77% of surveyed firms "always" or "almost always" used IRR as an evaluation technique.

Table 1: Incremental After-tax Cash Flows Using the Finance Method*Panel A: IRR Summary*

Year	Using the Finance Method
0	(\$635,000)
1	\$233,100
2	\$233,100
3	\$233,100
4	\$233,100
5	\$186,850

Panel B: Calculations of Annual Cash Flow Values

<u>Year 0</u>		<u>Year 5</u>	
Cash Outflow for equipment	(\$730,000)	Sale of Equipment	\$75,000
Working Capital Savings	\$95,000	Taxes on Sale of Equipment (35%)	(\$26,250)
Net Cash Flow for Year 0	(\$635,000)	Net Proceeds from Sale	\$48,750
<u>Years 1-4</u>		Annual Operating Cash Flow	\$233,100
Annual Cost Savings	\$280,000	Net Proceeds from Sale	\$48,750
Taxes on Savings (35%)	(\$98,000)	Loss of Working Capital Savings	(\$95,000)
Net Cost Savings	\$182,000	Net Cash Flow for Year 5	\$186,850
Cost of Equipment	\$730,000		
Useful Life	5		
Annual Depreciation	\$146,000		
Tax Savings on Depr. (35%)	\$51,100		
Net Cost Savings	\$182,000		
Tax Savings on Depr.	\$51,100		
Net Cash Flows for Years 1-4	\$233,100		

This table summarizes the after-tax cash flows using the finance method. Panel A presents the IRR summary table. Panel B presents the calculations for each of the annual values in the summary table.

The accounting perspective

The financial accounting perspective to this problem focuses on accurate reporting of the decision to invest in the project for use by investors and other stakeholders in making decisions about the business. Accurate financial records that follow the principles of Generally Accepted Accounting Principles (GAAP) are not only crucial for communicating with stakeholders, but are also a legal requirement for publicly traded companies in the U.S. Due to the auditing process and the requirements of Sarbanes-Oxley, accounting professionals and the executive team must ensure that their records are materially correct before publishing their financial records and submitting them to the SEC. In other words, the accounting goal is to ensure accurate records rather than make an initial decision.

Because of this goal (and the associated legal requirements), the methods used in financial accounting, whether for actual reporting or when using the values for decision making purposes, must follow the rules and regulations set out in U.S. GAAP. In this case, the GAAP requirements would leave the net change in annual expenses the same (\$182,000, net of taxes) but would change the estimate of the tax savings from depreciation. More specifically, ASC 360-10-35-4 requires that the salvage value (\$75,000 in this example) be removed from calculation of depreciation expense. In this case, that would lead to anticipated tax savings of only \$45,850: (\$730,000 less the \$75,000 salvage value divided by 5 years, then multiplied by 35%.² Table 2 presents the annual cash flow values using the

² We have ignored the effects of deferred taxes in this example because most of the students in the class had not yet learned about deferred taxes and because the information provided in the problem was not sufficient to effectively consider the additional issues required to calculate the deferred tax effects.

accounting method. As before, the terminal cash flow has been included in the Year 5 values. Based on the cash flow values presented in Table 2, the IRR for the project is 22.03%.

The difference in IRR

Under the finance method, the IRR is 23.16%. Under the financial accounting method, the IRR is 22.03%. In both cases, as long as the firm's cost of capital used to fund the project is less than 22%, the project would be accepted. At the time of this class discussion, economic conditions were such that there were low interest rates available for funding capital projects, making this project seem attractive to most corporations regardless of the method used. Since the final decision is the same under both methods, most faculty (as well as most business professionals) would write off the difference as immaterial and move on to other topics without acknowledging that a difference even existed, which would have happened in this case if not for the question raised by two students.

However, even though the decision doesn't change, the difference in the input values used in calculating the IRR under the finance and accounting methods can cause significant confusion for students. Without the necessary background and training to understand the minor effects of the differences, students only see the different cash flow values and the different results. They are then left with three options. Option one, which we fear is the most common, is to shake their heads and ignore the implications of the difference. They stop thinking about why there might be differences between classes, write down the method they need for each class, memorize that method, and move on without even considering the different perspectives.

Option two, which we believe to be the next most common, is for each student to value the method in their chosen major and discount the value of the alternative method. Under this option, students lose respect for the other discipline. They believe that the difference is caused by a weakness in logic or approach, not a difference in perspective. This belief can lead them to discount the information presented in classes outside their major and cause them to discount the value of learning alternative methods. We believe that this is one of the reasons finance majors taking an accounting class find it "useless" for their future careers and accounting majors taking a finance class find it "wrong" and not worth their time. Ultimately, this prejudice can leak into their professional careers and limit their ability to see the big picture of a business and fully integrate information from various disciplines, even after years of experience.

Option three, which in our experience is the least likely, is for students to challenge the professor in order to reconcile the difference. Under this option, students will either explain the alternative method and ask for clarification or they will accuse the professor of being wrong. While it is typically more difficult for us as faculty members to handle an accusation-style challenge (since our natural inclination is to "put down" the perceived threat to our classroom authority), both styles can be difficult to handle if the faculty member is not familiar with the alternative methods or with the perspective of other business disciplines. On the flip side, this final option at least provides students with an opportunity to see the differences in perspective and to discuss how these differences can be resolved when making a business decision.

How we handled this specific issue

Since this example was demonstrated in an Intermediate Financial Management class, the instructor initially discussed only the finance perspective for solving the problem. Upon finishing the calculations, two of the students in the class politely informed him that he had done it wrong. According to what they had learned in their Intermediate Financial Accounting course (in which they were concurrently enrolled), the IRR for the project should have been about 22%. Undaunted, but intrigued, the professor asked the students to demonstrate how they would do the problem based on what they had learned in their accounting course. The students readily agreed and explained the alternative method and demonstrated their answer.

Rather than argue with the students in class, the professor wrote down their "correct" way of doing the problem and said he would look into the matter and get back to them in the next class period. He then went on with the rest of the lecture and other in-class examples. After class, he approached the other author, the professor who taught these students intermediate financial accounting, to get his perspective on the problem and on the students' proposed solution.

Table 2: Incremental After-tax Cash Flows Using the Accounting Method

Panel A: Summary of Yearly Estimated Cash Flows for IRR Calculations

Year	Using the Accounting Method
0	(\$635,000)
1	\$227,850
2	\$227,850
3	\$227,850
4	\$227,850
5	\$181,600

Panel B: Calculations of Annual Cash Flow Values

	<u>Year 0</u>		<u>Year 5</u>
Cash Outflow for equipment	(\$730,000)	Sale of Equipment	\$75,000
Working Capital Savings	\$95,000	Taxes on Sale of Equipment (35%)	(\$26,250)
Net Cash Flow for Year 0	(\$635,000)	Net Proceeds from Sale	\$48,750
	<u>Years 1-4</u>	Annual Operating Cash Flow	\$227,850
Annual Cost Savings	\$280,000	Net Proceeds from Sale	\$48,750
Taxes on Savings (35%)	(\$98,000)	Loss of Working Capital Savings	(\$95,000)
Net Cost Savings	\$182,000	Net Cash Flow for Year 5	\$181,600
Cost of Equipment	\$730,000		
Less: Estimated Salvage Value	(\$75,000)		
Depreciation Base	\$655,000		
Useful Life	\$5		
Annual Depreciation	\$131,000		
Tax Savings on Depr. (35%)	\$45,850		
Net Cost Savings	\$182,000		
Tax Savings on Depr.	\$45,850		
Net Cash Flows for Years 1-4	\$227,850		

This table summarizes the after-tax cash flows using the accounting method. Panel A presents the IRR summary table. Panel B presents the calculations for each of the annual values in the summary table.

After discussing the alternative perspectives, the finance professor discussed the two different methods at the beginning of the next class session, explaining to the class why there was a discrepancy and how to address it in practice. At the end of the discussion, the students seemed to fully understand and accept the explanation.

This method of addressing the discrepancy provided three important benefits to both the finance professor and the students. First, the professor was spared the potentially unpleasant task of arguing with the students in class about their method to prove that he was “right”. These conversations rarely go well for either the professor or the students. Arguments tend to make the professor uncomfortable and defensive and the students angry and confused. Second, because neither party became frustrated and the professor stayed open to the students’ concern, he provided a more open learning environment for the remainder of the session and the semester. Third, taking time to solve the issue opened students’ minds to the different perspectives in business and how they can, and should, be addressed. It also avoided the possibility of giving different majors the attitude that “accounting (finance) does things all wrong and we will have to fight to make them see the *right* answer.”

In addition to these primary benefits, the professor’s choice to talk with a colleague and address the matter in a future class allowed him to determine if the students’ work was accurate and not just a mistake on their part instead of a true difference in perspective. If it had been a mistake, he could have worked with the students during office hours or through email to correct their mistake rather than making them feel uncomfortable in front of the entire class.

The second example

The second example that introduced this idea of partial integration to us occurred when one the authors was teaching Intermediate Financial Accounting, a course required for both accounting and finance majors at our university, and the other was teaching a senior level capstone class in finance. This case-based capstone class was taught primarily through student presentations of the cases assigned, with the instructor teaching through his questions and comments, both to the group presenting and to the other members of the class, rather than through lectures. Since all of the finance majors were required to take intermediate financial accounting prior to or at the same time as the capstone class, the finance professor expected his students to demonstrate a relatively high level of proficiency in financial statement analysis as part of their case presentations and other classroom discussions. Unfortunately, after a few sessions it became apparent that his students were using little, if any, of what they had learned in intermediate accounting in preparing for his class.

Becoming frustrated with the students' obvious lack of effort in this area, he approached the other author and explained his frustration. After a few minutes of discussion, he asked his colleague to attend the next group presentation in the hopes that having the accounting instructor attend would push his students to actually use their accounting knowledge.

On the day of the student presentation, both authors attended class. When the accounting instructor walked in, the group getting ready to present became noticeably upset. Despite their requests to the contrary, he took a seat next to their professor and listened to the full presentation, taking careful note of the accounting points being made, or not made, as appropriate. At the end of the presentation, the finance professor opened up the session for questions and comments, as he had done for every presentation made up to that point in the semester. The class was silent, all eyes on their guest. Again the professor called for questions, warning the students that if they didn't ask he and the accounting instructor would. Silence. With a shrug, the professor turned to his friend and said, "Go ahead."

Since the accounting portion of the presentation had indeed been lacking, then next few minutes were uncomfortable for all of the students, the presenting group trying to make up for their lack of preparation and the other students realizing what was going to be expected in future presentations. We're happy to report that all of the students survived the experience, but it was a subdued group that left the classroom that day.

Once again, the method used to address the problem provided important benefits to both of the professors and to the students. First, student work improved, especially in the accounting aspects of their case preparations, throughout the remainder of the semester. The natural reaction to the uncomfortable session provided all of the encouragement necessary. Students actually reinforced the lesson on their own as those who were presenting in upcoming sessions would often stop the accounting instructor in the halls and ask if he was coming on the day of their presentation. His answer was always the same: a slight smile and "Maybe." With that encouragement, student performance remained high the rest of the semester, even though he never attended again.

Second, the finance professor was saved from the necessity of lecturing the class or taking off a significant number of points to encourage them to incorporate accounting into their analysis. Rather than fight with the students, he was able to focus on helping them to develop a greater understanding of both disciplines and how they relate in financial analysis. Once again his chosen method for dealing with the problem led to a more open atmosphere for classroom discussion and learning, at least once the class realized that the accounting professor was not going to show up on a given day.

Third, the accounting professor was drawn into the discussions of the finance class. Occasionally students would stop by his office with questions about the accounting aspects of their cases and projects, allowing him to provide some mentoring and additional instruction in accounting. More important for him was the change in his own perspective. Thinking about the finance implications as well as accounting implications of decision making allowed him to change some of the projects and homework in his classes to make them more relevant to finance majors, instead of keeping the focus solely on accounting. It also allowed him to shift the focus on some of his pedagogical research to incorporate both accounting and finance aspects.

Other examples

Along with these two primary examples that changed our attitudes about integration, we have had several other experiences that have reinforced our belief that small, course by course integration can be an effective method for helping students to gain the benefits already observed in the integration literature. One of these is the differences in perspective between accounting and finance in the present value calculations for bonds. In this case, the calculations themselves are exactly the same. In both accounting and finance we determine the present value of the interest payments over the life of the bond, then the present value of the lump sum payment that will be repaid at the end of the bond's life (the stated value). The sum of these two values serves as the present value of the bond. While the calculations are the same, what each discipline *does* with those calculations is very different. In finance, the focus is on whether or not the bond should be issued or purchased. Is this a good decision for the company? How will this affect future cash flows? etc. In accounting, the focus is on reporting a decision that has already been made. How will this bond show up in the income statement? What will need to be shown in the balance sheet? What adjustments for the amortization of the premium or discount will need to be addressed in the statement of cash flows? As with the example of calculating IRR, faculty members teaching their own classes will typically focus solely on the use within their own disciplines, leaving students in an accounting class wondering why the bond was purchased in the first place with such a horrible rate of interest and students in a finance class wondering how investors are likely to react to the decision to retire a bond when it will actually reduce EPS. However, after our successful experiences described above, we have been able to add discussion to our classes about the difference in perspective. The conversations take only a few minutes, but the nods from the students, as well as their increased interest in the process, are anecdotal evidence that it is time well spent.

Other examples from specific questions we have been asked by students or seen in student answers on exams also highlight these differences and the confusions that result when no effort is made to integrate topics on the course level. One of these areas is SWOT (Strengths, Weaknesses, Opportunities, and Threats) vs. TOWS (Threats, Opportunities, Weaknesses, and Strengths) analysis, both of which are commonly used in several business disciplines. In both of these methods a firm's internal strengths and weaknesses are identified along with external opportunities and threats and then appropriately "paired" to develop strategies for improvement. The two methods are similar in both format and results, but there is one important difference. While SWOT begins with the internal aspects of the firm (S and W), TOWS emphasizes the external environment (T and O) first. Proponents of TOWS claim that it is more important to understand the environment within which the firm will be operating than getting bogged down with discussions of what the firm does best and what it does not do well. Students who are exposed to both techniques are often confused about which one is "best" or "correct," when in reality they are two different versions of the same analysis method.

Another example is students hearing in an economics course that the most important goal of a publicly-traded company is to maximize its profits. In an accounting course these same students will learn about the importance of maximizing earnings per share. Then the students take a finance class and are told that the overriding goal is to maximize the price of stock or the wealth of the company's owners. Which is "correct"? None of them are correct. They are all versions of the same ultimate goal, just couched in the language and perspective of the different disciplines, although none of their instructors typically mention that. It is no wonder that students can become confused and frustrated!

SUGGESTIONS FOR RESOLVING THESE DIFFERENCES

Many other examples could be provided to illustrate the challenges facing students because of our silo approach to teaching business concepts and methods. The end result, however, is the same. We are ultimately missing simple opportunities to clarify and integrate our curriculum, causing confusion and questions for our students that could easily be resolved if we would but take the time. For example, it would take only a few minutes to redo the SWOT or TOWS matrix to show that they are similar, then point out when a different perspective might be appropriate and how each version should ultimately lead to similar plans for development. Why not take the time to develop ways we can help our students deal with these issues in each of our classes? One important reason is that the incentives for faculty focus on research productivity instead of on teaching or curriculum development (Navarro, 2008). Perhaps if administrators included integration issues in their raise, tenure, and promotion decisions, more faculty members would spend time developing the skills and pedagogy needed to fully address this issue.

While economic pressures and competition might eventually force business schools to change the incentive structure and develop fully integrated curricula, we do not have to wait for these extensive changes. Based on our experiences and small successes, we propose two ways that we, as individual faculty members, can address these issues immediately instead of waiting for our colleges and schools to change.

Developing our own understanding

Perhaps the best way to resolve these issues is to develop our own understanding of the various business disciplines and how they interact, so that we can easily talk about them in class or office hours. Ideally, each of us would have the time to do a faculty internship or some consulting work that would push us to see how the different elements of a business interrelate first hand. Unfortunately, with limited budgets and constraints on faculty time, such opportunities are few and far between. As an alternative, there are three means by which we can develop our understanding by working with our colleagues while we teach.

First, we can talk with our colleagues when specific questions come up in class. Like the first example in this paper, students' questions can often highlight the issues that are confusing between disciplines. While most of us tell students not "to worry about that" for the particular class we are teaching at the moment, we could instead tell students that we'll get back to them, then seek out a colleague and discuss the matter. Doing so will not only allow us to address the particular questions asked in our next class session, but will also allow us to better understand the relationship for future reference. We can then incorporate these relationships into our future lectures. For example, one of the authors typically pauses for a few moments after discussing the method of calculating bond values to discuss the differences between finance and accounting. Doing so always brings a lot of nods from students and a better degree of understanding, not to mention reducing the number of challenges regarding the appropriateness of a certain rate of interest or questions of why a company would choose to make the decisions implied in the class examples.

Second, we can discuss current events and economic news with our colleagues in the hallway or "around the water cooler." These discussions can even happen between classes as one instructor cleans up to leave the classroom and another gets set up to start her lecture. Another option is to discuss with each other the challenges we are having in our classes, since doing so might highlight not only pedagogical tips and techniques that might help resolve those challenges but also begin discussions about the topics themselves. Learning how our colleagues approach similar topics in their different courses should open our eyes to ways that we can more effectively inter-relate our topics.

Third, we can sit in on other instructors' classes, not for assessment purposes but to provide perspective in their class or to gain perspective for ourselves. As in our second example, this method can not only improve faculty understanding, but also improve student performance. If nothing else, it can emphasize to students in our own majors that these other topics are important for them to understand. Seeing an accounting professor in a marketing lecture, just to listen to the content, would suggest to all of the accounting majors in the class that this is an important topic for them to understand. Careful choice of which days to attend could provide even greater emphasis to those specific topics that will be important to our students or that are most difficult for them to understand.

Finding common ground

Another way to resolve these issues is to identify methods that do not cause this type of confusion. In other words, if we get questions or concerns from students about one method, we can switch to another method that is common between the two disciplines. In our example of determining IRR, the only difference between the accounting and finance methods was the assumption about straight-line depreciation. However, the question could be answered using the MACRS depreciation method required by the IRS. This method is generally required by law for capital budgeting purposes and is always required by law for tax reporting purposes, which means that it provides the actual amount that the company will save. Table 3 presents the annual cash flows for our example problem using MACRS as the depreciation method. Under this method, the IRR is 23.32%, consistent with the shortcut in the finance method and still only slightly different than the U.S. GAAP method.

Table 3: Incremental After-tax Cash Flows Using the MACRS Tables

Year	Using the MACRS Method
0	(\$635,000)
1	\$233,100
2	\$263,760
3	\$231,056
4	\$211,434
5	\$165,184

This table summarizes the after-tax cash flows using the MACRS method. Under this method, the cash outflow for the purchase of the equipment, the change in working capital in Years 0 and 5, the after-tax savings from the reduction in costs, and the cash inflow from the sale of the machine are all the same as those presented in the first two tables. However, the cash saved each year from the depreciation tax break is 35% times the value from the IRS' MACRS tables.

Since this method is consistent between both finance and accounting, it could be used in either class without raising the concerns that the initial discussion raised. While finding a consistent method will reduce student confusion, this method of handling their questions is really a second-best solution. It has the benefits of making things easier for the students and faculty now, but the consequence of potentially leaving students without all of the necessary tools that they will need as they enter the business world.

CONCLUSION

Experiences like ours are not unique or isolated incidents. They are a common result of a silo approach to teaching the concepts of an integrated business world. As instructors, we have a choice. We can wait until political pressures, annual incentives, and financial constraints are sufficiently resolved to allow a full integration across business disciplines, or we can seek opportunities to effectively handle these questions right now in our own classes, using partial integration to give our current students many of the benefits that will eventually result from a full integration. By making the choice to integrate within our own classes, at least to the extent that time and student interest allows, we can not only benefit our students, but also improve our research, our teaching, and our own perspectives of business. As a result, we will be able and willing to fully integrate when the opportunity arises.

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Using The Fast Fashion Supply Chain To Teach Sustainability

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ABSTRACT

How can the undergraduate business student be initiated into the topic of sustainability in a manner that is both conceptually sophisticated and pedagogically engaging? This paper proposes one approach that draws upon the model of the “triple bottom line” while simultaneously focusing on an industry—fast fashion—with which the typical undergraduate student is often familiar. The approach involves introducing students to the fast fashion supply chain and its key stages—suppliers, retailers, customers, and disposal—and analyzing the social and environmental impacts at each stage.

Keywords: sustainability, supply chains, fast fashion, triple bottom line

INTRODUCTION

There is a surprising degree of controversy and disagreement surrounding the term “sustainability”. In introducing the idea of sustainability to freshmen business students for the first time, how can we convey its essence in a simple, direct and clear manner, while balancing conceptual sophistication with concrete, vivid, real-world examples that resonate with students and their experience? This paper proposes one approach that draws upon the conceptual model of the “triple bottom line” while simultaneously focusing on an industry—fast fashion—with which the typical undergraduate student is often intimately familiar.

The approach in this paper responds, in part, to a recent critique made by Sharma and Hart (2014). According to this critique, as accrediting bodies such as AACSB have mandated content coverage in areas such as sustainability, ethics, and corporate social responsibility, higher education institutions have responded in a less-than-adequate fashion. Most commonly, business schools have used what Sharma and Hart call “the saddle bags approach” by which, for every new requirement, a stand-alone course is added to the curriculum to satisfy the requirement. This leaves the typical business curriculum of today substantially unchanged from the way it has been since the 1960s: organized fundamentally by function, while new, emergent and urgent areas are piled on like “saddle bags” to the core business curriculum (see also Doh and Tashman, 2014). Sharma and Hart argue that it would instead be more effective to integrate issues such as sustainability into individual courses of the business curriculum. Doing so counteracts a major problem with the “saddle bags approach,” which is that it makes a strong and hierarchical distinction between the supposedly “real content” of the business-functional curriculum and “additional topics” such as sustainability. This paper provides a counter-example to the “saddle bags” strategy by integrating discussion of sustainability into the context of supply chain management.

SUSTAINABILITY AND FAST FASHION

Sustainability involves meeting “the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland Commission Report, 1987). The intersection between this formulation of sustainability and the impact of business practices can be found in the idea of the “triple bottom line” (Elkington, 1997; Savitz and Weber, 2006). In this model, the impact of business practices is examined and analyzed in terms of three categories: People, Profit and Planet. In other words, business practices have social, economic and environmental impacts. The goal of sustainable practices is to achieve a balance of these three impacts with the ultimate, overarching goal of maintaining the long-term well-being of humankind (People), the success of commerce (Profit), and the flourishing of the Earth (Planet).

In the typical business course, the “economic bottom line” receives significantly more attention than the “social bottom line” or the “environmental bottom line”. The topic of sustainability opens the eyes of the typical undergraduate business student to the fact that the economic well-being of a firm often comes at the expense of negative social and environmental impacts. These impacts can be described, catalogued and understood with particular immediacy and cultural interest in the fast fashion industry.

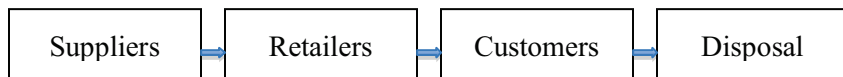
The fast fashion industry proves particularly suitable for engaging the undergraduate business student in an introductory discussion of sustainability because of the extent to which social media artifacts (like “haul videos” on YouTube) and popular, journalistic accounts of the fast fashion phenomenon can be deployed as classroom resources to spark the student’s interest.

This paper describes how fast fashion is used in an “Introduction to Management” course to illustrate the essential principles of sustainability by studying the supply chain of this industry, and its harmful social and environmental impacts. The fast fashion industry is part of a newly emerging global “discount economy” whose principal aim is to reduce prices to the customer. This objective is the primary driver for all decisions made within the fast fashion supply chain.

We begin the course by introducing the Brundtland Commission definition of sustainability and the concept of the triple bottom line, and then we establish the background context of the industry within which discussions of sustainability will take place. About 15 years ago, the fashion industry experienced a radical transformation. The price of most clothing began to drop dramatically, driven by a new business strategy first initiated by firms like Gap, later spreading broadly to other large retailers such as Zara, H&M, Forever 21 and Target. A main consequence of this strategy has been the move away from the traditional approach of “seasonal selling,” in which new designs and garments were introduced only periodically, typically between two to four times each year (Cline, 2013). Instead, fashion retailers now launch “trends” in a rapid and frequent fashion. For example, at Zara, a new garment can move from idea to design to manufacturing to store shelves in as little as two weeks—thus the term “fast fashion”. Further, new garments stay on the shelves for only a few weeks, after which the designs are retired. A key motivation for the move away from seasonal selling and towards frequent introduction of trends is the desire to bring the customer into the store more often, thus fueling more frequent buying (Ferdows, Lewis & Machuca, 2004). This is the background against which the course takes up and addresses various issues around sustainability.

In the course, after setting up the above industrial context, we introduce the basic idea of the supply chain in order to provide a framework within which the practices of the fast fashion industry can be studied. Figure 1 shows a flow chart of the typical fast fashion supply chain.

Figure 1: The fast fashion supply chain.



We travel through the supply chain, highlighting the sustainability implications and impacts at each stage, while simultaneously locating the roots of these impacts in specific, concrete practices of the fast fashion supply chain. Because the motor of the fast fashion supply chain is the stimulation of a high volume of sales and consumption, we begin our class discussion of the supply chain with customers, moving up the chain to suppliers, and finally concluding with disposal.

CUSTOMERS

One key reason for employing the fast fashion supply chain to introduce the basic concepts of sustainability is the fact that prior to taking an introductory business management class, the typical undergraduate student is already familiar with the products of this industry. Fashion is part of popular culture, but it is also, since the advent of fast fashion, within economic reach of the vast majority of the American public. The average person visits the clothing store more frequently—and purchases a greater amount of clothing per year—than ever before. Cline (2103) reports that the average American buys 64 items of clothing each year, and yet, paradoxically, spends a smaller percentage of her income on clothing (3%) than at any time in the past. This phenomenon has been made possible by the precipitous drop in garment prices in the last two decades thanks to the rise of the fast fashion model (Cox, 2007).

In class, after sketching the background context of the industry, we begin discussion of the fast fashion supply chain at the “customer stage”. To immediately engage students with the sustainability implications of this stage, we watch a “haul video” on YouTube. “Haul videos” are made and posted by fast fashion shoppers, frequently teenagers; they

form a rapidly growing category of YouTube videos. Haulers film themselves as they display, one by one, the contents of a recent “shopping haul”. They often do not “model” the clothes, but instead, hold up the clothes to the camera one at a time, point out certain features, and provide details such as list price and sale price for each item. The objective is to not only to show off the most recent acquisitions but also tell the viewer of the bargains the hauler was able to obtain. Haul videos are a direct consequence of the budget fashion era, and are a good way to get students to reflect upon the culture of over-consumption spurred by fast fashion.

One common theme of haul videos is mention of the ephemerality of clothes. Given the low price of most items showcased by haulers, it is normal for them to remark upon the disposability of clothes. An item could be worn once and thrown away—and it would still be “worth it”. This culture of disposable clothing is at odds with older, traditional attitudes towards clothes, which valued quality, durability, and longevity, especially because the size of one’s wardrobe was necessarily small.

The sustainability impacts of fast fashion at the customer stage belong to two categories: environmental and social. The key environmental impacts stem from over-consumption. Not only are consumers buying—and discarding—clothes in larger volumes than ever before, these clothes are frequently made in developing countries, necessitating long distances of travel to get to US store shelves. Further, because environmental regulations are frequently more lax in those countries than in the US, the environmental impacts are likely greater than they might have been if the clothes had been domestically manufactured.

The social impact of fast fashion has to do with the widespread and radical transformation it has wrought in the way society now views clothes. Rather than regarding clothes as valuable, durable assets that we put to use daily but also take care of and preserve for the long term, the industry has managed to persuade consumers to view them as low-cost disposable items that we purchase casually and discard frequently.

RETAILERS

The move to fast fashion has been made possible largely by the retailer strategy of outsourcing. In 1960, over 95% of the garments purchased in the US were manufactured domestically. In 1990, that number was 50%; today it stands at 2% (Cline, 2013). Retailers have dramatically slashed production costs—and thus, prices—through the practice of outsourcing. This deep drop in price has permitted them to sell large volumes of clothing. While per-unit profit margins for the retailer are lower than they were 20 years ago, their overall profits are high thanks to dramatic growth in sales volume.

Retailer profitability has also been bolstered by a concerted effort to shore up brand identity. Rather than selling clothing manufactured by a variety of companies—as department stores such as JC Penney or Sears might have done in the past—fast fashion retailers of today sell mostly store brands. This gives them a greater measure of control over the supply chain and also gives them more control in shaping their brand identity.

Outsourcing allows retailers to focus their efforts on design and marketing, which stimulate demand and spur (over)consumption. For example, discount stores of the past were usually unattractive in appearance, with uninviting floors, poor lighting and unorganized shelves, but today’s fast fashion retail spaces, which are among the discount stores of today, are designed to look sleek, well-lit, modern and “hip” (Cline, 2013). This renders the spaces seductive and inviting, drawing customers into the stores more frequently.

An important social impact of retailers choosing not to source their products domestically in the last two decades has been a sharp decline in the US garment industry. As part of a larger context that includes the implementation of the North American Free Trade Agreement (NAFTA), this has resulted in the loss of thousands of good, well-paying domestic jobs, which have been traded for poorly paid and relatively unsafe jobs in nations such as Bangladesh, China and Vietnam.

Finally, it is important to remind students of a key reality: supply chains are sites of power struggle. When supply chain management first burst on the scene over two decades ago, its objective was to unite multiple parties under a single aim: that of serving and satisfying the end customer. This meant that all members of the chain were partners working together towards a common objective. However, it is important for students to learn early on that these multiple parties, or partners, do not wield equal power. Especially since the 1980s, we have seen an explosion in the

growth—and thus, the power—of the large-volume retailer (Dauvergne and Lister, 2011; Barnes and Lea-Greenwood, 2006). This has meant that retailers in the fast fashion industry, such as Walmart, Target, H&M and Gap, are able to squeeze suppliers to lower prices and speed up deliveries, measures that often compel or tempt suppliers to cut corners, hire unreliable or unethical subcontractors, and hide their operations behind a veil of secrecy. There are harmful social and environmental impacts to these actions. Since the retailer is always the one with the most power and influence in the fast fashion supply chain, it also has the greatest ability to make positive changes in the supply chain.

SUPPLIERS

Fast fashion lends itself more readily to outsourcing than other industries because of a key reason: a large proportion of the process comprises the activity of sewing, which is heavily labor-intensive. This means that there is an enormous incentive for sourcing from countries with the lowest wages. To compare: the average US garment worker earns 4 times as much as a Chinese worker, 11 times as much as a Dominican worker, and 38 times as much as a Bangladeshi worker (Cline, 2013).

But the sustainability impact of this practice is not confined to developing countries alone. Students are frequently surprised to learn that garment sweatshops were prevalent in American industry in the past. This juncture provides a good opportunity for us to narrate the story of the Triangle Fire, one of the deadliest disasters in New York City until September 11, 2001. This horrific event makes a profound impression on students. It also provides a good point of transition to an account of the Rana Plaza fire in Bangladesh in April 2012, a workplace disaster whose death toll numbered nearly ten times that of the Triangle Fire. It is also an ideal point to use journalistic coverage with images and videos in class, modes of delivery that seize the students' attention.

Outsourcing in developing countries has resulted in an unusually long and secretive supply chain because of the presence of multiple levels of subcontractors. In the aftermath of the Rana Plaza fire in Bangladesh, it took fast fashion retailers such as H&M and Forever 21 several days to ascertain if any of their clothes were being manufactured in the building that had collapsed. The poor traceability at the supplier stage of the supply chain is not a coincidence: retailer firms have often been content to remain in the dark about subcontractors in order to not have to address the sustainability implications of small, makeshift, unsafe workplaces in firms deep down beneath first-tier suppliers in the chain. It is possible that industrial disasters such as the ones we have recently witnessed in Bangladesh will force retailers to make their supply chains more transparent, thus contributing in a positive fashion to sustainability concerns at this stage of the supply chain.

DISPOSAL

We begin this section in class by informing students that, according to the Environmental Protection Agency, the USA annually throws away 12.7 million tons, or 68 pounds of textiles per person (Hawley, 2008). However, this number does not alarm my students as much as it should. There is a common misperception that after clothes are disposed of, they are acquired and put to use by the needy. Instead, studies show that most discarded clothes are not reused, and instead become trash. Cline (2013) calls this the “clothing deficit myth”: that every donated garment finds its way to an unfortunate, indigent person who gives it a second life. This turns out to be not true, because a mere 20% of clothes donated to charities get sold through thrift stores. The vast majority are instead destined for the postconsumer waste stream.

A common misperception holds that when clothes are discarded and become trash, they do not pose a big threat to the environment because, unlike plastic, for example, they are recyclable or biodegradable. This is much less true today than it was in the past. Clothes made until a few decades ago were composed mostly of organic fibers, which are biodegradable, but today's garments frequently contain artificial, synthetic fibers such as polyester, rayon and viscose, which are difficult to recycle and also take decades to decompose in landfills. Finally, the environmental resources consumed in the process of manufacturing the large number of clothes that end up in the landfill are considerable, and, thus, constitute another source of waste.

Students are often surprised to learn about these realities, and because this new knowledge frequently disturbs their preconceptions about an industry whose products they purchase regularly, it is the teacher's hope that it might result in making a strong impression, thus producing an effective learning experience.

Figure 2: Key social and environmental impacts at each stage of the supply chain

	Social Impact	Environmental Impact
Suppliers	Low wages and poor working conditions in countries with weak labor protections	Pollution from chemicals and dyes in the garment production process, exacerbated by location of factories in countries with weak environmental laws
Retailers	Precipitous decline in the US apparel industry, with over 600,000 jobs lost in the last two decades	Carbon footprint of apparel transportation from suppliers in the Global South to retailers in the Global North
Customers	Radical transformation in the way society now views most clothes, i.e. as disposable	Large volumes of purchase of cheap clothing translates to high environmental footprint on a per-consumer basis
Disposal	The “clothing deficit myth”: most donated clothes do not reach the indigent people who need them	The escalating use of non-biodegradable textile fabrics (“Frankenfabrics”)

STUDENT RESPONSES

This approach of using fast fashion to introduce fundamental ideas of sustainability was deployed in an “Introduction to Management” course populated mostly by undergraduate freshmen and sophomores. Two sections of the course were offered in successive semesters. Both sections were surveyed to obtain qualitative comments and feedback on course content. 19 students responded in the first section, and 22 in the second.

The comments relating to fast fashion and sustainability were overwhelmingly positive. Some typical student comments included: “Really enjoyed the sustainability discussions; the impact of those discussions will follow me long past college.” “Sustainability was the most rewarding part of the class.” “The idea behind using the fast fashion industry to talk about sustainability was eye-opening.” “I found the incorporation of fast fashion and sustainability into the course to be interesting and in keeping with the Jesuit foundation of the college to educate the “whole person.””

The only negative comment received was the following one: “The sustainability material was alright; a bit left-leaning, but not aggressively so.” It was one of my fears that discussions about sustainability, especially grounded in a thoroughgoing social and environmental critique of the fast fashion industry, might ignite heated political, partisan debates in the classroom that might derail the discussions and dilute the effectiveness of the learning experience. Fortunately, my fears proved unfounded, and the students displayed both a curiosity and a receptivity to the sustainability-driven critique of fast fashion.

CONCLUSION

By following the fast fashion supply chain step by step and cataloguing its negative social and environmental impacts at each stage, students get a vivid sense of sustainability issues and concerns not just in theoretical, abstract terms but in a concrete fashion that lifts the veil on an industry they think they know well. The fact that students are usually significant consumers of fast fashion enhances the effectiveness of this approach because it enlightens students about an industry to which they already feel a strong connection.

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Manuscript Guidelines, Submission and Review Process

TOPIC AREAS (BUT NOT LIMITED TO THESE):

- Course design – current courses, new courses, new trends in course topics
- Course management – successful policies for attendance, homework, academic honesty ...
- Class material
 - o Description and use of new cases or material
 - o Lecture notes, particularly new and emerging topics not covered effectively in textbooks
 - o 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 providing following these instructions.

This style guide represents style guidelines in effect for future issues.

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: 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.
- Avoid footnotes unless absolutely necessary.
- Page numbering bottom centered.
- No section breaks in the paper.
- No color, including url's. Format to black. No color in tables or figures. Use shading if necessary.
- All pages must be portrait orientation. Tables and figures in landscape orientations should be reformatted into portrait orientation.
- All paragraphs should be justified left and right, single spaced, in 10 point Times font, no indent on first line, 1 line between each heading and paragraph.
- One line between each paragraph.

Titles, Authors, and Headings:

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

Tables, Figures and Graphs:

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

References:

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

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

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

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

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

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

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

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

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

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

PREVIOUS RESEARCH

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

RESEARCH DESIGN

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

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

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

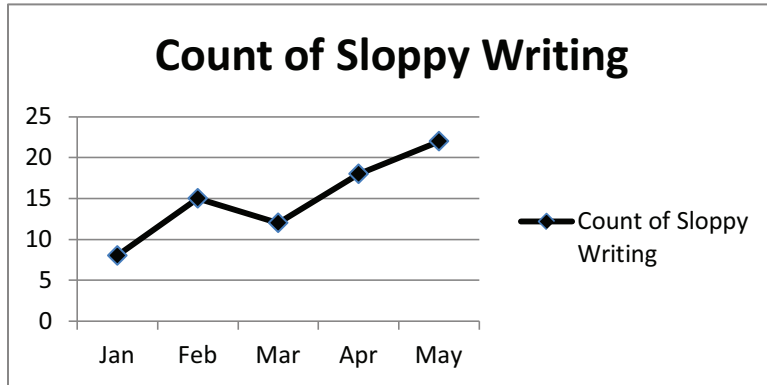
Data Analysis(Sub-heading, bold but not all caps, 10 point, aligned left, bold, no line after to paragraph)

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

DISCUSSION

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

Figure 1: Sloppy Writing During the Semester



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

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

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

*-Indicates significance at the 5% level)

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

CONCLUSIONS

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

Future research will try to determine causality.

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

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

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

Peter J. Billington, Ph.D., is a professor of operations management at Colorado State University – Pueblo. His research interests span from lean six sigma to 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.

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