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ONLINE VERSUS FACE-TO-FACE: DOES DELIVERY METHOD MATTER FOR UNDERGRADUATE BUSINESS SCHOOL LEARNING?

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ABSTRACT

Considering the significant growth in online and distance learning, the question arises as to how this different delivery method can affect student learning. Specifically, this study compares the student learning outcomes on both a “basic” and “complex” assignment given in the same course, but using two different delivery methods of traditional face-to-face and online, across five undergraduate business courses taught at Elon University during the summer 2007 session. This study includes data from over 120 students and, after controlling for other factors known to affect student performance, the results indicate that delivery method has no significant difference in student learning.

JEL: A22

KEYWORDS: Learning Outcomes, Online, Face-to-face, Undergraduate, Business

INTRODUCTION

The breadth of online coursework has grown substantially over the past decade. According to Allen and Seaman (2011) who collaborated with the College Board to survey over 2,500 colleges and universities, 65 percent of all reporting institutions indicated that online learning was a critical piece of their long-term strategy. Further, Allen and Seaman (2011) report that over 6.1 million students took at least one online course during the fall 2010 term, an increase of approximately ten percent over the previous year, and 31 percent of all higher education students now take at least one of their courses online. The recent introduction of ‘massive open online courses’ (MOOCs) offers additional evidence that online learning is growing, massively. Due to their low delivery costs, MOOCs can have exceptionally high enrollments. As Herman (2012) describes, in 2008, George Siemens and Stephen Downes administered an online course for 25 paying students at the University of Manitoba; however an additional 2,300 students enrolled in the course at no charge. According to Hyman (2012), Peter Norvig, Google’s director of research, and Sebastian Thrun, a Google vice president, offered one of the most successful MOOCs, “Introduction to Artificial Intelligence”, in the fall of 2011. They enrolled over 160,000 students and more than 23,000 completed the course.

The reasons for the growth in online learning are likely multifaceted; however, it can arguably be explained in terms of student demand for online coursework and the cost-saving incentives institutions have to meet this demand. As Howell et al. (2003) discusses, more and more students require flexibility in their programs to meet work or family needs and thus ‘shop’ for courses and programs that meet their schedules and circumstances; and online learning can be designed such that the marginal cost of enrolling and instructing one more student is essentially zero.

If the online delivery method is here to stay, how does student learning and performance vary relative to the traditional brick and mortar classrooms? While Allen and Seaman (2011) report that the majority of academic leaders perceive that the learning outcomes achieved through these two delivery methods are the same, this study empirically tests this hypothesis. Specifically, this study compares the student

learning outcomes on both a “basic” and a “complex” assignment given in the same course, but with the two different delivery methods of traditional face-to-face and online, across five undergraduate business courses taught at Elon University during the summer 2007 session.

Note that the design of our study was influenced by two previous studies that have found statistically significant evidence that online students learn less. First of all, student learning outcomes on ‘basic’ and ‘complex’ assignments are considered as Brown and Liedholm (2002) have found that student performance can differ on these two types on assignments given the course delivery method. Secondly, using performance on the Test of Understanding College Economics (TUCE) as their measure of learning, Coates et al. (2004) found that “students in the online sections correctly answered about two fewer questions on TUCE than students in the face-to-face sections.” However, this result may not be due to deficient online instruction and learning, but rather an outcome of self-selection. According to the Coates et al. (2004) paper, all three colleges that provided the student data for their study have noteworthy part-time student enrollments (from a low of 26% to a high of 37%) and their online and face-to-face samples have several statistically significant differences. Specifically, the online sample includes older students with less financial aid and greater work commitments relative to the face-to-face students. Thus, it is possible that the results presented in Coates et al. (2004) have more to do with the characteristics of the online students than the nature of online instruction and learning. In contrast, the Elon undergraduates included in this study are full-time, traditional students, and the online courses all occurred during the summer; eliminating possible problems related to self-section.

The remainder of the document is organized as follows. The next section provides an overview of the experiment conducted in this analysis in addition to a discussion of the relevant literature and findings. The Data and Methodology summarizes the data and provides a table with the descriptive statistics. The following section, Results and Discussion, presents the analysis results and discusses the empirical findings with an emphasis on the hypothesis test results. Finally, the section Concluding Comments provides a brief summary of the study and discusses avenues for future research in addition to the limitations of the study.

OVERVIEW OF EXPERIMENT AND LITERATURE REVIEW

As noted above, most academic leaders would not expect to see learning differences arise due to the course delivery method. Likewise, there is evidence that the majority of students who participated in our 2007 study believe that the two delivery methods are essentially equivalent. Specifically, each student enrolled in one of the five online courses was asked to take an online, anonymous survey at the conclusion of the course. The survey included two questions regarding student perceptions of the difficulty of online courses. The first question asked,

Q1: *“Prior to taking this online course, did you perceive online courses to be easier than traditional, ‘face to face’ courses?”*

The second question asked,

Q2: *“Having taken an online course was your perception correct? In other words, if you perceived online courses to be easier / harder than traditional courses, do you still have the same opinion?”*

A total of 89 students across the five online courses responded to both questions, representing a near 100 percent response rate of all students who completed one of the online courses. Table 1 contains the survey results. Of the four possible responses, two (“Yes” to Q1, “Yes” to Q2 and “No” to Q1, “No” to Q2) could be interpreted as a claim that online is easier than face-to-face. The remaining two responses (“Yes” to Q1, “No” to Q2 and “No” to Q1, “Yes” to Q2) could be interpreted as a claim that online and

face-to-face are equally difficult. As summarized in Table 1, the overwhelming majority (75.6%) perceive no difference between delivery methods in terms of difficulty.

Table 1: Student Perceptions of Difficulty

	% responding
“Yes” to Q1 and “Yes” to Q2	7
“No” to Q1 and “No” to Q2	17.4
Online is easier than face-to-face.	24.4
“Yes” to Q1 and “No” to Q2	32.6
“No” to Q1 and “Yes” to Q2	43
Online and face to face are equally difficult.	75.6

Table 1 Summarizes two of the survey questions regarding student perceptions of the difficulty of online versus face-to-face courses.

Of course, beliefs are not always accurate and, while student perceptions about online course delivery are important, it is arguably more important to understand if the learning outcomes are dependent on the course delivery method. Our primary research question therefore is:

Do college students, on average, learn more with a traditional face-to-face delivery method?

There are arguably other meaningful differences in both the students’ and instructors’ experiences and attitudes toward these two different delivery methods; however, if the answer to the above question is “no;” then, as far as student learning is concerned, there is no downside to the online delivery method. We can have it all; lower costs and convenience, plus learning. If the answer is “yes;” then there is a nasty trade-off. We can only have the lower costs and convenience if we give up some student learning. Nonetheless, in order to answer the question above with some degree of confidence, we need two pieces of information: valid data on learning and a model of learning to account for other factors that can significantly affect learning besides the delivery method. A discussion of each follows.

The Teaching Experiment

In the summer session of 2007, instructors of the same course, but different delivery methods, were paired and asked to prepare a ‘basic’ assignment and a ‘complex’ assignment. These assignments became part of their courses, as well as the source for this study’s dependent variables. For example, the instructor teaching the business statistics online was paired with the instructor teaching business statistics in the traditional classroom setting. The basic questions were designed to test students’ knowledge of definitions, formulas, or concepts, and their ability to make the appropriate calculations. The complex application assignments were to be more open-ended and asked students to apply the course material beyond straightforward mechanics. An example of a ‘basic’ question for the business statistics course is to ask the students to calculate and interpret a correlation coefficient. Alternatively, an assignment that required students to prepare a research paper in which they collected their own data, estimated a multiple regression, and interpreted their results on a topic of their choosing, would be an example of a complex application problem for the same course.

Each student’s grade on the ‘basic’ questions was simply collected and used to measure (on a standard 100 point scale) learning of the basics. Recording the relevant data for the complex application was a bit more involved. The faculty who were paired (teaching the same course, but using different delivery methods), were first asked to calibrate their grading and then grade the complex assignments from both of the courses. Given the nature of writing, there is inherent subjectivity when grading complex assignments (Nelson and Hayes 1988), even with a prior calibration. Thus, following rule was imposed: the complex grades could vary by less than 10 points on a 100-point scale. The final step was to take the average of the two complex grades, which served as the learning measure on the complex assignment.

Table 2 provides the layout of the experiment. Five different courses, ACC = Principles of Financial Accounting, OPS = Operations & Supply Chain Management, STAT = Business Statistics, ECON = Principles of Economics and BLaw = Business Law; and eight different teachers: T1, T2, T3, T4, T5, T6, T7, and T8, were part of the project. As shown in Table 2, teacher T4 taught OPS with both delivery methods, as did T3 with BLaw. While the teacher and delivery method differed in the other three courses (ACC, STAT, and ECON), all participating teachers were tenured, full-time Elon professors with similar amounts of teaching experience.

Table 2: Courses, Students, and Faculty Data Summary

Online		T1	T2	T3	T4	T5	T6	T7	T8	Number of Students Enrolled
Face to Face	ACC		T2							12
	OPS				T4	T5				27
	STAT								T8	13
	ECON							T7		10
	BLaw			T3						17
	ACC	T1								7
	OPS				T4					9
	STAT							T7		10
	ECON						T6			8
	BLaw			T3						8
Total										121

Table 2 summarizes the courses, faculty instructors, and the number of students enrolled in each course. This data is used in the analyses.

The Learning Model: Carroll

The learning model used in this analysis originates from Carroll’s (1963, 1989) seminal work. According to Carroll, learning is a function of time. While students vary in the amount of time they *need* in order to achieve a certain degree of learning, any student can achieve that certain degree of learning by *spending* the necessary amount of time. Carroll equates the *degree of learning (D of L)* achieved by a student to a comparison of the time that student actually *spent* on learning against the time that student *needed* to have spent. Equation (1) captures the idea.

$$D\ of\ L = f(\text{Time Spent} / \text{Time Needed}) \tag{1}$$

When the ratio: *(Time Spent / Time Needed)* is large, a high degree of learning occurs; when this ratio is small, not much learning occurs.

In the Carroll Model there are two factors driving *Time Spent*, described in (2):

$$\text{Time Spent} = g_1(\text{Motivation (+), Opportunity to Learn (+)}) \tag{2}$$

If the student is highly motivated to learn, then the student spends more time on the learning task; hence, the plus sign after “*Motivation*” in (2). The other factor determining *Time Spent* is *Opportunity to Learn*. Think of this factor as the time that has been explicitly set aside for the learning assignment. For example, if the teacher devotes three hours of class time to learning task A, and one hour of class time to learning task B, then the *Opportunity to Learn* associated with task A is greater than the *Opportunity to Learn* associated with task B. Following Carroll, we assume that if more time is invested by a teacher on a task, more time will be spent by the student on that task, perhaps in the form of homework.

To measure a student’s academic motivation (*Motivation*), student cumulative GPAs are used and the following assumption is made:

$$(\text{Student } x \text{ is more motivated than Student } y) \text{ if, and only if (the GPA of } x > \text{ the GPA of } y) \tag{3}$$

There are challenges to this assumption. Chiefly, it is possible for an unmotivated student with a high IQ to generate higher grades than a highly motivated student with a lower IQ; after all an extensive body of literature has found a significant positive correlation between IQ scores and measures of school learning (Jensen (1998) and Geary (2005)). Given that Frey and Detterman (2004) find that SAT scores are essentially a measure of IQ, the counterexample to (3) is unlikely to occur in our sample as Elon’s business students have a relatively narrow SAT range. The other *Time Spent* variable in Carroll’s model is the *Opportunity to Learn*. To capture this factor, we consider the number of courses each student was enrolled in during this assessment period. The majority of the students enrolled in either one or two courses during the summer session, but a small percentage enrolled in three courses. While obviously not a perfect measure for *Opportunity to Learn*, the more courses a student takes within a period of time, the less time and opportunity they have for learning a given subject. Thus, we assume:

(Student x has *more opportunity to learn* than Student y) if, and only if, (x takes fewer courses in this summer session than y) (4)

We now consider the other side of the Carroll Model; there are two factors driving *Time Needed*, as described in equation (5).

$Time\ Needed = g_2(Aptitude\ (-),\ Quality\ of\ Instruction\ (-))$ (5)

If the student has a high aptitude for learning then the student can learn quickly, as indicated by the first negative sign in (5). In Carroll’s model, aptitude refers to general intelligence, which can be measured by an IQ test. As mentioned above, there is plenty of evidence that this kind of aptitude positively affects student learning, all else constant. Letting MSAT stand for the math sub-score of a student’s SAT results, the following assumption is made (recall the Frey and Detterman (2004) findings):

(Student x has *more aptitude* than Student y) if, and only if (the MSAT of $x >$ the MSAT of x) (6)

The SAT math score is used in place of the total SAT score as it is more highly correlated with the assignment scores and has historically been a stronger predictor of overall student performance in the business school at Elon. Finally, the last factor is *Quality of Instruction*. Carroll’s model assumes that instruction can vary in effectiveness such that better instruction implies less time needed; hence, the second negative sign in (5). Variation in instruction can be due to the effectiveness of teachers. Some teachers may be so effective that, all else held constant, the teacher can reduce the amount of time that the student needs to attain the requisite learning outcome. Perhaps certain methods of teaching are particularly effective; or perhaps the effectiveness of instruction varies by the subject matter being taught. For example, Sweller et al. (1998) have argued that due to its high “element interactivity,” mathematics is more difficult to learn than a subject like history where ideas are often only weakly connected. Following Sweller et al. (1998), we assume:

(Student x has *better instruction* than Student y) if (y is in STAT and x is in one of the other four courses: ACC, OPS, ECON, or BLaw) (7)

In (7) we assume that teachers are equally effective across the courses, but that there is a greater instructional challenge in teaching the statistics course. Further, (7) also allows for the possibility that one delivery method is better than the other is.

Two More Predictions

When Carroll created his model of school learning, the theoretical construct of *working memory* (WM) was relatively unknown; however WM is now considered a central idea in cognitive science and WM

could be viewed as the organizing construct for a more complete understanding of the *Time Needed*-side of Carroll’s model. Consider then the following brief explanation of WM and *working memory capacity* (WMC). Our WM connects our sensory input to our Long-Term Memory (LTM), where our school knowledge is stored. If our WM is unable to process that input, it will not be added to our LTM. Correspondingly, in order for information in our LTM to affect our behavior on test taking and paper writing, this information has to pass through our WM. If our WM is unable to process that information, our test taking and paper, writing will proceed without that information. Since WM is quite limited in its capacity to store information, and the stored information in WM decays quickly, WM is known as the “bottleneck” of human cognition. Evidence is accumulating that there are important differences between the WMs of individuals; some WMs can store more information, some WMs can store information longer, some can do both. As Conway et al. (2003) discuss, while WMC and general intelligence (IQ) are different concepts, they are highly related.

We predict that two key differences between the basic and complex grades created from our teaching experiment will come from the fact that each complex application involved a writing assignment that the students could complete through successive drafts. The first predicted difference between the grade-types is described as follows. Since these drafts are essentially problem-solving aids external to WM, the complex applications are less reliant on WMC, hence the complex grades will be less related to MSAT (since both WMC and MSAT are positively correlated with IQ, general intelligence). On the other hand, the basic applications are traditional questions that require some degree of memorization; making the basic grades dependent upon WMC and highly related to MSAT. The second predicted difference between the grade-types is related to student GPA. As Flower and Hayes (1981) discuss, given the way that papers are written, more drafts implies more reviewing, evaluating and revising and this process usually leads to a better final product. The willingness to produce more drafts is a sign of high motivation. Thus, we expect our proxy for motivation, GPA, to be strongly related to the complex grades. Since basic grades should be fundamentally connected to WMC, and we are unaware of any relationship between motivation and WMC, we will not be surprised by a weak relationship between GPA and basic grades, if MSAT has already been controlled for. In an effort to consolidate the information outlined in this section, Table 3 summarizes the essential discussion points.

Table 3: Summary of Empirical Model and Predictions

Proxies and Measures
D of L → *BG* and *CG*
Motivation → *GPA*
Opportunity to Learn → *Courses*
Aptitude → *MSAT*
Quality of Instruction → *STAT, ACC, BLaw, OPS, ECON*
Delivery Method (DM) → *Online and Face-to-Face Instruction*

Specifications
 $BG = \beta_0 + \beta_1 MSAT + \beta_2 GPA + \beta_3 Courses + \beta_4 DM + \beta_5 ACC + \beta_6 BLaw + \beta_7 OPS + \beta_8 Econ + \varepsilon$

$CG = \gamma_0 + \gamma_1 MSAT + \gamma_2 GPA + \gamma_3 Courses + \gamma_4 DM + \gamma_5 ACC + \gamma_6 BLaw + \gamma_7 OPS + \gamma_8 Econ + \varepsilon$

Predictions
 $\beta_1 > \gamma_1 > 0$
 $\gamma_2 > \beta_2 > 0$
 $\beta_3 < 0$ and $\gamma_3 < 0$
 $\beta_5 > 0, \beta_6 > 0, \beta_7 > 0, \beta_8 > 0$
 $\gamma_5 > 0, \gamma_6 > 0, \gamma_7 > 0, \gamma_8 > 0$

Research Question: What is the impact of the delivery method (DM) captured by β_4 and γ_4

Table 3 provides a summary of data measures, regression model, and predictions employed in the analysis.

DATA AND METHODOLOGY

To empirically test the primary research question if delivery method significantly affects student performance on learning outcomes, we estimate the two regression models summarized in Table 3. As a preliminary analysis, the descriptive statistics of the data used to estimate these two models are provided in Table 4. It should be noted that the sample standard deviation for the basic grades (both for the online and face-to-face subsamples) is relatively greater than the sample standard deviations for the complex grades and this will be discussed in detail below. Further, the students were given the basic assignments early in the semester and the complex assignment was due later in the semester. Some of the students did not complete the course, thus the sample size is slightly smaller for the complex versus the basic grades.

Table 4: Descriptive Statistics

Combined		Mean	Standard Deviation	N
	Basic Grade (BG)	82.8	19.3	121
	Complex Grade (CG)	83.3	12.7	112
	MSAT	589.3	67.8	121
	GPA	3.0	0.43	121
	Courses	1.4	0.51	121
Online	Basic Grade (BG)	83.9	18.1	79
	Complex Grade (CG)	83.4	13.2	73
	MSAT	595.9	64.8	79
	GPA	3.16	0.38	79
	Courses	1.4	0.52	79
Face to Face	Basic Grade (BG)	80.6	21.3	42
	Complex Grade (CG)	83.0	11.8	39
	MSAT	576.9	72.4	42
	GPA	2.78	0.43	42
	Courses	1.3	0.46	42

Table 4 provides a summary of the data and the descriptive statistics for the data used in the analysis discussed below.

The first regression model uses the student’s score on the basic assignment as the dependent variable and uses the proxies for Carroll’s aptitude (SAT math), motivation (cumulative GPA), opportunity to learn (number of courses enrolled), and quality of instruction (a dummy for online versus face to face that takes the value of one if the course is taught online.) as well as dummy variables to control for the course the student is taking (accounting, economics, etc.).

RESULTS AND DISCUSSION

The estimation results are presented in Tables 5 and 6. In regards to the estimated results for Model 1, the coefficient on *MSAT* is significant and positive, indicating the expected result that higher math SAT scores lead to higher scores on the basic assignment. Further, all of the coefficients on the dummy variables for which the student was enrolled, accounting, economics, etc., are significant, indicating that there are differences in grading or difficulty in the basic assignments across courses, as predicted by assumption (7). The coefficient on *GPA* is not significant; however as discussed, this is not an entirely unexpected result. Further, all of the variance inflation factors (VIFs) are less than 5.3, the cutoff for multicollinearity suggested by Hair et al. (1992), indicating that multicollinearity does not appear to be a problem in this analysis.

In reference to the primary question posed in this study, the coefficient on *DM* is not significant. This suggests that there is no significant difference in the student performance on basic application questions either in foundational undergraduate business courses that are delivered online or in traditional, face-to-face classrooms. The estimated regression results for Model 2 are presented in Table 6. While a more detailed discussion of the regression results follows, interestingly, the coefficient on *DM* remains

insignificant. Thus, student performance on both basic applications and complex assignments are found not to depend on the course delivery method.

Table 5: Estimation Results Model 1: Dependent Variable: *BG*

	Coefficient Estimate	Std Err	t Stat	p-value	VIF
<i>Intercept</i>	20.98	13.68	1.53	0.1280	0
<i>MSAT</i>	0.057***	0.021	2.68	0.0084	1.26
<i>GPA</i>	1.25	3.56	0.35	0.7265	1.47
<i>Courses</i>	2.59	2.63	0.98	0.8358	1.28
<i>DM</i>	-1.49	3.02	-0.50	0.6213	1.09
<i>ACC</i>	13.89***	4.51	3.08	0.0026	1.67
<i>BLaw</i>	38.60***	4.22	9.14	<0.0001	1.81
<i>OPS</i>	28.21***	3.92	7.18	<0.0001	2.00
<i>Econ</i>	23.59***	4.57	5.16	<0.0001	1.64

Adj. $R^2 = 0.4737$ F stat = 14.50***

Table 5 provides the estimation results for Model 1 with the dependent variable of 'Basic Grades' (*BG*). As shown above, the coefficient on Delivery Method (*DM*) is not statistically significant, indicating that online versus face-to-face does not affect student learning on basic assignments. $p < 0.10^*$; $**p < 0.05$; $***p < 0.01$

Table 6: Estimation Results Model 2: Dependent Variable: *CG*

	Coefficient Estimate	Std Err	t Stat	p-value	VIF
<i>Intercept</i>	58.63***	11.82	4.96	<0.0001	0
<i>MSAT</i>	0.0008	0.02	0.04	0.9672	1.36
<i>GPA</i>	7.31**	3.21	2.28	0.0240	1.60
<i>Courses</i>	1.08	2.30	0.47	0.6376	1.36
<i>DM</i>	-3.09	2.65	-1.17	0.2540	1.09
<i>ACC</i>	-0.75	3.80	-0.20	0.8443	1.66
<i>BLaw</i>	10.71***	3.57	3.00	0.0034	1.80
<i>OPS</i>	0.48	3.50	0.14	0.8900	1.82
<i>Econ</i>	0.007	3.86	0.001	0.9985	1.60

Adj. $R^2 = 0.1453$ F stat = 3.360***

Table 6 provides the estimation results for Model 1 with the dependent variable of 'Basic Grades' (*BG*). As shown above, the coefficient on Delivery Method (*DM*) is not statistically significant, indicating that online versus face-to-face does not affect student learning on basic assignments. $p < 0.10^*$; $**p < 0.05$; $***p < 0.01$

As shown in Table 5, the Adjusted R^2 for Model 1 is notably higher (0.4737) compared to the Adjusted R^2 for Model 2 (0.1453), giving Model 1 greater explanatory power. Considering that the independent variables are the same in the two regressions, the question arises as to why these variables explain a greater proportion of the variance in the basic grades compared to the complex grades. Recall the theoretical prediction that the complex assignments do not stress working memory capacity as much as basic assignments, suggesting that *MSAT* should be an insignificant predictor of complex grades. Thus, we are left with only one predictor of within course variation in complex grades, a proxy for academic motivation, the student's cumulative *GPA*. Further, since complex assignments are not as clearly defined or structured as the basic assignments, grading these assignments is more subjective. Although an effort was made to reduce the subjectivity of the complex grades by taking the average of two faculty members' grades for the same assignment, averaging must have reduced the total sum of squares by more than the reduction in the error sum of squares caused by our averaging. These changes will obviously lower the Adjusted R^2 for Model 2. Alternatively, working memory capacity is a much stronger determinant of success than motivation for basic assignments. Given that *MSAT* is a relatively clear signal of working

memory capacity, there will be less measurement error associated with Model 1, hence a higher Adjusted R^2 .

Consider one more difference between Model 1 and Model 2. The estimated coefficients on the courses (*ACC*, *OPS*, and *ECON*) are significant in Model 1, but are not significant in Model 2. While the estimated coefficient on *BLaw* is significant in both regressions, the t -stat is smaller in Model 2. To explore this result further, the sample variances for the basic and complex grades were compared across each of the courses. For example, the sample variance of the basic grades was compared to the sample variance of the complex grades for the *ACC* course and similar comparisons were made for the remaining four courses. Of the five courses considered, four of the sample variances of the basic grades were greater than the sample variances of the complex grades. Also, as shown in Table 4, the overall sample variance of the basic grades is greater than the overall sample variance of the complex grades. This indicates that there is generally less variability in the complex grades, both overall and by course. Given the algebra underlying OLS estimation, this will give less explanatory power to the course dummies in Model 2 relative to Model 1, thus increasing the likelihood that the coefficients on the course dummies will be insignificant, or at least less significant, in Model 2.

CONCLUDING COMMENTS

This study considers the potential for differences in student learning outcomes based on the delivery method (face-to-face or online). Our results indicate that delivery method does not significantly affect student-learning outcomes on either basic or complex assignments. These results contradict the conclusions found in the two studies mentioned in the introduction: Brown and Liedholm (2002) and Coates et al. (2004). We will end by using the Carroll Model to propose some hypotheses reconciling the conflicting evidence. We suspect that the online students in the Brown and Liedholm (2002) and the Coates et al. (2004) samples fared worse because of an insufficient amount of *Time Spent* compared to the corresponding face-to-face students.

In the Coates et al. (2004) sample, the online students were older and less likely to have financial aid, suggesting that they needed to work more than their fellow students did in the face-to-face sample. All else constant, this need could have reduced their *Time Spent* through the *Opportunity to Learn* factor. Now consider Brown and Liedholm (2002), they find that the students who enrolled in the online course performed significantly worse on the most complex questions on the examinations. We hypothesize that the cause of the deficient *Time Spent* in this case though is through the *Motivation* factor. Specifically, when outlining our theory, we introduced the idea of *Long-Term Memory* (LTM). LTM is the location of the stored knowledge we access when solving problems. Problem-solvers differ in their expertise; experts can solve complex problems in their field of expertise, novices cannot. Experts have this ability because their LTM has a structure quite different from a novice's LTM (Ericsson and Kintsch 1995). For an expert, the "right" information has been encoded into the "right" schemas; as a result, an expert can reliably retrieve what is relevant. This ability requires practice, time and effort, which requires high motivation in order to achieve expert status and be able to solve complex problems. In reference to Brown and Liedholm (2002), if this theory is correct, there should be indications that their online students were less motivated than their face-to-face students were, which is the case. As measured by better class attendance, Brown and Liedholm (2002) note that their face-to-face students did put more effort into the course. In addition, the Brown and Liedholm (2002) online students, when compared to the face-to-face students, have higher ACT scores, yet slightly lower GPAs. Given the relationship between standardized test scores and grades, the combination of high ACTs and low grades can signify lower academic motivation.

Brown and Liedholm (2002) conclude that their "results strongly suggest that the virtual course represents an inferior technology to the live sections" because "doing as well in an online course as in the live

alternative seems to require extra work or discipline beyond that demonstrated by our students, especially when it comes to learning the more difficult concepts.” Given our theoretical model and empirical findings, we disagree. Most of our students view online and face-to-face courses as equally difficult. Based on Table 4, there appears to be no difference in student motivation levels between the two delivery methods and the students in our online courses do as well on complex assignments as our face-to-face students.

It should be noted; however, that our study is not without its limitations. First, while the sample used in this analysis is not small, a larger sample size would provide results that are more robust. Further, as with all studies attempting to measure variables that are largely qualitative such as intrinsic student motivation, the proxies cannot be perfect measures and thus these results should be considered with this note of caution.

Finally, we conclude with avenues for future research in this area. Specifically, Marissa Mayer, the CEO of Yahoo, recently promoted the value of workplace interaction and communications by removing previous company policies that had allowed employees to telecommute. Many Yahoo employees expressed distress in the policy change as many stated the significant benefits of telecommuting; especially their increased productivity. While this study found no significant difference in student learning outcomes from the two different delivery methods, an avenue for future research would be to explore possible differences in other factors such as student and faculty relationships and the effectiveness and quality of communication and sharing of ideas. Such research could shed light on some of the more intangible and qualitative differences of teaching, learning, and working in the same physical location compared to online or telecommunication.

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LINKING THE SUBSTITUTION AND OUTPUT EFFECTS OF PRODUCTION TO PROFIT MAXIMIZATION IN THE INTERMEDIATE MICROECONOMICS COURSE

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ABSTRACT

In a recent article, Thaver (2013) makes the case for including in intermediate microeconomics textbooks analysis of the substitution and output effects of a firm's response to a change in the price of an input. In her analysis, Thaver assumes that the firm is constrained by a fixed budget for inputs, making the firm's substitution and output effects analytically identical to the consumer's substitution and income effects. Intermediate microeconomics textbooks typically do not assume a fixed budget for inputs when describing a firm's profit-maximizing behavior. This paper removes the assumption of a fixed budget for inputs and provides a non-calculus presentation of substitution and output effects suitable for the intermediate course. Without this assumption, the substitution and output effects of the change in the price of an input must work in the same direction regardless of whether an input is normal or inferior, and the firm's input demand curve, unlike a consumer's demand curve for a good, must slope downward.

JEL: A22, D11, D24

KEYWORDS: Substitution Effect, Output Effect, Isoquants, Consumer Theory, Production Theory, Input Demand

INTRODUCTION

In a recent article in this journal, Thaver (2013) makes the case for including in intermediate microeconomics textbooks and courses analysis of a firm's response to a change in the price of an input. In particular, she makes a case for introducing students to the substitution and output effects associated with an input price change in a way analogous to the substitution and income effects associated with a change in the price of a consumer good, emphasizing the similarities between the two. Just as a consumer's response to a change in the price of a good can be broken into a substitution effect and an income effect, a firm's response to an input price change can be broken into a substitution effect and an output effect. For the consumer, the substitution effect shows how he would change his purchases if his income were adjusted to leave him at his original level of well-being, and the income effect shows how he would change his purchases due to the adjustment in purchasing power at the new output prices. For the firm, the substitution effect shows how the firm would change its use of inputs if it were to continue producing the same amount of output, and the output effect shows how the firm adjusts its use of inputs when it chooses a new profit-maximizing output level.

Given the usual assumptions about production made in intermediate microeconomics courses (downward-sloping, convex-to-the-origin isoquants and profit-maximization), it can be shown that a firm's input demand curve when there are several variable inputs must slope downward (e.g., Henderson & Quandt, 1980). This is a noteworthy result. After impressing upon students in the principles course the "law" of downward-sloping demand, intermediate courses go to great lengths to show through the analysis on income and substitution effects that the usual assumptions economists make about consumer preferences leave open the possibility of Giffen goods, goods for which a consumer's demand curve slopes upward over some range of prices. Yet, while making what appear to intermediate microeconomics students to be

very similar assumptions about production that lead to almost identical graphical representation, the analysis can demonstrate that input demand curves must slope downward. There can be no Giffen input. However, while intermediate microeconomics textbooks often explain that input demand curves slope downward and that the demand curve with several variable inputs will be more elastic than the short-run input demand curve, they rarely relate this result to an isoquant analysis. Similarly, they do not explain how a firm's response to a change in the price of an input is similar to and different from a consumer's response to a change in the price of a good purchased. This often leaves students with the sense that what they learned about consumer theory can be carried over to the analysis of a firm's input demand curve. In making her case, Thaver (2013) includes the unusual assumption that the firm is constrained by a fixed budget for inputs. This assumption makes the firm's response to a change in an input price identical analytically to a consumer's response to a change in the price of a good. Both the firm's substitution and output effects map directly onto the consumer's substitution and income effects, suggesting for the firm that substitution and output effects can work in opposite directions. However, in the rest of the treatment of the theory of the firm, intermediate courses emphasize profit-maximization and do not assume a fixed budget for inputs. By assuming fixed expenditure on inputs, Thaver (2013) reinforces the analysis of consumer substitution and income effects by circling back to these concepts in the theory of the firm, but she does so at the price of inconsistency in the coverage of firm behavior. This is a missed opportunity to emphasize how the different assumptions about consumers and firms lead to different conclusions.

This paper offers a non-calculus presentation suitable for intermediate microeconomics textbooks and courses of the substitution and output effects associated with a firm's response to a change in an input price. We show that the substitution and output effects must work in the same direction and always imply a downward-sloping input demand curve when a firm maximizes profit without a fixed budget constraint. For ease of exposition, this paper will focus on how a firm adjusts its use of labor when the wage rate falls. The literature review in the next section summarizes how some intermediate microeconomics textbooks present the topic of input demand in the long run, when there are two variable inputs. The next section demonstrates the analysis of substitution and output effects associated with a change in the price of a normal input, an input of which the firm would use more if it were to produce a larger quantity of output at given input prices. We then follow the same logic to explain substitution and output effects in the case of an inferior input, an input of which the firm would use less if it were to produce a larger quantity of output at given input prices. Finally, there are some concluding comments on the value of this analysis in the intermediate microeconomics course.

LITERATURE REVIEW

While most intermediate microeconomics textbooks derive a labor demand curve when both labor and capital are variable inputs for the firm, and some emphasize that this long-run demand curve will be more elastic than the short-run labor demand curve, there is little consistency in their approach to this topic. Moreover, textbooks rarely give the same degree of analytic rigor to the presentation of a firm's response to a change in the wage rate as they do to a consumer's response to a change in the price of a good. In many textbooks (e.g. Mansfield and Yohe, 2004; Perloff, 2012; Pindyck and Rubinfeld, 2005; Salvatore, 2003), the derivation of a firm's long-run labor demand curve focuses on how the short-run labor demand curve shifts when capital is also a variable input. Having demonstrated that the short-run labor demand curve coincides with the downward-sloping portion of the firm's marginal revenue product of labor (MRP_L) curve, these textbooks explain that a lower wage rate will not only induce the firm to use more labor but also induce the firm to adjust its use of capital. Regardless of whether labor and capital are complements (more of one raises the marginal product of the other) or substitutes (more of one reduces the marginal product of the other), the adjustment upward or downward in the use of capital as the firm uses more labor will raise the marginal product of labor, shifting the MRP_L curve to the right. This induce a further increase in the use of labor and produces a long-run labor demand curve that slopes downward and is more elastic than the short-run labor demand curve. This approach is analytically

rigorous, but fails to tie the analysis of a firm's long-run labor demand curve back to its isoquant map in a way similar to the derivation of a consumer's demand curve from his indifference map.

Some textbooks do derive the long-run labor demand curve or explain how the use of labor changes when the wage rate changes starting from isoquants, but coverage varies widely and is not always complete or correct. Bernheim and Whinston (2008) cover only how a reduction in the wage rate leads to a change in the least-cost input combination for producing a given amount of output, essentially limiting their analysis to the firm's substitution effect, without going the next step to derive a labor demand curve. Similarly, Besanko and Braeutigam (2011) define normal and inferior inputs, but then show only the firm's substitution effect and present a labor demand curve that holds output fixed. They go on to explain that the labor demand curve will shift to the right or left when output increases, depending on whether labor is a normal or inferior input. By focusing only on the substitution effect, they derive a labor demand curve that is analogous to the consumer's compensated demand curve rather than an ordinary demand curve. Katz and Rosen (1998) explain the concepts of substitution and output effects for a firm, but incorrectly state that the output effect can work in either direction by failing to note the relation between an input being normal or inferior and whether a firm will increase or decrease output when the wage rate falls. Katz and Rosen go on to say that the net effect of the substitution and output effects must lead to a downward-sloping labor demand curve, so they provide the correct bottom-line result. Nicholson and Snyder (2007) provide a correct analysis of substitution and output effects, describing "the most common case" (p. 460) of a normal input in the body of the text. Despite relegating reference to the inferior input case to a footnote, they state in the text that they "have shown that the firm's demand curve for an input will be unambiguously downward sloping" (p. 461). On the other hand, Nicholson (2005), a calculus-based textbook, presents substitution and output effects and then provides a calculus derivation to demonstrate that the substitution and output effects must work in the same direction regardless of whether an input is normal or inferior. However, even in this textbook the verbal summary statement about the output effect implicitly assumes a normal input.

In another calculus-based treatment, after demonstrating that an input demand curve must slope downward, Henderson and Quandt (1980) state, "There is only a substitution effect. There is no counterpart for the income effect of the consumer in the theory of the profit-maximizing producer" (p. 81). However, the consumer's substitution effect holds utility fixed, while Henderson and Quandt do not hold output fixed. The firm's output effect is a counterpart for the income effect of the consumer, but it does not work in the same way.

SUBSTITUTION AND OUTPUT EFFECTS OF A CHANGE IN THE PRICE OF LABOR AS A NORMAL INPUT

We will make the same assumptions as Thaver (2013) with the exception of not constraining total expenditure on inputs to be constant in order to be truer to the assumption of profit-maximization characteristic of the rest of the intermediate microeconomics discussion of firm behavior. We consider a perfectly competitive profit-maximizing firm that uses two variable inputs, labor (L) available at a market wage rate (P_L) and capital (K) available at a market rental price (P_K), to produce its output (Q). The analysis generalizes to more than two inputs and holds for either a price-taking firm or a firm that faces a downward-sloping marginal revenue curve, indeed for any firm that faces a marginal revenue curve that cuts its marginal cost curve from above at its profit-maximizing output level. An isoquant map for which isoquants slope downward and are convex to the origin, displaying diminishing marginal rate of technical substitution ($MRTS_{LK}$) as the firm substitutes more labor for capital to produce the same amount of output, describes the technology available to the firm. We will analyze the firm's response to a reduction in the market wage rate, holding all other parameters of the firm's profit-maximizing decision fixed.

Suppose a firm that is initially maximizing profit finds that the wage rate falls. This change affects the firm in two ways. First, the relative prices of inputs change. Labor becomes relatively cheaper and

capital relatively more expensive, so the firm would choose a different mix of inputs even if it were to produce the same amount of output. This is the firm's substitution effect. Second, the cost of producing any amount of output falls and the firm's marginal cost curve shifts. The new marginal cost curve leads the firm to adjust the amount of output it produces in order to maximize profit at the new input prices. This is the firm's output effect.

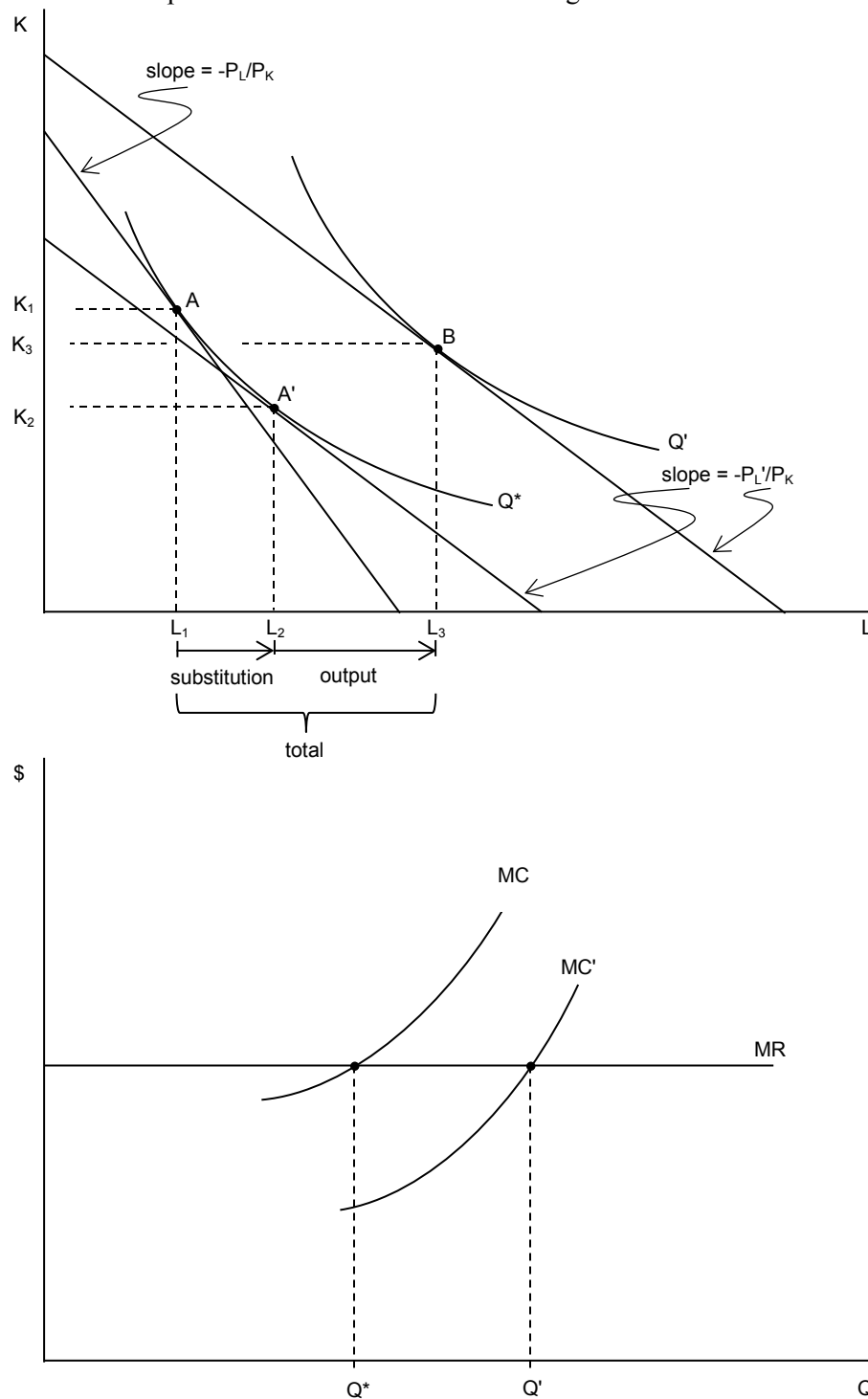
Figure 1 shows a firm that initially maximizes profit by producing Q^* units of output using L_1 units of labor and K_1 units of capital, the input combination for which $MRTS_{LK}$ equals the ratio of the input prices P_L/P_K shown by point A where isoquant Q^* is tangent to an isocost line with slope $-P_L/P_K$. When the wage rate falls to P_L' , the firm adjusts its profit-maximizing output level to Q' units of output because its marginal cost curve has shifted in light of the new lower wage rate. The firm now employs L_3 units of labor and K_3 units of capital, the input combination along the Q' isoquant for which $MRTS_{LK}$ equals the new input price ratio P_L'/P_K . This is shown by point B where isoquant Q' is tangent to an isocost line with slope $-P_L'/P_K$. The original and new isocost lines do not necessarily intersect the vertical axis at the same point because we have not constrained the firm to spend the same total amount on inputs. The firm's long-run labor demand curve will reflect that when the wage rate falls from P_L to P_L' , the firm increases its use of labor from L_1 to L_3 . Figure 1 implies a long-run labor demand curve that slopes downward. The question is whether this needs to be the case. To answer that question, it is useful to break the firm's response into substitution and output effects.

The firm's substitution effect is the change in input use that arises from the lower wage rate, if the firm were to hold its output fixed. Faced with flatter isocost lines reflecting the lower wage rate and fixed rental price of capital, the firm would use L_2 units of labor and K_2 units of capital (shown by point A') for which its $MRTS_{LK}$ equals P_L'/P_K , the new input price ratio, if it were to continue producing Q^* . Because isoquants are assumed to be convex toward the origin, input combination A' must contain more labor than input combination A. The substitution effect unambiguously implies that a fall in the wage rate leads the firm to increase its use of labor.

The firm's output effect is the change in input use when the firm adjusts the amount of output it produces, holding input prices fixed at their new values. In Figure 1, the firm no longer produces Q^* at the lower wage rate, but rather maximizes profit by producing Q' , as shown by the intersection of the firm's new marginal cost (MC) curve with its fixed marginal revenue (MR) curve (equal to output price for a perfectly competitive firm) in the lower graph. The output effect tells us that the firm uses L_3 units of labor and K_3 units of capital at the lower wage rate (shown by point B) rather than L_2 units of labor and K_2 units of capital (shown by point A').

Labor is a normal input in Figure 1, shown by the fact that the firm uses more labor at a higher output level. Moreover, we have suggested that, in this case of labor as a normal input, the firm's MC curve shifts downward when the wage rate falls and the firm maximizes profit at a larger output level. Must this be the case? While it will seem intuitive to most intermediate microeconomics students that the answer is yes, it is worth walking through the logic in order to lay the groundwork for the case of labor as an inferior input. The total cost of producing any output level certainly goes down when the wage rate falls, but how the firm adjusts production depends on what happens to MC at the original output level. We offer two non-calculus-based explanations suitable to the intermediate course of why MC at Q^* falls when the wage rate falls if labor is a normal input.

Figure 1: Substitution and Output Effects of a Decrease in the Wage Rate When Labor is a Normal Input



The firm is initially optimizing by producing Q^* units of output using the input mix shown by point A. When the wage rate falls, the substitution effect is shown by the movement from A to A' in the upper graph, indicating the change in the firm's use of inputs given the new relative input prices if the firm were to continue to produce Q^* . The output effect is shown by the movement from A' to B in the upper diagram, indicating the change in the firm's input use when it adjusts its output level in light of the lower wage rate. Because labor is a normal input, the marginal cost of producing output falls when the wage rate falls, and the firm produces more output. Both the substitution and output effects work in the same direction to increase the firm's use of labor at a lower wage rate.

First, consider a simple numerical example that abstracts from the substitution effect. Suppose that producing one more unit of output requires 10 more units of capital and 5 more units of labor (both inputs normal). Marginal cost is the cost of the extra capital and extra labor needed to produce one more unit of output. When $P_K = \$10$ and $P_L = \$6$, the cost of producing one more unit of output is $\$130$ [= $(10 \times \$10) + (5 \times \$6)$]. If the wage rate were to fall to $P_L = \$5$, the cost of producing one more unit of output would be only $\$125$ [= $(10 \times \$10) + (5 \times \$5)$]. The wage rate has gone down and so has MC.

Second, consider the geometry of the isoquant map. Marginal cost is essentially the vertical distance between the isocost lines for fixed input prices that are tangent to the isoquants corresponding to a unit increment in output. This measures MC in units of capital, the input whose price is not changing. If labor is a normal input, at any amount of labor the higher isoquant is steeper (has a higher $MRTS_{LK}$) than the lower isoquant. We know this because the higher isoquant has the same slope as the lower isoquant at a greater amount of labor. The isoquants and the isocost lines tangent to them are closer together at lower wage rates than at higher wage rates. Therefore, we know that, if labor is a normal input, MC falls when the wage rate falls.

Because a lower wage rate implies lower MC at the firm's original profit-maximizing output level Q^* , we know that the firm increases profit by producing a larger amount of output Q' . When the firm produces more output, it uses more of all normal inputs. If labor is a normal input, the firm will unambiguously use more labor when the wage rate falls due to the output effect.

If labor is a normal input, the firm's substitution and output effects work in the same direction and unambiguously imply a long-run labor demand curve that slopes downward.

SUBSTITUTION AND OUTPUT EFFECTS OF A CHANGE IN THE PRICE OF LABOR AS AN INFERIOR INPUT

How will the firm adjust its use of labor if labor is an inferior input? The analysis of the firm's substitution effect above did not rely on whether labor is a normal or inferior input, only that the firm's isoquants display diminishing $MRTS_{LK}$. Therefore, even in the case of labor as an inferior input, the firm's substitution effect implies unambiguously that the firm would use more labor to produce the same amount of output at a lower wage rate. This is shown along isoquant Q^* in Figure 2, where the firm uses L_1 units of labor and K_1 units of capital when the wage rate is P_L (point A), but would use L_2 units of labor and K_2 units of capital to produce Q^* if the wage rate were to fall to P_L' (point A').

As indicated above, to understand the firm's output effect when labor is an inferior input, we must ask what happens to MC at the original profit-maximizing output level Q^* when the wage rate falls. First, consider once again a simple numerical example that abstracts from the substitution effect. This time, suppose that producing one more unit of output requires 10 more units of capital and 5 *fewer* units of labor; that is, capital is a normal input but labor is an inferior input. When $P_K = \$10$ and $P_L = \$6$, the cost of producing one more unit of output is $\$70$ [= $(10 \times \$10) - (5 \times \$6)$]. If the wage rate were to fall to $P_L = \$5$, the cost of producing one more unit of output would be $\$75$ [= $(10 \times \$10) - (5 \times \$5)$]. The wage rate has gone down, but MC has gone up. The marginal cost of an additional unit of output is the cost of the additional capital needed *less* the amount saved by using less labor at the higher output level. When the wage rate goes down, the amount saved from using less labor goes down, so MC rises. While the total cost of producing any output level goes down when the wage rate falls, when labor is an inferior input the MC of producing one more unit of output goes up; the total cost curve shifts downward, but becomes steeper.

Second, consider again the geometry argument that we made above. With labor as an inferior input, at any level of labor the higher isoquant is flatter (has a lower $MRTS_{LK}$) than the lower isoquant for a pair of

incremental isoquants. The higher isoquant has the same slope as the lower isoquant at a smaller amount of labor. The isoquants and the isocost lines tangent to them are farther apart at lower wage rates than at higher wage rates. Therefore, if labor is an inferior input, MC rises when the wage rate falls.

Because a lower wage rate implies higher MC at the firm's original profit-maximizing output level Q^* , the firm increases profit by producing a smaller amount of output Q' . [Bear (1965) provides a more formal analysis to show that a change in the price of an inferior input will lead to a change in the profit-maximizing output level in the same direction.] When the firm produces less output, it uses less of any normal input but *more* of any inferior input. If labor is an inferior input, the firm will unambiguously use more labor when the wage rate falls due to the output effect.

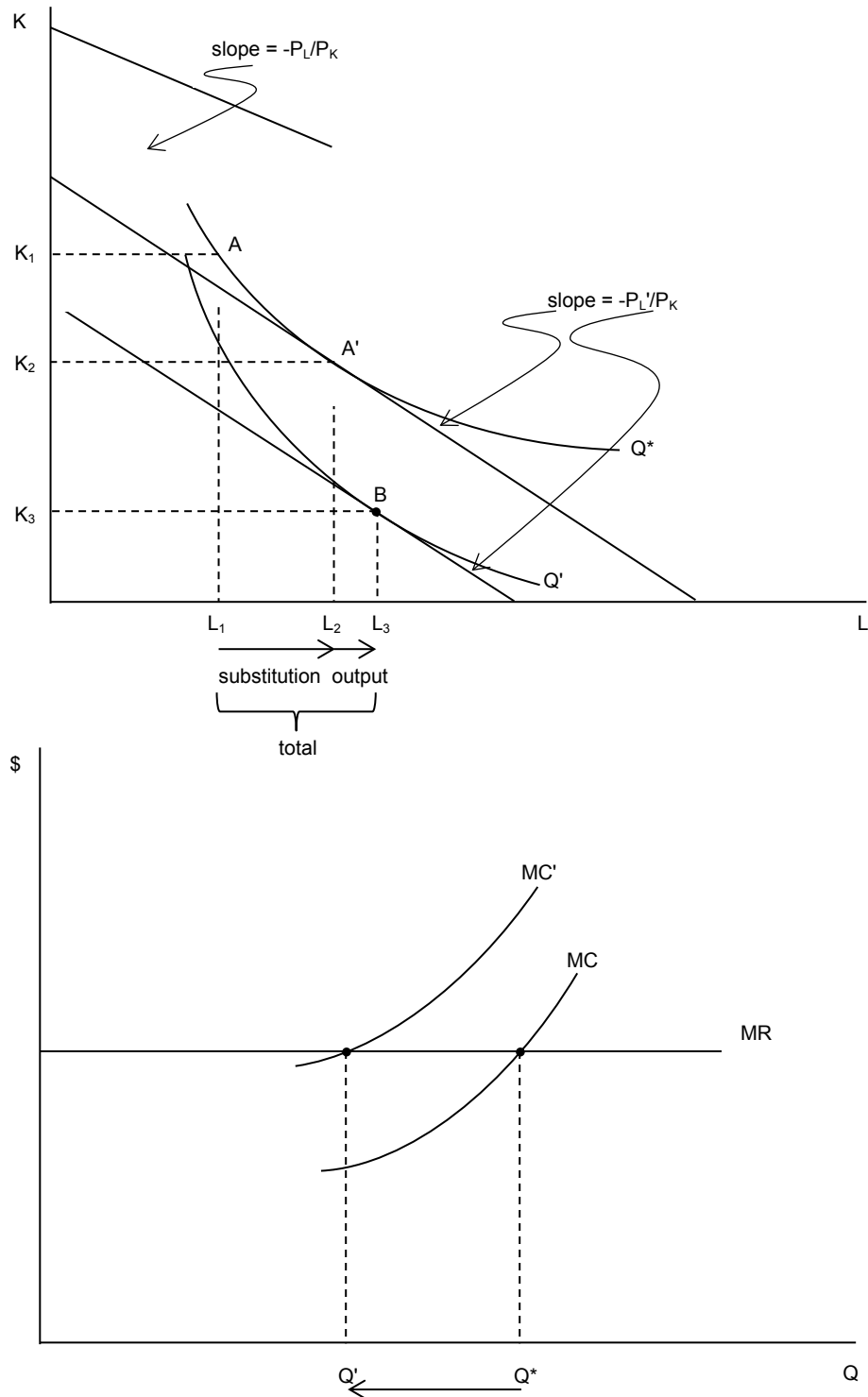
Figure 2 summarizes the case of labor as an inferior input. The firm initially maximizes profit by producing Q^* using L_1 units of labor and K_1 units of capital, the input combination for which $MRTS_{LK}$ equals the ratio of the input prices P_L/P_K , shown by point A where isoquant Q^* is tangent to an isocost line with slope $-P_L/P_K$. When the wage rate falls to P_L' , the firm's profit-maximizing output level falls to Q' because its marginal cost curve has shifted up in light of the lower wage rate. The firm now employs L_3 units of labor and K_3 units of capital (shown by point B), the input combination along the Q' isoquant for which $MRTS_{LK}$ equals the new input price ratio P_L'/P_K . The firm's substitution effect is the change in input use from L_1 units of labor and K_1 units of capital (point A) to L_2 units of labor and K_2 units of capital (point A') along the original isoquant Q^* . The firm's output effect is the change in input use from L_2 units of labor and K_2 units of capital (point A') to L_3 units of labor and K_3 units of capital (point B) on the lower profit-maximizing isoquant Q' . The firm reduces its output level because its MC curve has shifted upward at Q^* , so Q^* no longer maximizes profit.

If labor is an inferior input, the firm's substitution and output effects work in the same direction and unambiguously imply a long-run labor demand curve that slopes downward, just as they did in the case of labor as a normal input. Given the usual assumptions about technology and profit-maximizing behavior of firms made in intermediate microeconomics courses, there can be no Giffen input! The cases of labor as a normal and as an inferior input differ in their implications for what happens to the firm's profit-maximizing output level, but not for what happens to labor use or for the directions of the substitution and output effects.

CONCLUSION

By relaxing Thaver's (2013) assumption that a firm has a fixed budget for hiring inputs, we have tied the analysis of input use more closely to the assumptions about firm behavior made in intermediate microeconomics textbooks. We have also demonstrated in a way appropriate to the intermediate course that the substitution and output effects associated with the change in an input price must work in the same direction regardless of whether an input is normal or inferior. Whereas the analysis of substitution and income effects for a consumer demonstrates that these effects work in opposite directions for an inferior good and introduces the possibility of a Giffen good, the substitution and output effects for a firm must work in the same direction and always imply a long-run input demand curve that slopes downward. There can be no Giffen input!

Figure 2: Substitution and Output Effects of a Decrease in the Wage Rate When Labor is an Inferior Input



The firm is initially optimizing by producing Q^* units of output using the input mix shown by point A . When the wage rate falls, the substitution effect is shown by the movement from A to A' in the upper graph, indicating the change in the firm's use of inputs given the new relative input prices if the firm were to continue to produce Q^* . The output effect is shown by the movement from A' to B in the upper diagram, indicating the change in the firm's input use when it adjusts its output level in light of the lower wage rate. Because labor is an inferior input, the marginal cost of producing output rises when the wage rate falls, and the firm produces less output. Both the substitution and output effects work in the same direction to increase the firm's use of labor at a lower wage rate.

The analysis presented here may explain Thaver's (2013) observation that no research exists on the substitution and output effects of a change in the wage rate when labor is an inferior input. The effects work in the same direction, and the differences between inputs being normal or inferior matter only if one is concerned with the effects on a firm's output level. Indeed, one might similarly argue that the analysis of substitution and output effects of an input price change are unnecessary in the intermediate microeconomics course, as they provide no new insights to the law of downward-sloping demand. However, that would be a mistake if the goals of the intermediate course include demonstrating the coherence of microeconomic analysis and fostering the kind of analytic thinking associated with seeing how the assumptions made at the outset lead to the conclusions derived from them. In the particular case presented here, students of intermediate microeconomics should come to understand both the similarities and differences between the firm's substitution and output effects, on the one hand, and the consumer's substitution and income effects, on the other. They should also understand why input demand obeys "the law of downward-sloping demand," while our usual assumptions about consumer preferences and behavior do not lead to this result.

The consumer's and the firm's substitution effects are analytically identical. The consumer's substitution effect arises from the part of the consumer's optimization principle that says that the marginal rate of substitution must equal the price ratio. The firm's substitution effect comes from the requirement that the marginal rate of technical substitution be equal to the input price ratio. However, the second part of the consumer's optimization principle is different from the second part of the firm's optimization principle, so the income and output effects work differently. The income effect comes from the requirement that the consumer spend his entire income; a price decrease unambiguously leads him to a higher indifference curve and less consumption of inferior goods. The output effect comes from the part of the firm's optimization principle that says that the profit-maximizing firm will choose the output level for which marginal cost equals marginal revenue. Depending on whether an input is normal or inferior, a decrease in the price of that input either decreases marginal cost inducing the firm to increase output or increases marginal cost inducing the firm to decrease output. The firm does not have a fixed budget to spend on inputs in the way that a consumer has a fixed budget to spend on goods. Without this careful analysis, the similarities between the indifference curve/budget line diagram and the isoquant/isocost line diagram can mislead students.

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BIOGRAPHY

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LEBANESE STUDENTS' AWARENESS REGARDING ACCREDITATION IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

This research aims to explore students' awareness about Accreditation in Lebanon. Researchers tested many variables among students. The research adopts a quantitative approach by collecting primary data through a 14 items-questionnaire given to students at different Universities in Lebanon. Researchers used SPSS software to analyze data and derive appropriate conclusions and implications. After conducting correlation and regression analysis, the study reaches four main conclusions. First, there is high awareness of Accreditation in higher education. Second, students are willing to pay higher tuition fees if the university is internationally accredited. Third, Accreditation makes it easier for students to transfer between majors and/or between colleges. Finally, rich students are less interested in accreditation. Some conclusions are not definite and need more research to detect the factors lying behind. There is not much research done in Lebanon targeting the Education sector and investigating the importance of student's awareness regarding accreditation. Therefore, this study is vital because it explores a managerial sector of great importance in a country in which research is seldom conducted.

JEL: A10, A20

KEYWORDS: Awareness, Accreditation, Tuition, Education

INTRODUCTION

Students consider many factors when selecting a college or university. However, even if students select a university, some students may be undecided on a specific major or a career path. Thus, it is important that advisors explain how accreditation may affect student's future decisions and opportunities (ASPA, 2013). According to the American Psychological Association (APA), "Accreditation is both a status and a process. As a status, accreditation provides public notification that an institution or program meets standards of quality set forth by an accrediting agency. As a process, accreditation reflects the fact that in achieving recognition by the accrediting agency, the institution or program is committed to self-study and external review by one's peers in seeking not only to meet standards but to continuously seek ways in which to enhance the quality of education and training provided" (APA, 2013). An institutional accrediting agency evaluates the institution as a whole, applying the standards in light of the institution's mission. Besides assessing different educational programs, accreditation evaluates different areas such as governance and administration, financial stability, physical resources, library and technology, admissions, and student services. Institutional accreditation encompasses the entire institution and the Standards for Accreditation guide all decisions (NEASC, 2013). Since most theories are generated and empirically tested in a western context (Yu Zhou, 2011), this study attempts to fill a gap in literature by collecting data in Lebanon, a small Middle Eastern developing nation that lacks accreditation. The study is targeting Lebanese universities, mainly students in higher education to test their views and awareness about the importance and need of accreditation for high education institutions. In Lebanon, one university only, American University of Beirut (AUB), an

affiliate of state university of New York, is internationally accredited. According to AACSB, “There are 672 member institutions worldwide that hold AACSB Accreditation with nearly 50 countries and territories represented by AACSB-accredited schools” (AACSB, 2013). The huge number of accredited institutions around the world shows how important accreditation has become in recent years. Researchers ask two questions, what is the level of awareness of university wide accreditation among Lebanese students? What are the factors affecting this awareness? The aim of this research is to explore the student’s awareness about Accreditation and its relationship with each of the following variables: Ever heard about Accreditation, Easier University transfer, Tuition fees willing to be paid and Yearly tuition fees. The paper will proceed from the introduction, to the hypotheses to the Literature review, followed by the methodology used to test the hypotheses and its results. The final section summarizes the conclusion, the implications and the limitation of the study.

LITERATURE REVIEW

Accreditation is an extensively discussed issue among the educational sector. Yet, in Lebanon, few studies approached accreditation itself and the awareness towards accreditation among students, who generally consider many factors when selecting a college or university. The article, “What Do Staff Benefit from Working in an Accredited Organization,” defines accreditation deeply. According to the article, “It provides standards against which faculty members and students can assess their skills and talents, receive peer group recognition, improve career opportunity and mobility; as well as highlights the image of the business school as a leading organization and strengthens community’s confidence in its standards and staffs’ competency” (Alameh, 2006).

As for Allie Griffiths, she investigated the advantages this process would generate to applicants. She argued that the application process itself is a journey of self-reflection, which increases self-awareness among the applicant (Griffiths, 2007). According to John Saunders, accreditation helped the Aston Business School, United Kingdom to "calibrate" itself, to gain early leader advantage, and to associate itself with other accredited schools (positioning) as well as getting recognition within the "University" and from the international players and suggesting "competitive moves and shifts" (The Guardian, 2002).

A study by Ronald R. Slone, Jerry LaCava argued that accreditation facilitates the setting of new strategic directions for business schools and assists them in creating sustainable competitive advantages (Ronald et al, 1993). W.B. Scott-Jackson noted that competitive advantage could spring from differentiating the business program (Scott, 2006). In their article, Seers and Krug observed that people usually have a perception of MBA programs as being largely undifferentiated and that the same strategies and characteristics are applicable across the majority of business schools (Seers et al, 2007) Schools pursuing similar objectives and strategic moves have become less able to differentiate themselves in the marketplace.

Arthur Kraft mirrored this viewpoint during the AACSB (The Association to Advance Collegiate Schools of Business) International Continuous Improvement Conference; he noticed that differentiation through accreditation is becoming more important than ever, bearing in mind the increasing number of business schools offering similar programs in (Kraft, 2006). An additional benefit certified to accredited colleges/programs is the quality of education. The perception of students for tuition programs is important in this sense. For students, education is an ongoing process where mobility is highly valued (Delors, 1996).

The accreditation maintenance standards promulgated by the AACSB (2002) place "greater emphasis on continuous improvement" and "instill significant improvements over time through continuous and accumulative, rather than episodic, processes." However, According to Billing and Thomas (2000), some business colleges expect only external benefits (i.e. recognition and positioning) as if the accreditation

process is not for improving the quality of education but for earning the reputation. Therefore, they conclude that the objectives of accreditation must be clear and the strategic direction of the college be directed towards improving the quality of education through meeting the accreditation requirements.

A leading study investigated business schools' professors and students' perception of accreditation in Lebanon. The studies showed that respondents from programs based on the American system of education have more information than their French counterpart has about the real meaning of accreditation and are more aware of its benefits and disadvantages as cataloged by the academic and professional press. In general, accreditation links to quality assurance and continuous improvement. There was also a consensus that external assessments leading to accreditation would strengthen the image of the school/program and positively affect the educational level at these schools. Then, better image is linked to better mobility and better job prospects for both professors and students due to better quality programs and degrees and continuous improvement processes (Boushra et al, 2009).

Contrary to the supportive ideas for accreditation, Basken (2007) argued that accreditation could worsen academic quality rather than improve it. He noted, "Nothing in the accreditation process concretely measures student learning, instructional quality or academic standards." Moreover, McKee et al. (2005) observed that some deans at well-known "accredited" business schools considered that the AACSB accreditation requirements related to the curriculum are still predominantly U.S. driven which creates some restrictions if applied in other countries, and that to some degree, discourage innovation and differentiation in programming and curriculum.

Jill K. Bryant conducted interviews with students regarding accreditation awareness; he said that although students may not have been part of the decision-making process to pursue accreditation, they had definite opinions on what it meant to have their program accredited. The majority of the comments suggested that students viewed their degree as having more value coming from an accredited program. On the other hand Bryant mentioned that although students were aware of benefits, there was some concern that schools and agencies in the area were either unaware of what a accreditation means, or may in fact, simply don't care. He also mentions that his findings are similar to past literature suggesting generally positive views about accreditation (Bryant, 2012), ((McGlothlin & Davis, 2004 Schmidt, 1999; Wilcoxin, Cecil, & Comas, 1987) and the conviction that accreditation enhances professional identity (McGlothlin & Davis, 2004; Pate, 1990).

Participants see the merit in accreditation because they perceive it as a provided structure and increases rigor for the current program. Such results are congruent with past research indicating that both students and faculty (Schmidt, 1999; Smaby & D'Andrea, 1995; Vacc, 1985) value standards, specifically core standards. Students in the research "Perceptions of an Initial CACREP Accreditation by Students in Program," done by Jill K. Bryant, were keenly aware of the lack of knowledge present in community agencies and schools regarding accreditation.

Students suggest that the obligation lies on the department of business to inform and educate community partnerships regarding this big step and its implications. Moreover, students appeared irritated by faculty who taught the standards of accreditation, but failed to apply the coursework to real-world experiences, and from the interviews, it became evidenced that the participants believed this was a result of the accrediting experience. Such perceptions correspond with previous work by McGlothlin and Davis (2004). Thus, the new accreditation process, in addition to being mission-linked, should rely heavily on the existence of the academic processes considered necessary to the delivery of quality academic programs that create value for students (Bailey and Bentz, 1991).

METHODOLOGY AND DATA COLLECTION

The research required gathering relevant data using questionnaires, composed of five demographic questions and nine subject-specific questions, to specifically test: the level of awareness about accreditation, its importance for inter-college and inter-major mobility, willingness among students to pay a premium for accredited programs, and awareness about any impact accreditation has on university students. Researchers formulated the demographic part in a way that could relate any result gained to the demographic distribution, income level, academic year and college location. Moreover, researchers use IBM SPSS to analyze statistically significant relations between the different factors studied in the survey.

Researchers collected and analyzed data during December of 2012. The study is targeting University students, thus researchers distributed questionnaires across Lebanese universities, mainly, universities that implement the American system. In total, 260 questionnaires were distributed and 235 returned, thus making the percentage of available questionnaires for analysis 90.38 percent.

Distribution of the characteristics of the valid samples is as follows: 44.7 percent female and 54.9 percent male. Thus it is fairly distributed among genders with 6.8 percent freshman students, 24.3 percent sophomore students, 24.7 percent junior students, 40.4 percent senior students, and 3.8 percent master's and doctorate graduates. The clear majority are senior students. 24.3 percent of the participants pay a yearly tuition fee <\$5,000, 33.2 percent pay a yearly tuition fee between \$5,000 and \$8,000 amounting for the largest group of the population, 19.1 percent pay between \$8,000 and \$12,000 of yearly tuition fees, and 23.4 percent have their tuition fees over \$12,000. This gives us a fair distribution of the population among groups of different classes since university cost is an indicator of the financial classes of the participants where 24.3 percent have an income level <\$3,600, 38.7 percent have between \$3,600 and \$6,000, 15.3 percent between \$6,000 and \$12,000, and 21.3 percent have an income greater than \$10,000. Geographically 40.4 percent reach a university located inside Beirut and 59.6 go to a university located outside Beirut.

The paper defines ten independent variables of measurement. These variables are: university location, income level of students and/or parents, parents' level of education, academic year/level, yearly university tuition, role of students in the accreditation process, importance of accreditation for future career prospects, the role of accreditation in the mobility of students (major or university), the importance of 3rd party assessment, and willingness to pay extra tuition for accredited universities. The Dependent Variable is a Likert's Scale form question that state: Accreditation is important to my academic and professional future.

Descriptive analysis and cross tabs are used to identify any relation between demographic factors and accreditation awareness. However, the results of these statistical analyses show that there is no significant relation between demographic variables and accreditation awareness. Researchers use Correlation and Factor analysis to test the correlation between accreditation awareness and the most influential independent variables.

$$Y = \alpha + \sum_{i=1}^n \beta_i x_i \quad (1)$$

α and β are coefficients

Were X_i tends from 1 → 10 (Ten independent variables)

RESULTS AND ANALYSIS

The first research question is the main part of the survey, which answers the research problem. 63% of the surveyed students strongly agree that accreditation is beneficial for their future careers 29.8% agree, 6% have a neutral/undecided view and only 1.3% disagree. These values are comparable with the question of whether respondents have heard about accreditation before, of which 22% said they have not, and 77.4% said that they have. Compared to only 6% of undecided views about accreditation impact, 22% actually have not heard of it which means that 16% made an uneducated guess of whether accreditation is important to their future careers or not.

Another interesting result the frequency analysis show is that 69.4% percent answered that they have never heard of third party assessment, which implies that they probably do mix up between third party assessment which accreditation is all about and government licensing for universities. While only 0.4% disagree that accreditation is important to the actual service, which a university provide (education), 7.2% reported an undecided view, 15% agree and 7.2 % strongly agree.

Cumulative percentage shows that 67% agree or strongly agree that they are willing to pay higher tuition fees if the university was accredited which is interesting since pervious questions have established that university students do not have a clear idea about accreditation. 18% of the respondents had a neutral/undecided view 11.9% disagree and only 2.1% strongly disagree for any increase in their tuition fees. Although we have no data about previous studies done to test the willingness of students for paying higher tuition fees, we suspect that more than 14% of students would normally disagree to any increase in the tuition fees.

When asked whether accreditation facilitates mobility between colleges and/or majors 74.5% (cumulative) agreed or strongly agreed 21.7% where undecided and only 3.8% disagreed or strongly disagreed. This is another predictable result when we compare our findings to the literature review. Future career status (employed, self-employed or both) showed a normal distribution between those who expect to be employed and self-employed with a majority of 54% stating that they will be both employed and self-employed. However, this result had no statistical indication to awareness of accreditation.

The Demographic questions in the questionnaire where formulated to test the distribution of the population according to the following parameters: University location, income level, parents’ level of education, gender, yearly university tuition and academic year/rank. With the exception of the parents’ level of education, distribution of all demographic factors was normal with no skew-ness. This result ensures that the distribution of the population has no bias towards one group regarding income level, gender, university location, university tuition fees and academic year. Table 1 below shows normal gender distribution among male and female respondents, 55.3% were males and 44.7% were females, this shows that distribution among respondents’ gender was normal and unbiased towards one gender.”

Table 1: Gender distribution among Respondents

Frequency	Percent	Valid Percent	Cumulative Percent
Male	130	55.3	55.3
Female	105	44.7	100.0
Total	235	100.0	100.0

Descriptive analysis and cross tabs are used to identify any relation between demographic factors and accreditation awareness The Demographic questions in the questionnaire where formulated to test the distribution of the population. Distribution of all demographic factors was normal with no skew-ness. The table shows normal gender distribution among male and female respondents, 55.3% were males and 44.7% were females. This shows that distribution among respondents’ gender was normal and unbiased towards one gender.

Table 2 below shows the results of correlation and regression analysis of the seven independent variables and awareness about accreditation programs among Lebanese higher education students. The relationship between students who have heard about accreditation and accreditation’s importance appears to be positive since people who have heard of accreditation know that it is important for their academic and professional future. The relationship between willing to pay higher tuition fees and accreditation’s importance is highly correlated with a Pearson correlation and a significance of (0.000). A student who knows that accreditation is important; is eventually willing to pay more for higher standards of education. The relationship between transferring amongst majors and/or colleges and accreditation importance is positively correlated with a significance (0.000) indicating a fair knowledge about the benefits of accredited educational institutes. The relationship between yearly university tuition and the importance of accreditation has negative correlation and significance of (0.35). This interesting result might indicate that students in universities with a high tuition fees believe that their degree has high value and do not seek further accreditation as students in unaccredited universities. In addition, we suspect that those students, which are mainly located in LAU and AUB, are not as worried about their future career prospects since people with lower income and less-sought-after universities.

The relation between students that are willing to pay more university tuition fees and who believe that accreditation makes it easier to transfer between majors and/or colleges has a positive correlation and significance (0.08). This justifies why students are willing to pay more tuition fees for accredited universities since it facilitate their entrance to highly recommended majors or colleges. The relationship between students having a major role in the accreditation process, and who believe that accreditation makes it easier to transfer between colleges and/or major has positive correlation with significance of (0.00), as proved before, accreditation is important for those students to be able to transfer between universities and/or majors. The relation between income level of parents and yearly university tuition has positive correlation with significance of (0.001), since parents with higher income level have the ability to pay higher tuition fees respectively.

Table 2: Correlation between Variables and Awareness about Accreditation Programs among Lebanese Higher Education Students

Variables	Correlation Coefficient	Significance	Expected Sign	Produced Sign
Is there a relationship between students who heard about accreditation and accreditation importance?	0.304***	0.01	+	+
Relationship between willing to pay higher tuition fees and accreditation’s importance	0.234***	0.01	+	+
Relation between transferring between major and college and accreditation importance	0.236***	0.01	+	+
Relationship between yearly tuition and importance of accreditation	-0.138*	0.05	-	-
Willingness to pay higher tuition fees and the ease of major and college mobility due to accreditation	0.173***	0.01	+	+
Role of students in accreditation process and the ease of major and college mobility	0.243***	0.01	+	+
Relation between income level of parents and annual tuition	0.219***	0.01	+	+

***→ $P \leq 0.01$, **→ $P \leq 0.02$, *→ $P \leq 0.05$

Researchers use Correlation and Factor analysis to test the correlation between accreditation awareness and the most influential independent variables. The table shows the level of correlation between seven independent variables and awareness about accreditation programs among Lebanese higher education students. All variables show positive correlation and high significance level except for the “Relationship between yearly tuition and importance of accreditation” which yield negative correlation and low significance level. This indicates that students in universities with a high tuition fees believe that their degree has high value and do not seek further accreditation as students in unaccredited universities.

Regression analysis was conducted using the above four components to test the correlation between each of the four components and awareness about accreditation. The four factors have a significant impact on accreditation awareness 21.6% (R - Square). Those factors are X1= knowing about accreditation, X2=

willing to pay higher tuition fees for accredited universities, X3= the role of accreditation in inter-major transfer and inter-college transfer, and X4= the current yearly tuition fees of the participants.

$$Y = a + bX1 + cX2 + dX3 + eX4 \tag{2}$$

	$Y = 0.304 + 0.273X1 + 0.158X2 + 0.207X3 - 0.135X4$				
t	3.067	4.560	2.597	3.424	- 2.255
Sig:	0.002	0.000	0.10	0.001	0.025

Thus, these independent variables are good predictors of awareness about accreditation. We observe a relatively low F- Statistics (F= 13.2) which is statistically significant (sig. = .000), which means there is a 13.2 chance in 100 that all of the regression parameters are zero. Demographic factors had insignificant effect on regression analysis; this was expected since demographic factors were normally distributed, thus not affecting the general regression model.

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

This paper investigated the level of awareness of university wide accreditation among university students in Lebanon. In general, people had very positive views about accreditation, but their knowledge was limited. Many people confuse accreditation for government licensing for higher education organizations. Although students did not really understand details about the process of third party assessment, its implications were accurate compared to the literature review of the subject. This study showed that the majority of students were ready to pay extra tuition fees if their university is accredited. A high percentage is also aware that accreditation could help them transfer to different colleges that have similar accreditation, which is an important aspect for students who plan to complete their graduate studies abroad.

Although this research was carefully prepared, it has some limitations and shortcomings. The research took place in a sample of three universities. Moreover, the literature review is limited to studies conducted abroad due to the limited research that is available about accreditation awareness in Lebanon. There is still a socio-cultural barrier in Lebanon for respondents to convey, in a precise manner, to a survey questionnaire the data about their financial status – in this case their willingness to pay more for an accredited college - even though it researchers state that the survey is completely anonymous.

One thing to mention, researchers could conclude out of this paper is that most respondents feel obliged to agree to questions they really do not have a clear idea about to be decisive. The frequency analysis showed contradicting views about awareness on accreditation. Students do know that it is a good thing to have the university committed to certain standards, but few knew what accreditation is specifically about. This paper’s findings and conclusions make important contributions to Educational Institutions and students. This study’s results are robust, as are the reliability of its measures and regression model. However, it would be useful if future studies extend this research to other Educational institutions, like high schools, to shed light on the importance of accreditation and the seeking of best educational levels. Moreover, further studies could also expand this research to investigate factors affecting knowledge sharing in Universities. Future work may also expand the analyses to include other Lebanese universities including private and public sectors. Research that is more detailed is also advisable to test the willingness of people to pay higher tuition fees for accredited universities. Such a research will give universities a clearer financial insight to assess the direct implications of raising tuition fees in exchange for accreditation.

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STUDENT VIEWS ON THE USE OF A FLIPPED CLASSROOM APPROACH: EVIDENCE FROM AUSTRALIA

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ABSTRACT

A report on an introduction of a “flipped classroom” approach to lectures in a final-year actuarial course is presented. At the heart of the flipped classroom is moving the “delivery” of material outside of formal class time and using formal class time for students to undertake collaborative and interactive activities relevant to that material. Students were surveyed both at the start and end of the semester to obtain their views on lectures in general and the flipped classroom structure. After experiencing the entire course with this teaching style, student views became, on average, far more positive towards the flipped classroom approach.

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KEYWORDS: Flipped Classroom, Inverted Classroom, Student Perceptions

INTRODUCTION

The face-to-face model of a number of lectures plus a single tutorial each week has been a standard approach to course delivery in higher education for decades. Despite the revolution that the internet has been to education in providing flexible access to course material, tradition dictates that a number of hours each week be set aside for formal lectures and tutorials.

The maintenance of the formal lecture and tutorial structure is despite significant evidence that the traditional lecture format is not the most effective way for most students to learn. One approach to a more active student experience is through a “flipped classroom” model (first introduced by Baker, 2000, and Lage et al., 2000, and popularized through online videos and activities by, among others, Karl Fisch, Jon Bergmann and the Khan Academy). At the heart of the flipped classroom is moving the “delivery” of material outside of formal class time (through the use of extensive notes, video recorded lectures and other appropriate means) and using formal class time for students to undertake collaborative and interactive activities relevant to that material.

This paper reports on a move to a flipped classroom approach in a compulsory final-year course in the undergraduate actuarial program at the Australian National University (ANU). There are two specific research questions of interest. First, do students value the traditional lecture format compared to other learning activities? This is a question that has been extensively researched in the literature, although in this case it will flow into a second and less well researched question, how do students’ perceptions of the use of class time change after being involved in a flipped classroom structure? Both of these questions are answered through the use of a two-part survey taken of students in July and October of the 2012 edition of the course, which was the first time the flipped classroom approach had been used in the course.

The next section of the paper reviews relevant literature, in particular that on the use of the flipped classroom approach. Following that is a data and methodology section outlining the flipped classroom approach undertaken and the survey methodology used in answering the two research questions. Following that is the results of the analysis and then concluding comments.

LITERATURE REVIEW

Prince (2004) provides an overview of the literature on “active learning” and notes the difficulty in measuring its effectiveness due to the different definitions of and approaches to active learning across the literature. In its broadest sense, Prince (2004) describes active learning as requiring students “to do meaningful learning activities and think about what they are doing”. These learning environments are “student-centred” in that it is through student activity with the guidance of the teacher that learning occurs. In general, Prince (2004) presents significant evidence of the benefits of active learning. There has been a wealth of research into student perceptions of didactic compared to active learning environments, in both discipline-specific and general higher education literature. In addition to the benefits of active learning described by Prince (2004), Baeten et al. (2010) find that student-centred learning approaches are more likely (among other factors) to lead to a deep approach to learning (Marton and Säljö, 1976) by students.

Looking at examples within the discipline-specific literature, Butler (1992) finds that medical students perceive the didactic lecture to be the least effective learning tool within lecture time compared to more interactive approaches. Michael (2006) provides a meta-analysis of active learning in relation to teaching physiology and finds a variety of evidence of its success, although without finding one definitive type of experiment being used to prove the success. Armbruster et al. (2009) investigate the perception and performance of students in an introductory biology course where active learning was introduced through students being required to solve problems in groups in class, and find that student engagement and assessment performance is significantly improved compared to previous versions of the course. Garfield (1995) reviews prior literature on learning statistics and finds the key determinants in improved student performance are active participation in activities (including in a small group setting) and feedback on performance in these activities. Sander et al. (2000) note that first-year students in medical, business and psychology disciplines expect to be taught by formal and interactive lectures but prefer interaction and group-based activities. Smith (1998) finds student performance in and perception of first-year statistics is greatly improved by “doing statistics” in the course.

These previous studies are part of a very large body of literature looking at the effects of active teaching methods in higher education; no attempt is made here to provide a comprehensive overview beyond what is described above.

Biggs and Tang (2007) argue that courses should be “constructively aligned”. In courses that are constructively aligned the desired learning outcomes are expressed in terms of the activities students are required to be able to demonstrate, with teaching and learning activities and assessment (both formative and summative) being designed to be consistent with these desired learning outcomes. Consistent with the student-centred approach to learning, Biggs and Tang (2007) argue that the most important aspect of a course is what the student does and not what the teacher does.

A “flipped classroom” approach (Baker, 2000), also known as an “inverted classroom” (Lage et al., 2000), is one approach that can be used to focus teaching activity on what the student actively does. The approach does this very explicitly, by bringing active student engagement with the material (such as problem-solving, case studies, etc., usually in collaboration with other students) directly into the classroom whilst moving more passive activities (such as reading course notes and textbooks and viewing/listening to lectures) outside of the classroom. Conversely, under a traditional didactic lecture structure this active student engagement is left to a single one hour tutorial each week, and then outside the classroom to individual study and/or informal study groups. To students, the syllabus and teaching material in a flipped classroom may not look particularly different to more traditional approaches, but the form of accessing the syllabus and teaching material is different. As such, a flipped classroom could be

seen as a stepping stone to less structured and inquiry-based learning environments such as problem-based learning (see Barrows, 1986, and Hmelo-Silver, 2004).

Academic research into student perceptions and the effectiveness of a flipped classroom is relatively limited at present, with the majority of commentary coming in the form of informal weblogs and the like. Bishop and Verleger (2013) provide a recent survey of research into the flipped classroom approach and report on eleven studies that have investigated student perceptions of the flipped classroom, with results being relatively consistent in that general student opinion of the flipped classroom tends to be positive, with a significant minority being opposed. Lage et al. (2000), in introducing the term “inverted classroom”, find favorable impressions from students to the introduction of such a model in an introductory microeconomics course. Gannod et al. (2008) find that students in a software engineering course were largely happy with the model, although there were students who were not so supportive. Bates and Galloway (2012) find that 80% of survey respondents in a first-year physics course preferred the flipped structure to a traditional approach. Schullery et al. (2011) find a largely positive response from students in a flipped introductory business course, although 32% of survey respondents advocate a return to a traditional lecture format. Conversely, Strayer (2012) finds that students in a flipped classroom introductory statistics class were less satisfied with classroom structure than those in a traditional class, but that they became more open to co-operation and innovation as the semester progressed. Jaster (2013) finds a majority of students prefer a traditional lecture approach to a flipped classroom in a first-year algebra course.

DATA AND METHODOLOGY

Australian National University (ANU) is one of only six Australian universities to offer a program accredited by the Actuaries Institute. The Bachelor of Actuarial Studies is a three-year undergraduate program which provides students with the opportunity to meet the initial component of the qualification requirements of the Actuaries Institute. Accreditation requirements mean the syllabi for many of the courses within the program are heavily prescribed with technical content. Teaching time arrangements tend also to be fairly standard, with typically three hours of lectures and a one-hour tutorial allocated for each course.

Actuarial Techniques is a final-year course typically taken by undergraduate students in their final semester at ANU. A small number of postgraduate students take the course as well. It has approximately 100 enrolments. The syllabus for Actuarial Techniques is not as heavily prescribed as in other courses in the program, and hence the course has space to give students an exposure to actuarial problems in more of a business context, using Microsoft Excel where appropriate. Performing activities without Excel helps students to understand the underlying mathematical processes they are analyzing, while performing activities with Excel gives students a real-world perspective in addition to allowing for more complex processes to be modelled.

The flipped classroom approach used in this study was undertaken in Semester 2 (July – November), 2012. A collection of high-quality notes from previous iterations of the course was already in existence. These had in the past been used as a supplement to formal lectures; i.e. the lecturer would talk through the notes and expand and/or embellish on the notes as appropriate. The notes also included some worked examples of the concepts that were being outlined, which the lecturer would also go through during lectures.

Teaching time arrangements for the flipped classroom were maintained as being three hours of lectures (which will now be called “class” to distinguish it from a didactic lecture) and a one-hour tutorial. The first change made to the course material was to convert these notes into readings that students were expected to read before the relevant class. This involved expanding the notes to ensure they were

sufficiently detailed to stand alone without the need for lecturer embellishment and that the solutions to the examples in the notes were sufficiently detailed for students to follow. The aim of this exercise was to free the time previously spent elaborating the notes in lectures to be used for activities that required students to interact with the lecturer and with each other.

However, it was noted that no amount of notes can replace the opportunity for students to ask questions to clarify material. Hence at the beginning of each class time was provided for students to ask questions of the lecturer, similar to the approach described by Lage et al. (2000). In addition, a Feedback activity was created in Moodle (the learning management system used by ANU) so students could ask these questions anonymously if they wished. The teacher would respond to the Feedback activity either via a Forum post or directly in class. This model was designed to provide students with adequate support to understand the readings.

The readings also contained activities set aside specifically for class, which could take the form of an Excel or handwritten exercise. Going through these exercises took up the majority of time in class. It was noted in the first class that students had sufficient access to laptops for there to be sharing between no more than two people for the Excel activities, with students who did not bring laptops to class being encouraged to move around the room to ensure they were sitting next to someone with a laptop (an instruction that was successfully adhered to with a small number of exceptions). Students were given time to complete these exercises (or they could attempt them before class if they wished) and encouraged to share their approaches and solutions with their colleagues. The teacher was also available for questions while students were attempting the exercises and typically wandered around the theatre, answering questions for a small group of students who were tackling the exercise together. After sufficient time to complete the exercises, the teacher modelled an approach to answering the question as feedback for the class. In some senses this was not significantly different from a large tutorial, although the standard 20-student, one-hour tutorial was also held each week in which students went through additional exercises. These tutorials were held in a computer lab to ensure each student had access to a computer during the tutorial.

An additional activity the teacher brought into class was the use of the Votapedia online audience response tool (now unfortunately unavailable – this tool allowed students to answer multiple choice questions by making mobile phone calls, with responses being tallied in real-time in a web browser). This served two purposes: first it was thought that it would be fun for students to see how their answers to questions matched with the rest of the class without having to bring attention to their own answer, and second it allowed the teacher to see which questions and concepts were best and worst understood from the readings and other activities and tailor future classroom focus accordingly. Students were typically asked to provide a response to questions on their own before discussing their answers with their colleagues and were encouraged to try and convince their colleagues of the validity of their answers before the correct answer was revealed.

The aims of these approaches were to have students performing the activities the teacher wanted them to be able to do in-class, in addition to out-of-class studying. In essence a passive component of the learning (in this case the readings) was moved outside of class, with more active components of the learning being moved into class time.

In the first class students were informed of the structure that the course would be taking and the rationale behind the structure. Around this time students were also e-mailed the first part (Part I) of a survey (in July 2012) which asked their views on the importance or otherwise of traditional lectures to their learning and their expectations of the proposed structure for the course. The questions in Part I were primarily directed at answering the first research question: do students value the traditional lecture format compared to other learning activities? A total of 62 students answered at least one question in the first part of the

survey, representing a response rate of 61% of all 101 enrolled students who were e-mailed a link to the survey.

In the final week of classes in the course (in October 2012) students were e-mailed the second part (Part II) of the survey, which asked them their views on the class structure used in Actuarial Techniques and how well it assisted their learning. The questions in Part II were primarily directed at answering the second research question: how do students’ perceptions of the use of class time change after being involved in a flipped classroom structure? A total of 50 students (of the 62 students who were involved in the first part of the survey) answered at least one question in the second part of the survey.

Questions asked of the survey respondents are provided in the discussion of results in the next section. The survey was undertaken using the SurveyMonkey web tool.

RESULTS

We start with Part I of the survey, with Table 1 and Table 2 presenting results of questions where students were asked to rank general and university-specific activities that assist learning. A lower rank indicates a higher preference for that activity.

The results from Table 1 clearly indicate that, on average, students perceive they learn most from performing an activity, followed by reading, with listening being the least effective learning activity. However, the results from Table 2 indicate only a clear preference against group study, with slight preferences toward individual study and then lectures over tutorials.

Table 1: Rank the Following Activities in Order of Which You Believe You Learn the Most from

Rank	Reading Text, Graphs, Etc.	Listening to Someone Talk	Performing an Activity
1	14	10	36
2	33	16	11
3	13	34	13
AVERAGE RANK	1.98	2.40	1.62
INDEPENDENCE TEST*	Pearson Chi-Squared statistic = 47.600 with df = 4 and p-value 0.000		

* The Pearson Chi-squared test of independence of rankings gives a test statistic of 47.600 and a p-value of 0.000 (df = 4). This indicates there are significant differences in the proportion of students who prefer each of the three different categories of learning activities.

Table 2: Rank the Following University Activities in Order of Which You Believe You Learn the Most from

Rank	Lectures	Tutorials	Individual Study	Group Study
1	20	12	22	6
2	13	21	18	8
3	20	20	15	5
4	7	7	5	41
AVERAGE RANK	2.23	2.37	2.02	3.35
INDEPENDENCE TEST*	Pearson Chi-Squared statistic = 87.733 with df = 9 and p-value 0.000 or if “Group Study” removed as an option = 13.800 with df = 4 and p-value 0.0080			

* The Pearson Chi-squared test of independence of rankings gives a test statistic of 87.733 and a p-value of 0.000 (df = 9). This indicates there are significant differences in the proportion of students who prefer each of the four university learning activities. Removing the “Group study” preference from this question by collapsing these results into a 3x3 contingency table and re-running the Pearson Chi-Squared test gives a test statistic of 13.800 and a p-value of 0.0080 (df = 4). The slight preference toward individual study and then lectures over tutorials remains.

Interestingly, when viewing only the responses of students who do not use English as a primary language of communication outside of the university (57% of respondents), the lecture overtakes individual study as the most preferred learning activity, although again there are not large differences between lectures, individual study and tutorials. One reason for the preference against group study might be the paucity of

enforced group activities in earlier courses in the Bachelor of Actuarial Studies, meaning students have had little opportunity to experience group learning.

Put together, these results demonstrate the perceived value students have of large lecture classes, although not as strongly where the large class is used only as a didactic lecture. They indicate that a flipped classroom approach could be perceived as a positive approach to the university classroom due to its combination of activity and demonstration. The results also show the variety of perceived values that students have of different activities, meaning a variety of different learning opportunities will have the best chance of providing a well-perceived learning experience across the student body.

Students were also given an opportunity to answer open-ended questions about the strengths and weaknesses of lectures as a university activity.

The responses to strengths of lectures were extremely varied and hard to pin down significant consistencies. The categories and keywords that were most regularly reflected in the comments were that of the “demonstration” and “clarification” aspects of lectures, e.g.

(Lecturers) add their own insight and background knowledge which is often very useful in allowing the student to better understand the material.

Lectures provide good clarification of topics. I find it much easier to learn something when someone explains it rather than having to read it in a textbook.

Other comments focussed on the organizational and even social aspects of lectures, e.g.

(Lectures) keep attending students up to date with material covered, and provide a sense of belonging to the university.

Somewhat disappointingly, only one response identified the motivating aspect of lectures:

Initiating discussion on topics, enjoying lecturers' presenting style, motivation to learn more on topics discussed.

These varied responses demonstrate that students still place a significant value on time spent in lectures.

Responses to weaknesses of lectures tended to focus on issues of class size, speed and engagement, e.g.

Too many students in each class means the lecturer can't target what people don't know.

Pace of lecture does not suit everyone.

The using of course outlines compress materials of that particular section to a single lecture. Hence, becoming a 'touch and go' session. Everything breaks down when encounter problems that require in-depth understanding of that particular sub-topic.

It's generally a one-way learning process.

(Lecturers) usually do not push us to think and be creative; instead, they sometimes fool us into the belief of having spent enough time studying until we reach the end of the semester.

Each of the three issues of class size, speed and engagement was found in approximately one quarter of responses.

This variety of perceptions is demonstrated by the very even Yes/No 47.5%/52.5% response rate to the question ending Part I – “Do you believe your learning would suffer if lectures were replaced by comprehensive notes, with lecture time used to answer problems and share ideas with other students and the teacher about the course material?” Some used the open ended portion of this question (where respondents were asked to explain their answer) to enthusiastically clarify their “No”, e.g.

I think that is what university should be!

In university we should learn to study by ourselves and also share or debate ideas with people.

Others showed an understandable concern that the “comprehensive notes” would not be sufficient compared to lecturer insight, e.g.

Lectures are the sole avenue of having someone qualified to discuss ideas and demonstrate them. It is also the only avenue to clarify possible misconceptions in the lecture notes (no matter how comprehensive it could be) due to the wordings or the sentence structure. Further, it is often more effective for information to be verbally transmitted.

Other concerns were that students would not be sufficiently organized to do pre-class activities and that students are not confident enough to contribute in class, e.g.

I do not read the lecture materials before class, so my first contact with the lecture materials is through the lecturer's explanation. Then when I go back to study on my own outside, I find that I can understand better.

Seeing the low participation rates when lecturers ask students a question, lectures dedicated just to share ideas will be met with awkward silences.

The clear differences of opinion on this issue demonstrate the need to be very careful when using a flipped classroom approach – a balance between active classroom activities and demonstration/clarification is important. The author's view on the issue of whether students are organized enough to do the (not particularly significant) pre-class reading is to place the responsibility on the students themselves, although with appropriate warning and discussion of the difficulty in following in-class activities if the reading is not completed. Prior research recommends the inclusion of in-class quizzes before moving onto interactive activities, to further encourage the completion of pre-class activities (see Bishop and Verleger, 2013). However one wonders if such a penal approach to this issue actually encourages the practice of self-directed learning, which is a skill that will serve students well in their postgraduate study and career.

In Part II of the survey three Yes/No questions were asked, with each having an opened ended section allowing students to explain their answers. The results of the Yes/No questions are summarized in Table 3, with results split by respondent answers to the final question of Part I of the survey.

Respondents gave largely positive feedback on the class structure, in particular that sufficient opportunity was given for clarification to be sought, e.g.

The discussion forum was a convenient and transparent medium where students could ask questions and look at responses to other people's questions.

Lots of forums available on (Moodle), anonymity was particularly helpful so that I won't be embarrassed to ask silly questions.

This is particularly encouraging given the significant concern of students at the commencement of the course about the opportunities for clarification in a flipped classroom.

These results are largely consistent with the results of the study by Lage et al. (2000), who observed an average score from students of 3.9 across a 1 – 5 Strongly Disagree – Strongly Agree Likert scale from the question “I believe that I learned more economics with this classroom format” upon the introduction of a flipped classroom in an introductory microeconomics course. It is also encouraging to see the strong support of those who took an unfavorable view to the proposed structure at the start of the semester (i.e. those who answered the final question in Part I “Yes”), which for the final overall question in Table 3 is largely the same ($17/24 = 71\%$) as the support of those who took a favorable view ($20/25 = 80\%$). Finally, it should be noted of the potential for bias in the responses due to those more engaged in the course being more likely to respond, although the response rate is relatively high and the attendance rate at class for the course was the highest the teacher had ever experienced over eight years of university teaching.

Table 3: Yes/No Questions of Part II of the Survey

Question	Favorable View of Flipped Classroom at Start of Semester (Yes/Responses)	Unfavorable View of Flipped Classroom at Start of Semester (Yes/Responses)
Did you feel like you had sufficient support (from the notes, teacher, tutor and other students) to learn during the course?	22 / 25 ***	20 / 24 ***
Did you feel that sufficient opportunity was given to students to ask questions of clarification to the teacher (either in class or through the Feedback on Moodle)?	25 / 25 ***	21 / 24 ***
Overall, do you believe the way class time was used in Actuarial Techniques this semester was more beneficial to your learning than a typical lecture format?	20 / 25 ***	17 / 24 **

*** means results are significant at the 10% / 5% / 1% level compared to a null hypothesis that 50% of respondents will answer YES compared to an alternative hypothesis that more than 50% will answer YES.

The number of open-ended responses was far fewer in Part II of the survey than Part I, most likely because of the shorter amount of time available to students at the end of the semester (due to exam preparation) than at the start of the semester. Hence, it was difficult to determine categorical trends in the responses. Positive comments on the lecture experience related mostly to the application of concepts in class and the interactivity of the class, and reflected the deep learning experience of these individuals in the course, e.g.

I believe I got more exposure to the questions directly because I believe it is more important to know how to apply the knowledge you obtain rather than just knowing it. This is because I believe there is a major difference between understanding a theory and applying it.

Engaging and actually having a go at the problem beforehand allowed me to learn more and understand where I needed help in the problem.

(The) lecturer encouraged us to discuss our ideas with other students in lecture, which I found very useful because we helped each other understand the concepts.

Concerns that were expressed by students related chiefly to the requirement to do pre-reading, and unhappiness with the general structure of the course, e.g.

Most of the time, students do not prepare ahead (although this is supposed to be the way). In this case, time spent in class doing questions is sometimes inefficient as students have yet to study the relevant materials.

Lectures are meant to inform students about new concepts and ideas. Whilst it is good that we can practice, most of the time is spent waiting on the others to finish.... I'd rather review those lecture exercises at home after some hint.

CONCLUDING COMMENTS

This paper has considered the value that students place on the traditional lecture format compared to other learning activities and how students' perceptions of the use of class time changes after being involved in a flipped classroom structure. This flipped classroom structure was run in a compulsory final-year course in the undergraduate actuarial program at the Australian National University (ANU), with students taking a two-part survey at the start and end of course to investigate how perceptions of the use of class time change.

Student response to the flipped classroom structure of Actuarial Techniques was largely positive, indicating it to be an approach worth pursuing in future years. While around a 50/50 split of respondents thought the proposed structure would be beneficial at the start of semester, by the end of the semester over 75% of total respondents viewed the flipped classroom as being beneficial to their learning experience compared to a didactic lecture structure. The 25% of students who viewed the flipped classroom as not being beneficial to learning is relatively consistent with the 32% in Schullery et al. (2011) and the 20% in Bates and Galloway (2012).

However, there is still room for improvement in the student learning experience. Looking first at the feedback from respondents to Part I and Part II of the survey, it would be helpful to some students to have a short, pre-recorded (perhaps video) lecture on each topic available in addition to the course notes. This would form an optional part of the pre-reading for each topic and would assist in making the pre-class preparation time more efficient for students. As stated previously, the author is of the opinion that organization issues relating to student pre-preparation is a skill students need to develop for themselves, although a further incentive/threat could be considered in the form of semi-regular in-class quizzes. It would also be useful to have informal extension activities available in-class to those who feel they are being held back by those who haven't done sufficient pre-preparation.

In addition, it should be noted that the results of this study, while considering student perceptions of learning experience, make no comment on the success (or otherwise) of the students in the attainment of the desired learning outcomes of the course. While the literature provides some evidence that active engagement in class improves attainment of learning outcomes, additional data would be required to make that statement in relation to the course considered in this study. However, at the very least, a flipped classroom structure makes it easier to give students the opportunity to practice in-class what they are learning, which is consistent with the constructive alignment approach recommended by Biggs and Tang (2007). Further research could investigate the effect of a flipped classroom structure on the attainment of learning outcomes.

Finally, it is important to consider the academic time taken to deliver a course using a flipped classroom approach. Research and service requirements place significant pressure on many academics to ensure that the time spent teaching is used as efficiently as possible. Course structures that place a significant time

and/or resource burden on academics and/or the university are unlikely to be sustainable. The experience in teaching Actuarial Techniques using a flipped classroom approach for the first time was of an increasing time taken in initial preparation, due to the need to ensure the course notes were sufficiently comprehensive and that in-class exercises were prepared. However, the preparation required before class was much shorter. This was because it was not necessary to prepare for the “performance” of a lecture but simply to be available to answer questions based on the exercises already prepared and to provide a demonstration of how to solve these exercises to the class. In addition, while the initial preparation will not need to be repeated, the benefit of shorter pre-class preparation will continue to be experienced in the future running of the course. Hence, it is possible to run a course in this way without spending significant additional academic time in preparation. These observations are consistent with those of Lage et al. (2000).

The income of many universities is becoming less driven by government and other support and more by student income. Given the improved experience for students noted in this and other studies, and the neutral cost in academic time and resources, academics have a duty to students to explore more engaging and interactive ways of presenting courses such as (but not limited to) flipped classroom approaches.

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INTEGRATING SUSTAINABILITY INTO A GOAL PROGRAMMING EXERCISE

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ABSTRACT

This paper discusses a sustainability exercise for use in a management science course. Specifically, we discuss an exercise using goal programming and Excel Solver for making supplier selection decisions incorporating a triple bottom line approach (economic, environmental and social performance objectives). The multiple, conflicting objectives and the qualitative nature of the social performance objective require the use of multi-criteria decision-making. Our goal programming exercise requires only Excel and could be expanded to include additional triple bottom line criteria.

JEL: C6, M11

KEYWORDS: Sustainability, Management Science, Curriculum, Triple Bottom Line, Goal Programming

INTRODUCTION

Our Supply Chain Management (SCM) program at UW Oshkosh started integrating sustainability into our major in the Fall Semester of 2006 and continues to integrate sustainability into all of our SCM courses. The first widespread definition of sustainability was presented in *Our Common Future* (World Commission on Economic Development, 1987, p. 8) in which sustainable development was defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Other researchers (e.g., Elkington (1994, 1998)) expanded the definition of sustainability to include the triple bottom line criteria of economic, environmental, and social performance. The least understood and under-researched of the three bottom lines is social performance. Mass and Bouma (as cited in Castro & Chousa, 2006) divided the social performance criteria into two broad categories: internal measures (education, training, safety, health care, employee retention, and job satisfaction) and external measures (sponsoring, volunteer work, investment in society, and stakeholder involvement). Norman and MacDonald (2004) argued that it is impossible to calculate a social performance bottom line in the same way that an income statement is created. Summing a company’s performance on various social performance measures into a single bottom line is problematic due to: (a) the question of what units to use to express social performance, and (b) the manner in which social performance often is expressed—using percentages, which cannot be added or subtracted into a single meaningful measure. However, even though managers cannot calculate a bottom line for social performance, we argue that managers still could make value judgments and comparisons concerning which social performance criteria are more important. Multi-criteria decision-making (MCDM) methods, and in particular, goal programming, work well for making these value judgments and comparisons.

Goal programming is an extension of linear programming in which the objective function measures the minimization of unwanted deviations from goals (targets). As discussed by Romero (2004), two of the most common types of objective functions for goal programming models are lexicographic and weighted. The lexicographic type of achievement function, used later in our paper, leads to preemptive, or prioritized, goals. As described by Anderson, Sweeney, Williams, Camm, and Martin (2012), goal programming problems with preemptive priorities are solved by finding the solutions for a sequence of linear programming models with different objective functions: Priority Level 1 goals are considered first,

Priority Level 2 goals second, etc. At each step of the solution procedure, a revision in the solution is allowed only if it causes no reduction in the achievement of higher priority goals previously minimized. Anderson et al. (2012) discussed two types of constraints in a goal programming model: hard constraints, which are typical linear programming constraints that cannot be violated, and soft constraints, which correspond to goal equations and can be violated but with a penalty for doing so (the penalty is represented by deviation variables).

Our paper discusses the continued integration of sustainability concepts in our supply chain management curriculum. We already have added several sustainability exercises in our Manufacturing Planning & Control, Supply Chain Management, Supply Chain Strategy, and Advanced Quality Management courses. In the current paper, we outline the use of goal programming for supplier selection decisions based on triple bottom line criteria. First, we present literature with applications of goal programming for sustainability type of multi-criteria decisions. Second, we present the in-class exercise using goal programming and Excel Solver. Third, we conclude with a summary of the goal programming exercise and possible extensions to this exercise.

LITERATURE REVIEW

Goal programming, with its ability to handle multiple, conflicting criteria, has been used to model sustainability decisions in many contexts, e.g., agricultural planning, utility planning, and supply chain planning. Examples of sustainability decisions in each of these areas are discussed below.

Darradi et al. (2012) discussed the use of goal programming to optimize environmental performance (nitrogen, sediments, and water yields) of agricultural activities in a case study in France. Acosta-Alba et al. (2012) applied goal programming to optimize economic, environmental, and social performance criteria in a study of dairy farms in France. Cisneros et al. (2011) created a goal programming model to analyze the tradeoffs between economic, environmental, and social performance criteria when studying land uses, crops, pastures, and conservation practices in a case study in Argentina.

San Cristobal (2012) developed a goal programming model to determine the mix and location of renewable energy plants in Spain and included economic, environmental, and social performance criteria in that model. Papandreou and Shang (2008) proposed a goal programming model for designing utility systems while considering economic and environmental (emissions) goals. Liner and deMonsabert (2011) considered economic, environmental, and social performance criteria in their goal programming model for selecting water management alternatives using publicly available data from a California utility. Cowan, Daim, and Anderson (2010) combined the analytic hierarchy process (AHP) with goal programming to select an optimal mix of hydroelectric power and storage technologies to achieve triple bottom line objectives. They used AHP to assign weights to the deviational variables within the objective function of their goal programming model.

Oglethorpe (2010) illustrated a goal programming approach using a real case study to create a food supply chain that considers triple bottom line objectives: economic (return on sales); environmental (GHG emissions and water use), and social (health impacts from fat content of products and number of jobs). Buyukozkan and Berkol (2011) also studied designing a sustainable supply chain by combining goal programming with quality function deployment (QFD) and the analytic network process (ANP).

IN-CLASS EXERCISE USING GOAL PROGRAMMING AND EXCEL SOLVER FOR SUPPLIER SELECTION

The exercise described below analyzes the selection of new suppliers to replace a current hazardous material used in the manufacture of a company's product. The buying company must purchase 2,000 units

per year of a similar material that performs the same function as the current material. Each supplier has limits on its capacity—Supplier 1 can provide at most 1,500 units; Supplier 2 can provide at most 1,200 units; Supplier 3 can provide at most 2,500 units.

An explanation of the supplier selection criteria follows.

1. Economic Criterion: Purchase cost savings per unit compared to the current supplier.
2. Environmental Criterion: Hazardous waste per unit generated by the supplier’s process (stated in pounds).
3. Social Performance Criterion: Hours of employment per unit generated in an economically disadvantaged area.

As shown in Table 1, these criteria focus on economic, environmental, and social performance objectives.

Table 1: Estimated Supplier Performance on the Criteria

Criterion	Supplier 1	Supplier 2	Supplier 3
1) Purchase Cost Savings per Unit	\$10	\$25	\$8
2) Hazardous Waste per Unit (lbs.)	1.5	1.2	2.2
3) Hours of Employment per Unit	0.8	0.9	1.0

This table shows estimated supplier performance for all three suppliers on the criteria considered. The first criterion lists the purchase cost savings per unit from changing from the current supplier to each of the new suppliers. The second criterion lists the amount of hazardous waste per unit generated by each supplier’s manufacturing process. The third criterion lists the hours of employment per unit generated in an economically disadvantaged area by each of the supplier’s processes.

Step 1 of the exercise is to prioritize goals and to set targets for each goal:

Priority 1 Goal: The desired annual purchase costs savings must equal at least \$32,000.

Priority 2 Goal: The total amount of hazardous waste generated annually by the suppliers should be at most 1,800 pounds.

Priority 3 Goal: The hours of employment per year generated in economically disadvantaged areas should be at least 2,200.

Step 2 is to define the decision variables, the deviation variables, the goal constraints (in order of priority), and the hard constraints:

Decision Variables:

X_1 = units purchased from Supplier 1.

X_2 = units purchased from Supplier 2.

X_3 = units purchased from Supplier 3.

$$\text{Goal 1 Constraint: } 10X_1 + 25X_2 + 8X_3 - d_1^+ + d_1^- = 32,000 \tag{1}$$

Deviation Variables:

d_1^+ = the amount greater than the goal of \$32,000.

d_1^- = the amount less than the goal of \$32,000.

We wish to minimize the amount less than \$32,000 (represented by d_1^-).

$$\text{Goal 2 Constraint: } 1.5X_1 + 1.2X_2 + 2.2X_3 - d_2^+ + d_2^- = 1,800 \tag{2}$$

Deviation Variables:

d_2^+ = the amount greater than the goal of 1,800 pounds of hazardous waste.

d_2^- = the amount less than the goal of 1,800 pounds of hazardous waste.

We wish to minimize the amount greater than 1,800 pounds (represented by d_2^+).

$$\text{Goal 3 Constraint: } 0.8X_1 + 0.9X_2 + 1.0X_3 - d_3^+ + d_3^- = 2,200 \tag{3}$$

Deviation Variables:

d_3^+ = the amount greater than the goal of 2,200 hours.

d_3^- = the amount less than the goal of 2,200 hours.

We wish to minimize the amount less than 2,200 hours (represented by d_3^-).

Hard Constraints:

$$\text{Supplier 1 Capacity: } X_1 \leq 1,500 \quad (4)$$

$$\text{Supplier 2 Capacity: } X_2 \leq 1,200 \quad (5)$$

$$\text{Supplier 3 Capacity: } X_3 \leq 2,500 \quad (6)$$

$$\text{Total Demand: } X_1 + X_2 + X_3 = 2,000 \quad (7)$$

Step 3 is to define the objective function. Here, we use the lexicographic approach demonstrated by Anderson et al. (2012):

$$\text{Objective Function: } \text{Min } P_1(d_1^-) + P_2(d_2^+) + P_3(d_3^-) \quad (8)$$

P_1 , P_2 , and P_3 are only labels—they remind us of the priority of each goal.

Step 4 is to write the complete goal programming model:

$$\text{Objective Function: } \text{Min } P_1(d_1^-) + P_2(d_2^+) + P_3(d_3^-) \quad (9)$$

Subject to:

$$\text{Goal 1 Constraint: } 10X_1 + 25X_2 + 8X_3 - d_1^+ + d_1^- = 32,000 \quad (10)$$

$$\text{Goal 2 Constraint: } 1.5X_1 + 1.2X_2 + 2.2X_3 - d_2^+ + d_2^- = 1,800 \quad (11)$$

$$\text{Goal 3 Constraint: } 0.8X_1 + 0.9X_2 + 1.0X_3 - d_3^+ + d_3^- = 2,200 \quad (12)$$

$$\text{Supplier 1 Capacity: } X_1 \leq 1,500 \quad (13)$$

$$\text{Supplier 2 Capacity: } X_2 \leq 1,200 \quad (14)$$

$$\text{Supplier 3 Capacity: } X_3 \leq 2,500 \quad (15)$$

$$\text{Total Demand: } X_1 + X_2 + X_3 = 2,000 \quad (16)$$

$$\text{Non-negativity: } X_1, X_2, X_3, d_1^+, d_1^-, d_2^+, d_2^-, d_3^+, d_3^- \geq 0 \quad (17)$$

Step 5 is to solve the model using Excel. To do this, first we modify the objective function to include only the P_1 priority goals (called the P_1 Problem):

P_1 Problem:

$$\text{Objective Function: } \text{Min } d_1^- \quad (18)$$

Subject to:

$$\text{Goal 1 Constraint: } 10X_1 + 25X_2 + 8X_3 - d_1^+ + d_1^- = 32,000 \quad (19)$$

$$\text{Goal 2 Constraint: } 1.5X_1 + 1.2X_2 + 2.2X_3 - d_2^+ + d_2^- = 1,800 \quad (20)$$

$$\text{Goal 3 Constraint: } 0.8X_1 + 0.9X_2 + 1.0X_3 - d_3^+ + d_3^- = 2,200 \quad (21)$$

$$\text{Supplier 1 Capacity: } X_1 \leq 1,500 \quad (22)$$

$$\text{Supplier 2 Capacity: } X_2 \leq 1,200 \quad (23)$$

$$\text{Supplier 3 Capacity: } X_3 \leq 2,500 \quad (24)$$

$$\text{Total Demand: } X_1 + X_2 + X_3 = 2,000 \quad (25)$$

$$\text{Non-negativity: } X_1, X_2, X_3, d_1^+, d_1^-, d_2^+, d_2^-, d_3^+, d_3^- \geq 0 \quad (26)$$

The Excel spreadsheet is shown in Figure 1. The Changing Variable Cells are shaded in Cells B4:J4. You would leave them blank initially, although now in Figure 1, they show the results of the first solution from running Solver. The Set Objective Cell is shaded in Cell B7. The coefficients and right-hand-side values for constraints are listed in Rows 10 to 16. We simplify the entering of constraints as shown in Rows 18 to 24.

Figure 1: Solver Model for P_1 Problem Classroom Use

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Figure 1													
2	P_1 Problem													
3	Variables:	X1	X2	X3	d1+	d1-	d2+	d2-	d3+	d3-				
4		1,200	800	0	0	0	960	0	0	520				
5		Min												
6	Objective	d1-												
7	Function:	0	=F4											
8														
9	Subject to:	Enter coefficients and right-hand-side values for constraints here.												
10	Goal 1:	10	25	8	-1	1						=	32,000	
11	Goal 2:	1.5	1.2	2.2			-1	1				=	1,800	
12	Goal 3:	0.8	0.9	1					-1	1		=	2,200	
13	S1 Capacity:	1										≤	1,500	
14	S2 Capacity:		1									≤	1,200	
15	S3 Capacity:			1								≤	2,500	
16	Demand	1	1	1								=	2,000	
17		Simplification of constraints using SUMPRODUCT function.												
18	Goal 1:	32,000	=SUMPRODUCT(B\$4:J\$4,B10:J10)										=	32,000
19	Goal 2:	1,800	=SUMPRODUCT(B\$4:J\$4,B11:J11)										=	1,800
20	Goal 3:	2,200	=SUMPRODUCT(B\$4:J\$4,B12:J12)										=	2,200
21	S1 Capacity:	1,200	=SUMPRODUCT(B\$4:J\$4,B13:J13)										≤	1,500
22	S2 Capacity:	800	=SUMPRODUCT(B\$4:J\$4,B14:J14)										≤	1,200
23	S3 Capacity:	0	=SUMPRODUCT(B\$4:J\$4,B15:J15)										≤	2,500
24	Demand	2,000	=SUMPRODUCT(B\$4:J\$4,B16:J16)										=	2,000

This figure shows the Excel spreadsheet created to run the Solver model for the P_1 problem. Cells B4:J4 are used for the Changing Variable Cells. Cell B7 is used for the Set Objective Cell. The formula for Cell B7 is listed in Cell C7. Cells B10:M16 are used to enter the coefficients and right-hand-side values for constraints. Rows 18 to 24 are used for entering the left-hand-side and right-hand values of each constraint. The formulas used for the left-hand-side of each constraint are shown in Cells C18:C24.

To run Solver, we specify the following:

1. For Set Objective Cell, enter: B7
2. Select “Min”
3. For Changing Variables Cells, enter: B4:J4
4. Select “Add” to enter the following constraint: B18:B20=M18:M20
5. Select “Add” to enter the following constraint: B21:B23≤M21:M23
6. Select “Add” to enter the following constraint: B24=M24
7. After entering the last constraint, select “OK”
8. Ensure that the following is checked to ensure non-negativity: “Make Unconstrained Variables Non-Negative”
9. For Solving Method, select “Simplex LP”
10. Select “Solve”

After running Solver, we have the following values for the variables:

$$X_1 = 1,200; X_2 = 800; X_3 = 0; d_1^+ = 0; d_1^- = 0; d_2^+ = 960; d_2^- = 0; d_3^+ = 0; d_3^- = 520.$$

We can tell that we achieved our Priority 1 Goal fully because $d_1^- = 0$.

Note that there are multiple solutions possible for this P_1 problem. As long as your solution has $d_1^- = 0$, it is correct. When we solve the P_2 and P_3 problems, the solutions will converge.

P_2 Problem

Next, we modify the objective function to include only the P_2 priority goals (called the P_2 Problem). We also must add a constraint to ensure that the solution from the P_1 Problem is not degraded. These changes

Figure 2: Solver Model for P_2 Problem Classroom Use

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Figure 2													
2	P_2 Problem													
3	Variables:	X1	X2	X3	d1+	d1-	d2+	d2-	d3+	d3-				
4		800	1,200	0	6,000	0	840	0	0	480				
5		Min												
6	Objective	d2+												
7	Function:	840	=G4											
8														
9	Subject to:	Enter coefficients and right-hand-side values for constraints here.												
10	Goal 1:	10	25	8	-1	1						=	32,000	
11	Goal 2:	1.5	1.2	2.2			-1	1				=	1,800	
12	Goal 3:	0.8	0.9	1					-1	1		=	2,200	
13	S1 Capacity:	1										≤	1,500	
14	S2 Capacity:		1									≤	1,200	
15	S3 Capacity:			1								≤	2,500	
16	Demand	1	1	1								=	2,000	
17		Simplification of constraints using SUMPRODUCT function.												
18	Goal 1:	32,000	=SUMPRODUCT(B\$4:J\$4,B10:J10)										=	32,000
19	Goal 2:	1,800	=SUMPRODUCT(B\$4:J\$4,B11:J11)										=	1,800
20	Goal 3:	2,200	=SUMPRODUCT(B\$4:J\$4,B12:J12)										=	2,200
21	S1 Capacity:	800	=SUMPRODUCT(B\$4:J\$4,B13:J13)										≤	1,500
22	S2 Capacity:	1,200	=SUMPRODUCT(B\$4:J\$4,B14:J14)										≤	1,200
23	S3 Capacity:	0	=SUMPRODUCT(B\$4:J\$4,B15:J15)										≤	2,500
24	Demand	2,000	=SUMPRODUCT(B\$4:J\$4,B16:J16)										=	2,000
25	P_1 Problem Solution	0	=F4										=	0

This figure shows the Excel spreadsheet created to run the Solver model for the P_2 problem. Cells B4:J4 are used for the Changing Variable Cells. Cell B7 is used for the Set Objective Cell. The formula for Cell B7 is listed in Cell C7. Cells B10:M16 are used to enter the coefficients and right-hand-side values for constraints. Rows 18 to 25 are used for entering the left-hand-side and right-hand values of each constraint. The formulas used for the left-hand-side of each constraint are shown in Cells C18:C25.

are shown in Figure 2. We need to change the formula in Cell B7 as follows: =G4. This change allows us to minimize d_2^+ . Next, we must add a constraint to ensure that the Priority 1 Goal is not degraded, i.e., ensure that $d_1^- = 0$. We make this change as shown in Row 25 and then enter another constraint in Solver: B25=M25.

After running Solver, we have the following values for the variables:

$X_1 = 800$; $X_2 = 1,200$; $X_3 = 0$; $d_1^+ = 6,000$; $d_1^- = 0$; $d_2^+ = 840$; $d_2^- = 0$; $d_3^+ = 0$; $d_3^- = 480$.

We maintained the achievement of the Priority 1 goal ($d_1^- = 0$). As for the Priority 2 goal, we can see that we were not able to meet this goal fully because $d_2^+ = 840$.

P_3 Problem

Next, we modify the objective function to include only the P_3 priority goals (called the P_3 Problem). We also add a constraint to ensure that the solution from the P_2 Problem is not degraded. These changes are shown in Figure 3. Then, we change the formula in Cell B7 as follows: =J4. This change allows us to minimize d_3^- . Next, we add a constraint to ensure that the Priority 2 Goal is not degraded, i.e., ensure that $d_2^+ = 840$. We make this change as shown in Row 26 and then enter another constraint in Solver: B26=M26.

Notice that when solving the P_3 problem, we were unable to improve the solution from the P_2 problem. This means any improvement of the P_3 problem would degrade either the P_1 or P_2 solutions. Therefore, we have found our best solution above.

SUMMARY & POSSIBLE EXTENSIONS

The goal of this paper was to demonstrate an in-class exercise using goal programming and Excel Solver. We presented triple bottom line objectives along with performance metrics for each objective. We could modify the Excel Solver model in future exercises in the following ways (a) to include more objectives (goal constraints) and (b) to consider multiple objectives at the same priority level. Another possible follow-up exercise involves asking students to ponder which triple bottom objectives are important to a supplier selection decision and how to prioritize those objectives. Kearins and Springett (2003) described this type of thinking as “reflexivity.” Reflexivity requires students to think about both personal and societal values. For example, is the production of CO_2 desirable or undesirable? Other questions include the following: (a) What other triple bottom line objectives would you include in the supplier selection decision and how would you prioritize those objectives if you were a purchasing manager at a company? (b) Now, revisit the previous questions and pretend now that you are the owner of the company. This type of follow-up question may lead students to place greater emphasis on economic objectives when they are spending their own money, rather than the company’s money.

Figure 3: Solver Model for P_3 Problem Classroom Use

	A	B	C	D	E	F	G	H	I	J	K	L	M	
1	Figure 3													
2	P_3 Problem													
3	Variables:	X1	X2	X3	d1+	d1-	d2+	d2-	d3+	d3-				
4		800	1,200	0	6,000	0	840	0	0	480				
5		Min												
6	Objective	d3-												
7	Function:	0	=J4											
8														
9	Subject to:	Enter coefficients and right-hand-side values for constraints here.												
10	Goal 1:	10	25	8	-1	1						=	32,000	
11	Goal 2:	1.5	1.2	2.2			-1	1				=	1,800	
12	Goal 3:	0.8	0.9	1					-1	1		=	2,200	
13	S1 Capacity:	1										≤	1,500	
14	S2 Capacity:		1									≤	1,200	
15	S3 Capacity:			1								≤	2,500	
16	Demand	1	1	1								=	2,000	
17		Simplification of constraints using SUMPRODUCT function.												
18	Goal 1:	32,000	=SUMPRODUCT(B\$4:J\$4,B10:J10)										=	32,000
19	Goal 2:	1,800	=SUMPRODUCT(B\$4:J\$4,B11:J11)										=	1,800
20	Goal 3:	2,200	=SUMPRODUCT(B\$4:J\$4,B12:J12)										=	2,200
21	S1 Capacity:	800	=SUMPRODUCT(B\$4:J\$4,B13:J13)										≤	1,500
22	S2 Capacity:	1,200	=SUMPRODUCT(B\$4:J\$4,B14:J14)										≤	1,200
23	S3 Capacity:	0	=SUMPRODUCT(B\$4:J\$4,B15:J15)										≤	2,500
24	Demand	2,000	=SUMPRODUCT(B\$4:J\$4,B16:J16)										=	2,000
25	P_1 Problem Solution	0	=F4									=	0	
26	P_2 Problem Solution	840	=G4									=	840	

This figure shows the Excel spreadsheet created to run the Solver model for the P_3 problem. Cells B4:J4 are used for the Changing Variable Cells. Cell B7 is used for the Set Objective Cell. The formula for Cell B7 is listed in Cell C7. Cells B10:M16 are used to enter the coefficients and right-hand-side values for constraints. Rows 18 to 26 are used for entering the left-hand-side and right-hand values of each constraint. The formulas used for the left-hand-side of each constraint are shown in Cells C18:C26.

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INTEGRATING WRITING ASSIGNMENTS INTO AN HISTORICALLY NON-WRITING INTENSIVE COURSE

William E. Bealing, Jr., Shippensburg University of Pennsylvania

ABSTRACT

Students, faculty, alumni and employers all agree that it is important for students to acquire strong communications skills. However, finding a way to integrate writing assignments into technical courses, such as mathematics and accounting, can prove to be a challenge. This paper discusses one approach to address the problem. Specifically, one course writing assignment, evaluated with the StyleWriter software package, is presented. The use of StyleWriter and a rubric tailored to it, allow the instructor to provide timely, detailed feedback to students regarding both mechanical writing difficulties and content related issues. It is hoped that more faculty will adopt software to help evaluate writing assignments and allow students to hone their writing skills.

JEL: M41, M49

KEYWORDS: StyleWriter, Writing Assignment, Rubric

INTRODUCTION

Both faculty and employers agree that producing students who possess strong writing skills is important. Students also recognize the importance of being able to write well. When asked about various skills they need to strengthen, students identify writing as being critical to future success three times more than any other (Light, 2001). Attention to written communications abilities is probably well placed. Worth (1990) surveyed Harvard alumni and asked them to rate the importance of several skills to their current work and other endeavors. She found that more than 90% of them ranked the “need to write effectively” as “of great importance”. Gray et al. (2005) have found a range of studies identify the lack of excellent writing skills by new graduates is a global concern.

The remainder of this paper is organized as follows. The next section reviews work in the area of integration of writing into the curriculum. Following the literature review, one specific approach and methodology to the integration of writing into one, historically non-writing intensive course is discussed. The results, as well as implications for the assessment of student work appear after the methodology section. The paper ends with some concluding comments and an eye to possible future research.

LITERATURE REVIEW

Writing skills are widely acknowledged to be of critical importance for virtually any college graduate. According to Emir (1977), writing is a unique mode of learning. She goes on to argue that students’ learning is improved if the learning process includes writing. However, producing graduates with strong written communications skills has been a neglected element of many university programs. Glenn (2011) noted that according to the Chronicle of Higher Education, business majors are typically exposed to less than five writing intensive courses before graduation. Arum and Roksa (2010) found that business majors also tend to have weak gains on national tests of writing. Quible (2011) has gone on to state, “...most faculty members don’t see it as a priority to help students improve their writing.” Melissa Hudler, the Director of the Writing Center at Lamar University, has stated that it is unrealistic to expect most instructors to assign full length papers (2011).

What is driving this state of affairs? According to Kiefer (2000), most teachers feel uncomfortable examining student papers for grammatical and stylistic issues. Lunsford (2012) identifies a time factor which limits the number of writing assignments required of students. She suggests that while instructors, "...do not have time to grade papers continuously (it) should not interfere with students' potential to learn through writing." On the other hand, when instructors do assign writing to their students, they should provide adequate feedback about any shortcomings they identify. Elbow and Sarcinelli (2011) state that instructors should take the time necessary to write their comments on separate pieces of paper rather than simply put short comments in the margins of a student's paper.

While the above works indicate the importance of writing skills and some of the problems with integrating writing assignments into non-English Department courses, many authors have addressed the issue head-on. The late 1980's saw a move to incorporate writing throughout a student's entire college career. Carson (1992) reported that writing across the curriculum was considered to be one of the successful reforms in U.S. education. Ekroth (1990) noted that, "Professors are now expected to not only 'cover the material', but also to help students to think critically, write skillfully and speak competently". Hirsch and Collins (1988) discuss the use of memoranda and case analysis projects incorporated into managerial and cost accounting courses to help improve student writing. Stoudt et al. (1991) applauded this type of approach because it provided students with a sense of realism since it made them write for a specific audience. Riordan et al. (2000) required tax and intermediate accounting students to purchase *Effective Writing: A Handbook For Accountants* by May and May (1996). Students were then given multiple assignments from the handbook during the courses. Not only were students required to write, they were given a chance to earn additional points by revising their original papers in response to faculty comments. The authors report the result was a significant improvement in writing skills for junior level students.

However, students may fail to fully comprehend the value of discipline specific writing. Marbach-Ad and Ariv-Elyashiv (2005) found that 63% of science students agreed that scientific writing was an important part of undergraduate education. Yet, when asked to rank the importance of eight factors, these same students ranked scientific writing skills as second from the bottom. The authors went on to recommend an approach to writing which encourages students to focus on the content of the assignment, rather than to fixate on writing mechanics at the expense of expression of ideas. As they put it, "Begin by recognizing that your primary goal is to respond rather than proofread". (p. 17) Others (Curto and Bayer 2005; Huot 2002 and Straub 2000) have also found that prioritization of the content portion of assignments is an approach which is pedagogically sound.

No matter how sound something may be from the standpoint of pedagogy, a final piece of the puzzle is that of assessment. Martell and Calderon 2005 and Suskie 2004 sum things up by asking if we are actually producing graduates with the knowledge and skills demanded by the marketplace. They make a strong case that instructors need to assess course goals in order to answer that question.

DATA AND METHODOLOGY

How can faculty integrate more writing assignments into their courses? This is a particularly vexing problem if the course in question is a traditionally technical course, such as a mathematics or accounting course. Faculty members in these courses generally spend the vast majority of their time explaining and presenting problems and other technical concepts. Similarly, the homework assigned in these courses tends to be of a technical nature. Usually there is a dearth of writing assignments. However, this does not have to be the case.

The use of software packages known alternatively as "style checkers", "grammar checkers", or "writing enhancement software" can greatly reduce the time an instructor spends grading and providing feedback

on “nuts and bolts” writing issues. This frees the instructor to focus on the students’ development and discussion of technical topics. Students are not short-changed because they will still be provided with specific suggestions for improvement of writing mechanics. However, because the instructor has more time to devote to the technical discussion and presentation of ideas, students are sent a clear message that content matters.

Three software packages were considered for use. These were 1) Microsoft (MS) Word’s built in grammar checker, 2) WhiteSmoke and 3) StyleWriter. A few of the advantages and disadvantages of each of the packages can be summarized as follows. MS Word is very widely used. A big advantage to anyone using MS Word is that the grammar checking component is already built in and, therefore, available at no additional cost. A disadvantage is that it only checks for relatively low level grammar errors. While it identifies possible deficiencies in writing, it generally does not provide a detailed explanation of the error. It also does not provide possible alternative wording of sentences.

WhiteSmoke is a separate package that, in addition to basic grammar correction capabilities, provides writing enhancement tools. One such tool was termed a “writing tool menu”. It allows users to do such things as find synonyms, add adjectives and adverbs to sentences and find definitions for words. One downside to WhiteSmoke is its additional cost.

StyleWriter is a separate package that, once loaded, integrates into MS Word and analyzes a document for both style and usage errors. The following information was taken directly from the StyleWriter web-site: StyleWriter is an add-on to Microsoft Word to help you edit everything you write into a model of clear English...StyleWriter can help with any type of writing task...StyleWriter marks up your document and show you how to edit each sentence. StyleWriter assumes you can write a sentence and doesn’t check your grammar-as Microsoft Word already offers you this feature. (StyleWriter)

StyleWriter provides an overall score/rating for each paper in three different areas, “style”, sentence length and an active/passive index. StyleWriter not only identifies items it considers to be problematic, it provides a description of the specific problem and presents recommendations for correction of the problem. StyleWriter seems to be well suited to most business writing situations in that its goal appears to be the elimination of excessive words. This results in a document that is clear and concise, a hallmark of good business writing. One downside to StyleWriter is its additional cost. This consideration is discussed below.

The rest of this section details the approach taken to integrate a writing assignment into one intermediate-level accounting course. Since the course in question is a business course, StyleWriter’s goal of producing succinct writing made it the prime candidate for consideration. (The current version of the software may be downloaded at: <http://www.stylewriter-usa.com/> for \$150 US).

The instructor selected and used StyleWriter to aid in the evaluation of one written assignment. The intent of the assignment was two-fold. First, it would require students to produce a short research paper and thus, require students to write in a course where, historically, they did not. Second, the assignment would provide students the opportunity to practice researching important issues which do not have clear cut answers.

A tailored grading rubric was developed which would dovetail into the types of comments that StyleWriter would provide when it evaluated a paper. Students were given the assignment, along with specific instructions to turn in both an electronic copy (which could be evaluated by StyleWriter) via email and a hard copy, upon which the instructor could provide written comments relative to the content of the student’s writing. The project was then evaluated and graded on the basis of both basic writing skills and soundness of logic and content. The use of the combination of the MS Word grammar/spell checker and StyleWriter provided a mechanism allowing for rapid grading of the writing elements of

students' papers only. It did not absolve the instructor from evaluating the technical discussions presented by the students.

RESULTS

StyleWriter provided a scoring of each paper in the categories of 1) Style, 2) Sentence Length and 3) Passive/Active writing at the top right of the first page of the marked up copy. The instructor incorporated these scores, along with a score for the logic/content component, into a rubric. This approach allowed for the relatively fast grading of writing assignments. Rapid feedback, combined with detailed comments on both content and writing is beneficial to students and faculty. Students no longer received a paper with comments like "grammar error" or "writing difficulty". StyleWriter's report indicated the specific rule of grammar which was broken and provided alternative wording to correct the possible problem. Simultaneously, the instructor could concentrate his/her comments on the more technical issues that were to be addressed in the paper. They could focus their grading and comments to students, on content related issues, while allowing StyleWriter to provide detailed feedback and suggestions about mechanical writing issues. Students were sent a strong message that they can't simply target their writing to "satisfy some computer". They needed to organize and present their thoughts and ideas in a clear and technically correct manner, while also following the rules of basic grammar and punctuation. It was not enough to satisfy the mechanics of writing but not be able to understand and communicate the technical content of the course. The result of the application of technology to the evaluation of student writing is thought to be an advantage to both faculty and students.

The actual project assigned, including the scoring rubric and paper submission instructions are contained in Appendix A. Students were instructed to submit both an electronic copy via email AND a hard copy of their papers. The electronic copy was opened in Microsoft Word. The instructor could then scan the document at that point for any obvious grammar/punctuation issues that have been identified by Word and that the student should have dealt with prior to submission. If more than a minimum specified number of problems are found, an appropriate grade can be assigned for not meeting the minimum quality level for the assignment and no further grading action would be required. (Note: The instructor could also immediately return the paper to the student for rework and assess the appropriate penalty at this point, if desired). Assuming no obvious problems were identified by Word, the instructor will then run the paper through the StyleWriter add-in. The result is an electronic copy of the student's paper that has been marked up to identify possible writing difficulties and suggested alternatives. StyleWriter produced the marked up copy of a paper in approximately one minute (depending on the overall length of the paper submitted). The instructor was then able to save the "corrected" paper in a "graded papers" folder. When all assignments had been run through StyleWriter, the instructor was able to easily email students copies of their assignments with detailed feedback about possible writing issues clearly identified and possible alternatives for them to consider. The instructor handed back the hard copies of assignments with traditional hand-written comments pertaining to the content portion of the assignment.

It is noteworthy that StyleWriter provided a scoring of each paper's writing. The instructor was easily able to complete the grading of the writing mechanics portion of the assignment based upon the output provided by StyleWriter. The instructor was still required to evaluate the logic/content portion of a student's writing. This was relatively easy to do when freed up from the time consuming task of identifying mechanical writing difficulties and suggesting alternatives.

Overall, StyleWriter greatly aided the faculty member in grading and providing rapid feedback for the first goal, the mechanics of writing component. For the second goal, the instructor could spend the time necessary to critically evaluate the quality of a student's arguments and technical content. The use of StyleWriter, indeed, allowed the instructor to prioritize the content portion of the assignment.

ASSESSMENT

One cogent question is, does the use of StyleWriter actually result in improved writing? There are several approaches that could be taken to address this issue. First, a pretest/posttest design could be used. Under such an approach, an instrument could be administered to students during the first week or two of class. The same instrument could be administered to the students at the end of the course (after they were exposed to the StyleWriter project). If a significant improvement is found, the inference is that it is due to the exposure and learning caused by the StyleWriter project.

A second alternative exists. Under this approach the performance of a control group could be compared to that of a treatment group. If an instructor has multiple sections of a course, one or more could be assigned a writing project using StyleWriter (treatment). One or more sections could be assigned projects without the use of StyleWriter. At the end of the course, a common instrument could be administered to all sections to determine if there were any significant differences in writing between the control and treatment groups.

CONCLUDING COMMENTS

Faculty, students, alumni and employers all agree that writing skills are critical for career success. However, it may be problematic to incorporate written assignments into courses that are traditionally more quantitative in nature. The demands of such courses may not allow instructors much time to grade written assignments in addition to the technical projects required by the course. This is especially true if the class size is large and timely feedback is to be provided. This paper has presented one alternative that assigns written projects, yet allows faculty to provide students with timely, detailed feedback. The approach outlined in this paper has been used for several semesters. Overwhelmingly, students like the detailed feedback and the suggested alternatives provided to them. They were told when the marked up versions of their papers were returned, that the software is not infallible. They should look at their papers and the comments received as a whole...not simply focus on one or two items. If they believed they had been unfairly evaluated in their technical writing skills, they should redo the paper incorporating the suggestions provided by StyleWriter. If they still believed they had been wrongly evaluated, they should contact the instructor. During the several semesters that the project had been administered, the instructor had only two or three students in total ask for a re-evaluation of their work. Overall, the instructor believes the approach discussed above has produced benefits for both students as well as faculty.

There are several variations that could be made to the project. First, the project could be modified to allow students to resubmit their papers AFTER providing comments on content and writing. This would allow them the opportunity to revise and, hopefully, improve their projects. This variation was actually considered but rejected because the “real world” usually only presents one chance to submit a proposal to a potential client. The businessperson works toward a definite deadline with only one chance to get the final product right. Whether the instructor allows for revision of projects may revolve around one issue. Do they wish to emphasize the importance of having a polished product in response to a firm deadline or do they want to give their students a chance to concentrate on their writing skills. In an ideal world, a mix of projects, some using each approach may be beneficial. Second, a site license for StyleWriter could be obtained and installed in a setting such as a computer lab. Students could then be notified of the presence of StyleWriter and advised to use it during the completion of the course project. That way the instructor could still simulate a hard and fast deadline, but students could still avail themselves of the feedback provided by StyleWriter before submitting their papers. In addition to improving writing for an individual project, the presence of StyleWriter in a lab setting would allow students to get feedback on their writing for any course. This hybrid approach to allowing students access to feedback on their writing, yet having only one chance to submit a polished final project may hold the most merit of all.

APPENDIX

Appendix A: Writing Assignment

INTERMEDIATE ACCOUNTING II
WRITING ASSIGNMENT: 91-322
DR. XXXXX XXXXX
SPRING 2012

Politicians have devised many plans to curb air pollution in recent years. One highly visible plan calls for the government to set a cap (limit) on how much pollution in total will be allowed. It will then issue companies credits (licenses) to pollute based on their size/industry/etc. If a company ends up polluting less than its cap allows, it would have extra credits which it may trade or sell to other companies. While the viability of such plans is outside of the bounds of this class, discussion of any potential accounting issues is not. Variations of the plan outlined above have been discussed throughout the world. However, there is no single accepted accounting treatment for the issuance of credits and/or subsequent trading allowed under such plans. I would, therefore, like you to prepare a technical report that includes discussion **AND** analysis of accounting issues that would occur if such a plan is enacted. Your discussion should include, but is not necessarily be limited to:

- a. Any balance sheet problems/issues surrounding such a plan.
- b. Any income statement issues surrounding such a plan.

Explain the issues as if you were presenting them to someone who has only had a basic accounting course, such as Financial Accounting—avoid jargon whenever possible. You need to explain the background and state the issues clearly and explain alternative treatments thoroughly. Do NOT simply use jargon filled quotes. You should clearly state, in your own words, the treatment that you believe to be proper for any company that would be subject to the environmental regulations described above.

All papers must be prepared using a MS Word. You are to use The Portable Business Writer, 1999, Houghton Mifflin (By Murdick) [or other style manual] as a reference tool for the style and form of your papers. BOTH A HARD COPY AND A MS WORD FILE COPY of the paper is due by the BEGINNING OF CLASS on April 5, 2012. Assignments will be graded as follows (50 pts total):

- Maximum of 30 points for writing component (see next page for details) of your paper
- Maximum of 20 points for completeness/correctness of your paper

Be certain the paper is adequately cited! [If you do not know the difference between a bibliography and a works cited list, I suggest you consult your English Composition professor!] **PLAGERISM WILL NOT BE TOLERATED—IF THE PAPER IS NOT ADEQUATELY CITED, YOU WILL RECEIVE A GRADE OF ZERO FOR THE ASSIGNMENT!** Remember, you must provide authoritative support for your position on the proper treatment of the accounting issues. A reader should easily be able to locate the authoritative source(s) of the information you used to support your position.

Late papers and those turned in outside of class on the due date will earn a score of zero.

In the case of chronic writing difficulties---I will stop grading the paper and award a total score of 10 pts if I encounter more than five major errors on a page OR the writing is so difficult to follow that I can't understand what you are trying to say! Proofread for clarity before handing in your papers. Use short, simple sentences that are easily understood.

A Couple of Style Issues:

Do NOT use “watermarks” or similar markings to simulate the paper having been prepared on quality stationary.

1. Do NOT use any italics in the body of the paper.
2. If there is any need for a footnote...please use endnotes.
3. Please use double spacing and block style.
4. You may use either MLA or APA style for citations...just be consistent with your style.

Explanation of Score for Writing Component:

Your “writing component score” will be evaluated on the following three criteria:

1. Basic Writing Style (50% of Grade)-This category examines items such as (but not limited to), grammar/punctuation errors, spelling, confused words, clichés, overused words
2. Sentence Length (25% of Grade)-For a technical report, you should strive to keep your writing clear and concise. Ideally, your sentences should be about 15-20 words long. (Longer sentences tend to obscure meaning.) A few tips that may help you achieve this goal:

-Avoid jargon and vague writing.

-Use simple, instead of complex words.

-Use examples and illustrations to explain difficult items.

3. Passive/Active Writing (25% of Grade)-You should avoid passive writing. It tends to be dull and long-winded. Active writing, on the other hand, tends to be interesting and readable. The following examples initially show a “passive” sentence followed by an “active” sentence:
 - a. Accounting majors are involved in the researching of highly specialized topics.
 - b. Accounting majors research specialized topics.
 - a. The two equations are used to link the data that has been taken from the sample questionnaires.

-
- b. The two equations link the data from the sample questionnaires.
 - a. After the application has been considered you may be contacted and you may be invited for an interview.
 - b. After we have considered your application, we may invite you for an interview.
- 30 Pts Scores in all three categories average in the excellent range
 - 25 Pts Scores for all three categories average in the very good range
 - 20 Pts Scores for all three categories average in the above average range
 - 15 Pts Scores for all three categories average in the good/average range
 - 10 Pts Scores for all three categories average in the bad/below average range
 - 5 Pts Scores for all three categories average in the poor/dreadful range
-

(Explanation of Score for the Completeness/Correctness" Component appears on next page)

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EVALUATION OF A FLIPPED CLASSROOM IN AN UNDERGRADUATE BUSINESS COURSE

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ABSTRACT

This study examined the results of a flipped classroom trial conducted for Business 1112, an introductory business course at Mount Saint Vincent University in the fall semester of 2012. Dr. Findlay-Thompson taught three sections of Business 1112 and used the flipped classroom style for one of the three sections and the traditional lecture-style teaching methodology for the other two. Post-term interviews were conducted with the students in the flipped classroom to gather information on their views of the learning environment in a flipped classroom. As well, a comparison of the quantitative results of the grades between the three sections was used to compare the academic outcomes between the two teaching methodologies. Student views on the flipped classroom were mixed and the academic outcomes were identical between the three classrooms. These findings are discussed in terms of how the flipped classroom teaching methodology needs to be implemented properly and whether or not it is an effective way to engage students in the learning process.

JEL: A22, I21

KEYWORDS: Flipped Classroom, Effectiveness

INTRODUCTION

Educators are continually challenged to find new strategies for engaging students in the classroom so as to increase the effectiveness of the learning process. A flipped classroom inverts the normal learning process. It “moves the lectures outside the classrooms and uses learning activities to move practice with concepts inside the classroom” (Strayer, 2012, p. 171). The use of technology is a key component in allowing lectures to be pre-recorded and made available to students outside of the classroom setting. The philosophy behind the flipped classroom teaching methodology is that it allows instructors to teach both content and process. Eric Mazur a professor of physics at Harvard University suggested that “Learning is a two-step process. First, you must have some transfer of information; second you must make sense of that information by connecting it to your own experiences and organizing the information in your brain” (Demski, 2013, p. 34). The flipped classroom is designed to create a classroom experience that inspires lifelong learning and meets the objectives of Mazur’s reference to a two-step process. Despite the recent accolades being extolled to the flipped classroom, there are also cautions about the need for both teachers and students to be properly trained in how to use and teach a flipped class. The remainder of this paper will review the relevant literature and how it integrates with the findings in this study. We will examine the data from actual results of a flipped classroom based on an experiment where the same professor taught an identical undergraduate business course to three sections using the flipped classroom methodology in one and traditional lecture-style teaching in the other two. The results will then be presented and the paper will close with some concluding comments.

LITERATURE REVIEW

In 2008, Jonathan Bergmann and Aaron Sams, two chemistry teachers at Woodland Park High School in Colorado’s Pike Peak, were finding it difficult to find the time to reteach lessons for absent students. They used their own money and bought software that allowed them to record lessons and they posted them online. The results were unexpected – they found that even students who had not missed class were

watching the recordings because it helped them review and reinforce classroom lessons. This led to Bergmann and Sams rethinking how they used class time and the subsequent concept of a flipped classroom (Tucker, 2012).

A flipped classroom is most commonly described as a reversed teaching model where the teacher uses various forms of technology such as videos to record the normal classroom lectures and students are required to view these recorded lectures outside the regularly scheduled classroom time. This allows for the homework portion, or other interactive activities, to be completed within the classroom setting. The intent is to create a more collaborative learning environment where students are focused on working through problems with both the guidance of their teachers and the support of their peers. According to Tucker (2012) teachers that use the flipped classroom model universally agree that viewing the recorded videos outside class time are not enough to make the model successful. Rather, it is how teachers integrate these instructional videos into an overall approach that makes the difference.

Mark Frydenberg (2012) is a senior lecturer in computer information systems and involved with a company that produces software for the flipped classroom, CIS Sandbox. He cautions that although the flipped classroom premise is very simple and it is an effective way to engage students in learning it is not a “one size fits all” model. On the teaching side, he suggests that many instructors find it difficult to put their egos aside as they make the shift from being the “sage on the stage” to becoming the “guide on the side” and that many “students need an incentive to watch videos at home just like they need to be motivated to read their textbooks and do their homework” (Frydenberg (2012)). He also suggests that not all students have access to the same technology such as smart phones or laptops, especially at home, and points out that there could be a digital divide against the flipped classroom methodology.

In schools where the flipped classroom has been used, the results appear to be positive. Carolyn Durley is a biology teacher at Okanagan Mission Secondary School in Kelowna, British Columbia, and adopted the flipped classroom in the 2011-2012 school year. She had noticed changes over the previous four years as to how students learned and recognized that she was losing her connection with them, something she had always relied upon in more than 20 years of teaching. She noted that students could get their biology from looking it up on YouTube or their phones and they “weren’t buying into me spouting off – you know, the fountain of knowledge – anymore” (Pearson, 2012).

She was not overly technology-savvy but realized she had to change and the flipped classroom gave her the ability to connect in what she considers an extremely powerful way. She noted that the first time she used the flipped classroom there were struggles with her understanding of how to teach a flipped class and that the students were not ready to leap into a whole class of self-directed time. In her second semester, she structured the class differently, focusing in on the lessons learned from her first semester using the flipped classroom methodology. She has not yet measured academic progress by way of empirical data but feedback from students has been positive and she believes that her relationships with the students have strengthened. Durley stated that while empirical evidence is one way of measuring the effectiveness of the flipped classroom it can take many years of comparison to fully determine it from a quantitative approach. She concluded that there are many other benefits that although not measurable are positive signs that this particular pedagogical approach to teaching is effective.

Harvard university professor Eric Mazur was an early adopter of the flipped classroom model and states that “if you were to step into one of my classrooms, you’d think I was teaching a kindergarten class, not a physics class” (Demska, 2013). He insists that the pandemonium is a wonderful thing because students are actively engaging in the material rather than blindly sitting in a classroom and either ignoring or writing down the words said by the professor. According to Chris Millet, assistant director of Education Technology Services at Penn State University the simplicity of technology allows the flipped classroom

to be easily created. He states further “there are drop-dead simple technologies that keep the flow of idea generation and exchange moving inside the classroom to support active learning” (Demski, 2013, p. 33).

The academic literature is extremely limited on actual quantitative studies on the effectiveness of the flipped classroom. Three studies were found and are reported next. The first article was by Alvarez (2012) who reported on the students at Clintondale High School in Clinton Township, Michigan. In 2009, more than 50% of freshmen students failed English and school leaders had 736 discipline cases for 165 students. The school determined that a flipped classroom would offer students more time to prepare for class especially as many lived as far as 12 miles from the school and busing was not always reliable. A year after implementing the flipped classroom educators in the school saw the percentage of students failing fell from 52% to 19%; in math, a drop from 44% to 13%; in science, it declined from 41% to 19%; and in social studies, fewer than 10% of students failed, compared with nearly a third the previous year. The conclusions at Clintondale High School were that “the flip approach holds the golden key for students because educators can control and eliminate learning obstacles, and it allows teachers to give their best presentations and share resources” (Alvarez, 2012).

The second academic study was conducted by Jeremy Strayer (2012) on his own work with a flipped classroom. The research took place in two different introductory statistics classrooms taught by Strayer at an unidentified U.S. university. The typical student in his class was a middle-class white American from the Midwest. He structured one classroom to be a flipped and the other to be a traditional lecture-homework format. He did not compare the grade results between the two classes. Rather he used the College and University Classroom Environment Inventory (CUCEI) to assess the perceptions of the learning environment (both what they preferred and what they actually experienced). There were seven scale items, personalization, innovation, student cohesion, task orientation, cooperation, individualization, and equity. Students as a whole felt that their actual learning environment was not measuring up to their preferred environment. When comparing responses between students in the flipped class and students in the traditional class, students in the flipped class preferred an environment with greater Innovation and Cooperation but there was no evidence of a difference in preferences for the other scales.

The limitation of this study was that Strayer had control over final grades and he administered the test prior to the end of the semester. The third academic study was conducted by Ferreri and O’Connor (2013) on the redesign of a large self-care course previously delivered in a traditional lecture format to a small-group case-based course. The UNC Eshelman School of Pharmacy wanted to redesign a course to the flipped classroom style because application, analysis, and evaluation rather than knowledge of nonprescription products was the outcome required for the course. Instead of a content-delivery method which forced students to memorize information, they spent time gathering patient information and applying the information to patient self-care scenarios. To accommodate this shift in teaching style, classes were redesigned to a small-group discussion rather than a large lecture hall style course.

The results reported by Ferreri and O’Connor were that students in the smaller-class format reported a preference for working in teams and achieved significantly better academic grades with the new course format. There is always pedagogical debate by educators between content knowledge and skills acquisition. Although Jonathan Bergmann and Aaron Sams are often credited with formalizing the model and are successfully rolling out the flipped class model into the mainstream, the ideas behind flipping are not entirely new. The National Center for Academic Transformation (NCAT) has experimented with similar ideas over the past decade across a multitude of disciplines. Carol Twigg, NCAT’s president and CEO stated that redesigning courses offers an opportunity to reengage students and to improve their motivation but she dismisses pedagogical extremes by stating “If you don’t have basic math skills, you can’t do an interesting physics project” (Tucker, 2012).

There are other noted issues with the flipped classroom that limit some of the accolades it has received. Firstly, it has been argued that this type of teaching methodology could create a greater chasm between high-income and low-income students so it is only effective with a specific student population base. Secondly, not everyone has access to the internet especially in rural areas. Thirdly, schools generally have to have access to software that might be too costly and not a reality in educational budgets (Techsmith, 2013; Knewton, 2013). Fourthly, teachers have to be trained on how to use the software and how to properly structure a flipped classroom which is time consuming and requires a commitment on the part of the teacher. Finally, students must overcome their reliance on traditional classroom teaching and be willing to accept the responsibility for self-learning that comes with a flipped class.

METHODOLOGY

Three sections of Business 1112, Introduction to Business Administration, were taught by Dr. Sandi Findlay-Thompson, an Assistant Professor at Mount Saint Vincent University and one of the co-authors of this paper, in the fall 2012 semester. Section (01) was taught using the flipped classroom methodology and classes were held on Mondays and Wednesdays from 11:05 am – 12:20 pm. There were 30 students registered in this section and 28 were in the age category of 18-24 years. Section (02) was taught using a regular lecture-style methodology and classes were held on Mondays and Wednesdays from 3:05 – 4:20 pm. There were 42 students registered in this section and 37 were in the age category of 18-24 years. Section (05) was taught using a regular lecture-style methodology and classes were held on Tuesdays from 6:05 – 8:35 pm. There were 36 students registered in this section and 28 were in the age category of 18-24. Students were given the same course outline in each section including assignments, quizzes, and exams with identical weightings for each activity. After the semester was completed and final grades had been published, students were interviewed relating to their experience in the flipped classroom.

Case study interviews were deemed appropriate as Flyvbjerg (2006) and Zikmund (2003) agreed that case studies, specifically interviews with participants, are useful in gaining a better understanding of a phenomenon. Interviews also allow for the greatest depth and detail of information compared to other methods (Cooper & Schindler (1998). Further, Yin (1994) stated that case study interviews can provide insight into research problems, while Marshall and Rossman (1985) noted that interviewing was a better method of obtaining quality data. In this study, open-ended questions were used to inquire about the students' experience with a flipped classroom. Open-ended questions were used because they encourage respondents to answer freely (Zikmund, 2003), respond in their own words (Crano & Brewer, 2002), result in unanticipated answers (Zikmund, 2003), and often provide richer data compared to closed questions (Minichiello, Aroni, Timewell & Alexander, 1995).

While the general consensus among researchers was that there was no specific number of cases that should be used (Cooper & Schinder, 2001; Zikmund, 2003), some researchers have suggested upper and lower limits (Eisenhardt, 1989). Seven out of a potential 30 students were selected to be interviewed as the number fell between the range suggested by Eisenhardt (1989) and the results from this study will be considered and interpreted along with the students' final grades. The seven participants for the study were selected using a judgment sample. Cooper and Schindler (2001) and Tull and Hawkins (1997) both stated that judgment samples are appropriate for exploratory research. Furthermore, the researchers wanted to ensure participants had different academic backgrounds and the diversity in the classroom was represented in the sample. Flyvbjerg (2006) noted that this practice of judgment samples ensures a richer base of information for the researcher than random sampling.

The interviews ranged in length from 35-70 minutes and open-ended questions were recorded verbatim. The information from the interviews was then recorded using Excel spreadsheets to see patterns which emerged in the research. Organizing data into sections with a matrix-like structure is acknowledged as a practical method for facilitating pattern matching of qualitative data (Yin 1994).

RESULTS AND DISCUSSIONS

As noted above, the seven participants for the study were selected using a judgment sample. Table 1 shows the breakdown of type of student, number interviewed for each type of student, and the code used to represent the type of student. Students were asked a number of questions including whether or not they would enroll in another flipped class if given the opportunity, allowing the researchers to gain insight into their opinion of a flipped classroom compared to a traditional classroom. Student's overall opinion on the flipped classroom was mixed. Students A, C, F and G spoke positively to somewhat positively about the experience and the opportunity to complete work normally assigned for homework in class. Student A stated: *"I enjoyed the flipped classroom. I liked going to class knowing I would get things accomplished which impacted my grades. I also enjoyed the convenience of accessing recorded lectures when I wanted to watch them."* Students F and G both felt the flipped classroom allowed them to access assistance from their professor enabling them to do better on assignments. The sentiment is perhaps best expressed by Student F who stated *"...it is easier to talk to your professor in the class. In other classes, we (students) sit and listen. I do not like interrupting or asking questions. In our class, we could ask questions all the time. I did better because of this."*

Students B and D, while offering some positive comments on aspects of the flipped classroom, such as the interaction with their peers and their professor, preferred a more traditional learning environment. Student B stated, *"I liked being able to interact with others in the room. I didn't like watching the videos at home and felt the lectures should be in the classroom."* Student D echoed this concern saying, *"... it (flipped classroom) seemed like more work. We had to watch the videos and do the work in class. I know in other classes we are supposed to read chapters and prepare for class. But this is my choice. In a flipped classroom I had to watch the video and had to complete the assignments."* Student E, the one mature student, was strongly opposed to the notion of a flipped classroom with a strong preference for traditional learning. *"I didn't enjoy the class. I want to come to class and learn the material from the professor. This way if I don't understand something I can stop and ask her. In this class, I had to watch lectures and if I was confused I had to email questions or remember to ask in class."*

The majority of students did express interest in enrolling in another flipped class with Students A, F and G all stating they would do so if given the opportunity. All of these students said the flipped classroom allowed them to complete assignments in the classroom which helped them meet deadlines, access immediate help from their professor and in their opinion helped improve their grades. Student A noted *"...the classroom set up was good for me. I could complete my assignments in class and if I needed help I could easily ask one of my friends or the prof."* Students F and G expressed similar sentiment that being able to ask their peers for assistance improved the experience and resulted in better grades.

Students B, C and D would consider enrolling in another flipped class. These students spoke positively about the classroom environment, interaction with their peers and professor but were somewhat concerned that the flipped classroom resulted in more work with no impact on their grades. Student B said *"I don't think it impacted my grades one way or the other. It was interesting to try and I would probably try another. If I felt it really improved my grades, sure I would be more open to it (flipped classroom), but after this I am not sure if it matters to my marks."* Students C and D openly spoke about the extra work involved and their sentiment is likely best captured by Student D who stated *"... the class was more work. I liked the prof and my friends but I had to do more and my grades weren't very different. I would take another course like this but I don't have a strong preference."* Student E would not enroll in a flipped classroom again preferring a traditional classroom experience.

It is interesting that the mature student was the individual opposed to the flipped classroom. Given the significant increase and popularity of distance learning and the numbers of mature students who are taking educational programs in this manner, we would have expected the reverse to be true. It is not

possible to draw conjecture as to why this mature student did not have a positive experience or if he or she was simply an anomaly. Additional information would be required to draw any conclusions and it would necessitate a separate study comparing a controlled group of mature learners against a controlled group of younger learners to ascertain if there is resistance to the flipped classroom from this group set as a whole. The majority of comments from the student interviews concurred with the literature review findings. The results were a mixture of positive and negative responses to the flipped classroom style. It is not surprising that students found the workloads heavier because homework outside of the classroom is generally an option, whereas watching the videos outside of the classroom is mandatory because testing of material requires the students at some point to watch the lectures if they want to learn the material. For students in the flipped classroom in this study, they had a quiz at the start of the class immediately following the due date that the lecture had to be viewed.

Table 1: Students Interviewed

Type of Student	Number Interviewed	Coded
Traditional (direct from high school)	4	A,B,C,D
Mature	1	E
International (2 different countries)	2	F,G

This table shows the number of students interviewed and the type of each student. They have been coded as Students A through G for discussion purposes in this study.

Of interest, some of the students that were interviewed mentioned they believed they had earned better grades because of the flipped classroom. A comparison of the average grades between the flipped classroom (which was the course that the interviewed students came from) and two additional sections of the same course that were taught in a traditional lecture-style methodology are found in Table 2. In comparing the three sections of Business 1112 the average student scored in a “B” range (between 73-76) in all three sections. There were no grade differences when comparing the flipped classroom with the two other traditional-lecture style classes. This does not invalidate the students’ belief that they did better in the flipped classroom but there is no evidence to support their claims other than their own perceptions of the learning experience. There was an expectation that grades would be higher in the flipped classroom for two reasons. The first was that quizzes were held the day following the due date for each video lecture. And as noted in Table 2 although the quiz scores were slightly higher for the flipped classroom section than for the other two sections where they did not watch the videos, the overall major exam grades were comparatively similar to the other two non-flipped sections.

Table 2: Grade Results between Flipped Classroom and Non-Flipped Classrooms

Section	Exam 1 - 15	Exam 2 - 15	Exam 3- 15	Quizzes- 5	Video -10	Debate - 10	Networking - 15	Case Study 15	Final Grade
Flipped Section (01)	10.62	10.62	10.51	3.94	9.10	7.05	12.36	10.87	75.09
Non-flipped Section (02)	10.40	10.53	10.61	3.25	8.97	8.08	10.97	10.94	73.80
Non-Flipped Section (05)	10.66	11.12	11.27	3.23	8.76	8.26	12.52	10.56	76.42

This table shows the grade results for Business 1112, breaking down the sections between flipped classroom which was sections (01) and the non-flipped classrooms which were sections (02) and (05) for an actual course held in the Fall of 2012.

It could lead to the conclusion that short-term memory was at play in the flipped-classroom quiz results. The second reason was that the in-class activities were designed to promote deeper learning of the course materials with the students doing more hands-on research and taking over more responsibility for the learning process. As noted by the interview responses, the majority of the students felt they had more opportunity in-class to ask questions of the professor or their fellow students and to work on projects but the grade results were not higher than those in the non-flipped classroom. A reason for this could be the inexperience of the professor teaching this flipped classroom. It was her first attempt at this style of

teaching and it would be interesting to do a follow-up project with her when she has finished more flipped-classrooms and becomes more competent in the teaching methodology.

CONCLUSIONS

The goals of this study were to compare the academic outcomes between two teaching methodologies, namely, a flipped classroom style versus traditional lecture-style as well as analyze student opinions regarding their views of a flipped classroom environment. Three sections of an identical class, Business 1112, Introduction to Business Administration were included in the study. Two of the classes were traditional lecture-style and the third was taught using the flipped classroom style. Students were given the same course outline in each section including assignments, quizzes, and exams with identical weightings for each activity. After the semester was completed and final grades had been published, grades were compared and students were interviewed and asked to relate their experiences in the flipped classroom. Identical questions were asked of all students but they were open-ended to allow students to freely comment on personal experiences.

The primary findings from this study were that there were no grade differences when comparing the flipped class with the two traditional-lecture style classes. There had been an expectation that grades would be higher in the flipped classroom based on the literature review findings. However, students did report that they felt they did better in the flipped classroom but there is no quantitative evidence in the grade results to support their claims other than their own perceptions of the learning experience. Students from the flipped class did report that they felt they had more opportunity in-class to ask questions of the professor or their fellow students and this could be responsible for the perceptions of a better learning environment in the flipped classroom.

This study was informative and confirmed that the flipped classroom to date has yielded both positive and negative outcomes, which concur with the literature review findings. Some lessons learned by the authors of this study who were involved with the experiment are that a number of processes seem to be necessary in order for the flipped classroom to be an effective teaching methodology. Firstly, student understanding of the purpose of the flipped classroom must be properly communicated and students given the opportunity to express concerns about their responsibilities to this new style of learning. Secondly, student buy-in must be gained so they will be committed to the learning process. Thirdly, the instructor must be willing to let go of traditional teaching practices and be fully trained in how to effectively implement a flipped classroom as it is not as simple as recording a video and letting students do homework in the class. If the conditions are properly set, the flipped classroom should have the potential to be an extremely effective learning style. It is the intention of the authors to conduct further flipped classroom experiments once the professor has been able to receive formalized training and establish formal procedures for communicating the process to students. A limitation in this study was the fact that the professor teaching all three sections had control of student responses. Although the survey was not administered or discussed with students until after the semester ended and final grades had been published, students might have concerns that if they took a class in the future with this same professor it could influence their success. Students were advised that names would not be released and the professor would have no way of knowing who had or had not participated and that all responses were confidential. The professor did not conduct the interviews or calculate the results, rather, these were done by the second author of this paper, Dr. Peter Mombourquette and only the cumulative results provided to Dr. Sandi Findlay-Thompson for review and analysis.

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BIOGRAPHY

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UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT'S ROLE IN REFORMING HIGHER EDUCATION IN PAKISTAN

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ABSTRACT

Since the last quarter of 2001 the United States Agency for International Development (USAID) has significantly increased its role in reforming higher education in Pakistan. This paper examines USAID's work in the development of Higher Education. Moreover, the paper discusses recent and on-going USAID efforts and contributions in reforming higher education in the country. The set of policies related to institutional development, reforms at the policy level and faculty development programs are also discussed. Additionally, the paper discusses parts of 2009 Kerry-Lugar bill that has been developed into a strategic partnership development document between Pakistan and the United States. The data collection process included document reviews and analysis; field visits to USAID funded projects, and consultations and discussions with the project leadership teams that are working with the USAID to bring about reform in higher education in Pakistan. Through an in-depth analysis of USAID's role in education in Pakistan, this research help develop well in-formed policy making and implementation process while taking into account the complexities of all the forces that shape higher education development in Pakistan.

JEL: A2, K12, I23, I25

KEYWORDS: Higher Education, Literacy, Pakistan, Teacher Education, Donor Agency

INTRODUCTION

Pakistan as a country is going through tough and challenging economic, social, religious and political situations. On the economic front, Pakistan's economy is in serious trouble and country has approached the International Monetary Fund (IMF) for assistance. Poverty is on the rise and prices of daily commodities including food and fuel are significantly high. And, on the social and political front, Pakistan is facing a very serious threat of terrorism, particularly in Federally Administered Tribal Areas (FATA) where the country is facing an ongoing war with the militants.

A sustainable and visionary policy to tackle the above-mentioned daunting challenges calls for well-educated and skilled manpower that could be a catalyst in reform-oriented change badly needed by the country. In order to succeed in the process and to provide opportunities of higher learning to the youth, there is a need to reform higher education system in such a way that is sustainable and offers better and improved access and quality higher education which should help students in becoming capable and resourceful manpower. However, in these increasingly difficult times, the overburdened public exchequer finds it hard to spare a big chunk of resources for higher education. This is the setting in which the USAID has stepped forward to work with the Higher Education Commission (HEC) to launch projects and offer funding for qualitative improvements in the Higher Education sector. This research sheds light and reviews the role of the USAID projects for promotion of higher education in Pakistan. USAID through its funding opportunities in social and economic development has played very important role in education reform. The paper critically examines the role of USAID in reforming higher education in

Pakistan and discusses the opportunities and challenges that the 21st century has presented to Pakistan. With this brief introduction rest of the paper is organized into four sections a) Literature Review b) USAID's role in higher education reform c) discussion on USAID funded Pre-STEP program and d) conclusion.

LITERATURE REVIEW

The acts of terrorism on September 11, 2001 that took place in both New York City and Washington D.C changed the United States and the World. Since then, significant changes have taken place and there were a number of policy shifts that followed. The important change that is relevant to the paper was the renewed interest of the United States in the Islamic World. Ever-since, Pakistan an important Muslim country located in South Asia and neighbor to Afghanistan became an important part of US foreign policy agenda. The United States declared war against terror and Pakistan became the front line ally in the war against terrorism. This alliance between the two countries and renewed interest of both the United States and the western world in Pakistan resulted into a number of changes that started to take place inside the country. The changes impacted the domestic as well as the foreign policy of Pakistan.

In domestic area one sector that got the particular focus and interest is the education sector of Pakistan. The importance of educated citizens that play a necessary and crucial role in the social, economic and political development of a society was revisited by Pakistani government. It was again realized by Pakistani government that education plays a vital role in producing conscientious, tolerant, accepting and accommodating citizens in addition to producing much-needed skilled labor force that Pakistan needs for its economic uplift. The argumentation led to a renewed and strong interest from both US and Pakistani educators and policy makers in promoting education for an overall development of the society and the country.

Public higher education system, meaning not only the Pakistani universities but also the colleges that offer bachelors and master level degree programs are implementing reforms set forward by the Higher education commission since 2002. Pakistan's higher education system serves many very important functions. These are the institutions and places that offer training and education to its young population and prepare them for future challenges. Furthermore, the higher education institutions help the country in creating a skilled and knowledgeable human capital. Educated human resources are very crucial for Pakistan in not only developing its institutions and increasing its productivity but to compete with other nations in the region as well as globally.

Bloom (2001), asserts that higher education provides countries with people that are equipped with a higher level of capabilities that cannot be attained just through primary and secondary schooling. Let us place this argument in the context of Pakistan. The country with a population of approximately 170 million people is the sixth largest in the world. Pakistan has limited natural resources and its economy is struggling. Moreover, the country is facing a serious terrorist threat. Poverty is increasing and with it social instability. However, Pakistan has the potential to address these challenges successfully. One possible way of addressing these problems is by investing in education and particularly higher education. Investment in higher education institutions and increasing access to higher education should help Pakistan in developing a pool of talented, skilled and knowledgeable young people. And, these educated and productive people can thrive in their professions. One way is by establishing a strong link between Pakistan's domestic policies and needs with its foreign policy. And, in the process redefine Pakistan's history and focus on indigenous cultures that help place the county in South Asian region.

Furthermore, higher education helps to produce people that possess leadership skills to lead the society and participate in the development process. Additionally, higher education institutions also provide support with the development of primary, middle and secondary education. This takes place when higher

education institutions help in developing policy framework, building institutions, and creating necessary structures to support a) Recruitment and selection processes of teachers b) Providing training to primary, middle and secondary level teachers c) Curriculum development d) Conduct research studies to understand and implement what educational practices work best in a particular contexts.

The institutions of higher education play a vital role in shaping and improving the social, economic, political and cultural life of different communities. Also, these institutions help in promoting a culture of dialogue that contributes in peace and development. The issues of community development, democratic participation and social responsibilities are discussed and enhanced at the higher education institutions. Therefore, for democracy to take root, social justice to prevail and human rights to be respected in a country like Pakistan. In this regard, the increased access to the higher education institutions is very crucial and significant (Hoodbhoy, 2005). However, higher education in Pakistan, as mentioned by Clark (2005), is facing a number of daunting challenges such as a) Only 2.9% has access to higher education which is very limited b) Insufficient education and training of faculty, only 1700 with PhDs c) Most Universities are ill-equipped to teach, laboratories and libraries are limited and resources are scarce d) Education and Research is not linked with issues such as economic and social development of Pakistan (Clark, 2005, pp. 55-56). Facing these challenges the international crisis group (2005) report has made a number of suggestions to improve the education and access to education for example a) Raising public expenditure on education to at least 4 percent of GDP b) Raising public expenditure on social sector development to make public schools more accessible to teachers and students c) Donors should condition aid on the Pakistani government on meeting benchmarks for increased expenditure on education as a percentage of GDP, and monitor the use of government funds in the education sector (ICG, 2005, p.169).

The importance of higher education, challenges faced, and recommendation made by experts to overcome the problem, as mentioned in preceding paragraphs, attracted the attention of the United States Agency for International Development (USAID) USAID and Pakistan. Their interest and mutual cooperation played an important role in replacing University Grants Commission (UGC) of Pakistan by a vibrant and resourceful Higher Education Commission (HEC) of Pakistan in September 2002. The total public budget allocated for higher education between 2002 and 2007, witnessed a remarkable increase from 3.2 billion rupees to 33.7 billion rupees (Hoodbhoy, 2008, p. 13). Naqvi (2008), in his support for the HEC asserts that since 2002 the institution has performed well. He argues that to see the results there is a need for continuation of HEC policies that were started seven years ago. He further suggests that Pakistan is going through a demographic transition and this is causing changes in country's age structure. The post-secondary population that falls between ages 18-23 is going to rise until 2050; whereas, the percentage of pre-secondary will continue to decline (Naqvi, 2008, pp. 8-10). This suggests that there is going to be more demand for higher education and by focusing on expanding the system, by increasing access and planning ahead, universities should be in a reasonable position to meet the growing demand.

Similarly, Hoodbhoy (2008) asserts that in last six years the HEC has sent about 3000 Pakistani students abroad for graduate studies and increased the salaries of university teachers. Both of these steps are taken to attract better candidates to teaching profession and improve the quality of teaching. Since the establishment of the commission, the higher education sector in Pakistan has experienced significant changes and reforms. The HEC developed its goals and under the medium term development framework started working on faculty development, access to higher education and promotion of excellence in learning and research (HEC, 2005). Rehman (2008), the retired chairman of the HEC asserts that since the establishment of the commission 47 new universities had been established. Furthermore, 18 new campuses of existing universities have also been started in all four provinces and regions of Pakistan. With regards to access, the university enrolment has almost tripled from 135,123 in 2002 to 363,700 in 2008 (Rehman, 2008, p. 11).

USAID in Pakistan

Keeping in view the challenges faced by higher education sector in Pakistan and the suggestions extended by experts, USAID is playing a critical role in helping Pakistan overcome the problems and furtherance of higher education in the country.

The USAID (2005), discusses that in August 2002, the United States Government, through USAID, signed a five-year \$100 million agreement with the Government of Pakistan to support education sector reform. The USAID asserts that the education allocation would be around \$300 million from the year 2008 to the year 2011(USAID, 2009). Hathway (2005) reports the main features of the education support reform include a) Sector-wide approach from primary to higher education to eliminate gender and access gaps and ensure optimum use of facilities b) Macro-level reforms in planning and procedures c) Institutional reforms in all tiers of government engaged in educational planning and service delivery d) Commencement of vocational and technical education streams at the secondary level e) Quality assurance f) Increased public-private partnerships g) Implementation of a poverty reduction program (Hathaway, 2005, p.127)

The Fulbright scholarship program is another effective initiative, working in association with the higher education commission, for promotion of higher education. The program is offering students scholarships to get higher education in the United States. The Fulbright program is contributing to build human capital and capacity of the existing colleges and universities in Pakistan. Through similar cooperation with other programs and by developing its own resources the HEC (2006), notes that during 2003-2009, the commission plans to send around fifteen thousand Pakistani students abroad for higher education.

Discussing the role of USAID in the development of higher education in Pakistan, Burki (2005), notes that a total of \$ 1.4 billion will be spent in education over a period of seven years. Part of the money will also come from the World Bank and the Asian development bank. Pakistan is likely to spend \$ 2 billion on education, with 20 percent provided by the donor community (Daily Dawn, 2005, April 16, p.10). The USAIDs' work in reforming higher education in Pakistan got further strengthened with the Kerry-Lugar bill that paved the way for the development of "Enhanced partnership act with Pakistan 2009". The following section presents the main features of the bill.

Enhanced Partnership Act 2009 (Kerry- Lugar Bill)

The enhanced partnership act 2009 between the USA and Pakistan is rooted in the development and reform of social sector in Pakistan, of which education is of primary focus. The five year Kerry-Lugar bill promises Pakistan a social sector development aid of \$7.5 billion dollars. The bill named as enhanced partnership with Pakistan (EPP) Act of 2009 asserts continuing support to strengthen democratic institutions and principles, and promoting social and economic development with financial assistance to its strategic partner Pakistan.

The examination of the EPP Act informs us about the significance of the achievement of political objectives that the U.S. has attached with the aid money that it promises to share with Pakistan. The mechanisms through which the money will be spent have not been explained, however, the EPP (2009) asserts that through partnership it would like to achieve following three key objectives: i) improve GOPs capacity to address its critical infrastructure needs ii) help GOP in providing improved economic opportunities in areas most vulnerable to extremism iii) Strengthen GOPs capacity to pursue economic and political reforms that reinforce stability (EPP, 2009, pp.2-4). Additionally the program plans to focus on a) High impact, high visibility infrastructure programs b) Focused humanitarian and social services c) Government capacity development. The EPP (2009) shares that out of total \$7.5 billion, about \$1.5 billion have been allocated for increased access and improved quality of education and health services. This means a significant amount of money has been promised for education. However, who is going to spend

the money, how the money will be spent and what will be its short and long term impact is yet to be analyzed and seen.

Table 1 provides a breakdown of economic assistance that will be provided to Pakistan through U.S. EPP 2009 act. The table shows that bulk of the money will be spent on agriculture and energy sector. Followed by, assistance to improve security mechanisms, improved governance and increasing access to girls' primary education. The higher education sector shall benefit from \$1.5 billion that has been allocated for both health and education sectors.

Table 1: Economic Assistance That Will Be Provided to Pakistan through U.S. EPP 2009 Act

Summary of Projected U.S. Assistance to Pakistan FY 2010-FY 2014 (\$ Millions)		
Activities	FY 2010-FY 2014	Criteria Addressed
Investment in high impact, high visibility programs	3,500 Sector wise breakdown Agriculture (2,000) Support for Pakistan's energy crisis(1,000) Other (500)	Political rates, girls primary education completion rates, government effectiveness, rule of law, control of corruption
Government Capacity Improvement	2,000 Sector wise breakdown Improved national and local governance (1,000) Improved security and legal institutions (1,000)	Civil liberties, political rights, Accountability, rule of law and control of corruption
Focused humanitarian and social services	2,000 Sector wise breakdown Immediate post crisis and other humanitarian assistance (500) Increased access to and quality of education and health services (1,500)	Civil Liberties, government effectiveness, girls primary education completion rate, public expenditure on health, primary education, and immunization rates

Source: (EPP, 2009, p.18) Note: The table demonstrate activities in different area and planned assistance in US million dollars with sector wise break down and assessment criteria

In subsequent section one of the major USAID funded project, the Pre-STEP, part of the Kerry-Lugar bill which aims at reforming teacher education in Pakistan is discussed to evaluate the role of USAID in education reform through its economic assistance.

DISCUSSION

The USAID (2008) asserts that the Pre-Service Teacher Education is a \$75 million funded program. The program was started in September 2008 and shall end in September 2013. The program was earlier implemented through the international contractor, the Academy for Education Development, however, now Education Development Center is the leading implementing organization.

The Pre-STEP is one major USAID funded program in the higher education sector that talks about bringing qualitative improvement in teacher education in Pakistan by introducing 4 years B.Ed program in education faculties of universities and affiliated colleges throughout the country. In Pre-STEP program, it is planned to select and send 60 Pakistani candidates to the U.S universities for PhD studies and 45 for Masters' level studies. The program discusses about introducing reforms both at the policy and the implementation level. The Pre-STEP program has lots of resources at its disposal. The question is how successfully the program is going to spend such a significant amount so that it could achieve some of the results that it plans to achieve: i) that all degree awarding institutions should offer 4 years B.Ed degree program only. ii) build education institutions' capacity (infrastructure and human resources) so that they

could offer 4 years B.Ed degree program. iii) and create conditions so that by 2018 all teachers that will be hired throughout the country should have at-least 4 years B.Ed degree.

The study shows that the Pre-STEP has lots of resources, both organizational and financial, and its goals can be achieved. The study suggests that program results will be achieved if funds are efficiently and effectively utilized. Thus far the project has gone through few tough and rough times. In September 2008, the Academy for Education Development (AED) was the lead program implementing contractor, but the auditor general of the USAID found AED with bad accounting practices that led to the black listing of the AED (USAID, 2010). In March 2011, the project was suspended for couple of months, however, within a short period the project was awarded to Education Development Center. The study shows that both the blacklisting of AED and the suspension of project activities for a brief period of time has had somewhat negative impact on programs' workings with 15 public sector partner universities, federal and provincial government departments and teacher education colleges that are spread all over Pakistan

The study shows that the Education Development Center is working closely with the local partner institutions in implementing the Pre-STEP program. The Pre-STEP under the leadership of Education Development Center, through various set of linked activities is working to improve the quality of teacher education by strengthening the education institutions that provide pre-service teacher education in Pakistan. The program is directly impacting the newly inducted and practicing teachers by helping them gain revised and upgraded teacher qualifications (USAID, 2010).

The Pre-STEP (2009) asserts that the program works with the Government of Pakistan, Higher Education Commission, provincial government education departments, universities and government elementary colleges to institutionalize specific reforms in pre-service education as desired by the Government of Pakistan through its National Education Policy. Furthermore, the Pre-STEP adds the primary objective is to help the Government of Pakistan develop, introduce, and implement effective curricula for a new four-year Bachelors' degree in education and a two-year associate degree in education. In the process and to achieve that goal, the Pre-STEP also helps provincial governments' in creating systems, policies and standards that ensure the effective execution of these degree programs.

Moreover, the Pre-STEP (2009) claims that the program assistance is tailored to support pre-service education priorities as determined by each province, and to enhance capacity and strengthen systems that will remain once Pre-STEP ends. Additionally, the program asserts that the end results shall include teachers graduating from colleges and universities with the knowledge, skills and dispositions required to be effective instructors and to meet Pakistan's National Standards for Teachers. The review undertaken suggests several areas for increasing the effectiveness of the USAID program relating to education given below i) there is a need to give importance to the fact that Pakistan is a large, diverse, underdeveloped country and education needs of different regions are contextual ii) it is suggested that Pakistani educators and higher education commission of Pakistan who understand the needs and the situation in the country should be effectively engaged at all levels of policy and decision making related to promotion of higher education. The local institutions have the experience, capacity, and are best suited to perform and deliver under the set of local context and challenges iii) there is a need to support local partners, i.e. Pakistani universities, local policy institutes and qualified NGO's that want to bring about sustained and meaningful reform in higher education in Pakistan.

The engagement of the local organization/professionals with the execution of USAID funded projects will result in the following benefits to the local people, the economy and the institutions in Pakistan: i) it will prove as capacity building initiative for improvement in technical skills, performance, efficiency and organizational development skills of the local project partners ii) it will help enhance interaction between local and international staff that will lead to better understanding of local culture, values, and systems iii) monetary benefits accrued by the local partner organizations will cause circulation of money in the local

economy iv) it will help increase monitoring and evaluation skills of the local partner organizations v) participation of local organizations and the local people will also help achieving the project objectives and making it successful

CONCLUSION

There is a realization among the policy makers and the government in Pakistan that promoting higher education is one of the means to tackling the economic as well as the social challenges – poverty, extremism and terrorism- faced by the country. Professionals and experts extend a number of suggestions in order to bring about a positive change (i) a considerable increase in percentage of GDP allocated for education (ii) generous foreign help in the form of donations from friends of Pakistan. It is, however, a big challenge for the over-burdened government exchequer to increase spending on education sector. In this difficult situation, the US government extended a helping hand and agreed to support the education sector reform in 2002, through the United States International Development Agency (USAID). This resulted in creation of a proactive and vibrant organization named the Higher Education Commission of Pakistan that replaced the University Grants Commission in the year 2002. After inception of HEC, an impressive growth in number of new universities and considerable increase in enrollment has been witnessed. The enhanced Partnership Act 2009, also known as ‘Kery-Luger Bill’ is another landmark agreement for cooperation between Pakistan and the US. It is meant for strengthening the social service sector in Pakistan including health and higher education. Pre- Service Teacher Education Program (Pre-STEP) is one the flagship projects that is being funded under the ‘Enhanced partnership Act 2009’. This project aims at enhancing and sharpening the teaching skills of the teachers in Pakistan. This project has considerable resources on its disposal. International consultants have also been engaged with the execution of the project.

The current paper critically evaluate the role of USAID in bringing higher education reforms in Pakistan. In the paper few of the projects in education sector funded by USAID were analyzed and their impact on reform of higher education was discussed. Overall, the USAID is playing an impressive and meaningful role in promotion of higher education that will lead to economic and social uplift of the people and help overcome the challenges of poverty, ignorance, and extremism. The youth of the country equipped with quality education and enlightenment will bring about peace, prosperity and tolerance not only in the country, but also in the region. However, to get more benefits from financial assistance local universities and community must be involved in ongoing projects in higher education reform. In future, quantitative research is needed to be done to assess the overall impact of USAID funded projects in bringing about reforms in the education sector.

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FRAUD EDUCATION: A MODULE-BASED APPROACH FOR ALL BUSINESS MAJORS

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ABSTRACT

Every two years, the Association of Certified Fraud Examiners produces a Report to the Nations on Occupational Fraud and Abuse. The most recent report reveals several trends including the type of frauds being perpetrated, profiles of perpetrators, and industries hardest hit by occupational frauds. Although many accounting programs are now including courses in financial fraud as part of their curricula, students in other business majors could also greatly benefit from learning about the impact of fraud on businesses. Using the Report to the Nations as a guide, this paper identifies trends in occupational fraud and suggests a method for integrating fraud prevention and detection education into the undergraduate curricula of non-accounting business majors.

JEL: M10, M40

KEYWORDS: Fraud, Curriculum, Accounting, Business Major, Education

INTRODUCTION

In the last decade, due to many high-profile fraud scandals (e.g., Enron, WorldCom, Tyco, etc.), the landscape for fraud and business activities has drastically changed. To combat the potentially disastrous repercussions of individuals engaging in fraudulent activities, the United States has seen the introduction of several initiatives. These include the Sarbanes-Oxley Act of 2002, the creation of the Public Company Accounting Oversight Board, and the increased importance of audit committees, all of which create new levels of accountability and responsibility for management and accountants in detecting and preventing fraud. With respect to education, the American Institute of Certified Public Accountants (AICPA) strongly suggests that an understanding of fraud and business risk (i.e., risk analysis) is one of the core competencies needed by all students entering the accounting profession (see <http://www.aicpa.org/interestareas/accountingeducation/resources/pages/corecompetency.aspx>).

Furthermore, many colleges and universities have responded to these accounting scandals and the call made by the AICPA by including within their curricula some training with respect to identifying and understanding fraudulent activities. Some colleges and universities, use standalone fraud or forensic accounting courses, while other schools choose to make this a component in an auditing class. However, accountants and auditors are not necessarily the only parties that should have knowledge of fraud, nor should they be the only ones trained to detect it. A report released in 2012 by the Association of Certified Fraud Examiners (hereafter, the ACFE report) shows strong support for this argument. The 2012 report compiles detailed information collected on 1,388 cases of occupational fraud investigated by Certified Fraud Examiners between January 2010 and December 2011.

One significant finding of this report is that organizations tend to rely too much on external audits conducted by accountants to detect fraud. Specifically, while these audits are the most frequently used control mechanism, they rank poorly with respect to actually detecting fraud and limiting losses (ACFE report, 5). In other words, the external auditor's role is actually relatively minor with respect to finding and controlling fraud. Instead, the report recommends that all employees—not just the accountants—

should be trained to understand and detect fraud, and finds that organizations with training programs tend to have fraud detected sooner and smaller overall losses, compared to organizations without such training.

Therefore, because employee education may be the most useful tool in detecting fraud, the purpose of this paper is to provide an outline that will allow all business majors—not just those in accounting—to be exposed to modules in learning about and detecting fraud but without requiring the creation of an additional standalone fraud course. To begin, we suggest that all business majors should be exposed to a module on corruption within a business law class. Then, using the ACFE report as a guide, courses within each business major should include a relatively short module that focuses on the education and detection of fraud schemes that are prevalent within that particular area of business.

The value of all business students receiving fraud education is twofold. First, introducing students to fraud education in their academic careers will give them a competitive advantage in the job market and potentially save their future employers both time and money on employee education. Second, training all future employees early could allow companies to prevent and detect fraud sooner. The ACFE report states that organizations lose approximately 5% of their revenues to fraud every year, with an estimated annual loss of \$3.5 trillion when applied to the 2011 estimated Gross World Product (ACFE report, 8), and that frauds tend to last a median of 18 months before being detected (13). Taken altogether, if all students receive education on fraud, this may lead to fraud being detected and reported sooner and saving their future employers a significant amount of dollars. The remainder of this paper will review literature concerning fraud and its pedagogy, further examine information found in the ACFE report, discuss the most common fraud schemes, and present suggestions on how to incorporate fraud education across various business disciplines.

LITERATURE REVIEW

Fraud occurs when an employee abuses employer trust for personal gain, or more formally, “The use of one’s occupation for personal enrichment through the deliberate misuse or misapplication of the employing organization’s resource or assets (ACFE report, 6).” In the media, fraud is often reported as being perpetrated by CEOs at large, publicly traded companies, who manipulate financial reports in order to defraud investors and creditors. Perhaps the most well known examples of fraudulent activity are of companies such as Enron or WorldCom, in which management deliberately defrauded its investors. However, the idea that fraud is only perpetrated by high-level executives who prepare misleading financial statements is actually false. Evidence against this misconception is found in one of the most comprehensive sources of data on fraud—the aforementioned ACFE report, published biannually by the Association of Certified Fraud Examiners. For the 2012 report, data was collected from 1,388 cases of fraud that were investigated by fraud examiners worldwide during 2010 and 2011.

After analyzing the data, the ACFE report summarizes and provides a breakdown of information, including the most common types of fraud, organizations in which fraud is the most prevalent, magnitudes of fraud by type, and characteristics of fraudsters. Despite the high profile coverage in business newscasts, the ACFE report finds that these types of financial statement fraud are relatively uncommon (only 7.6% of reported cases). In contrast, by far the most common fraud cases reported are asset misappropriations, defined as thefts and misuse of cash and other assets (86.7% of reported cases). The next most common fraud scheme is corruption (33.4% of reported cases), defined as a violation of duty to gain a benefit, for example, bribery or conflicts of interest (ACFE report, 11). It is noteworthy to mention that the percentages are greater than 100%, due to some fraud cases reporting more than one type of fraudulent activity. The ACFE report also provides evidence that one cannot assume that only high-level management in publicly traded companies will perpetrate fraud. For example, fraud can occur in any type of organization: publicly traded companies (28.0%), privately owned companies (39.3%), government (16.8%), and not-for-profit (10.4%, ACFE report, 25). Fraud can occur in entities of any size:

those with less than 100 employees (31.8%), between 100 and 999 employees (19.5%), between 1,000 and 9,999 (28.1%), and larger than 10,000 (20.6%, ACFE report, 26). Fraud is also not unique to upper management, as perpetrators were found in many departments, including accounting (22.0%), operations (17.4%), sales (12.8%), upper management (11.9%), customer service (6.9%), purchasing (5.7%), warehouse and inventory (4.2%), and others (ACFE report, 52). Fraud is perpetrated by employees at any level (ACFE report, 39) and any amount of tenure with the company (ACFE report, 49).

Research has also provided similar support that fraud is not perpetrated only by high-level managers looking to defraud investors. For example, Holtfreter (2005) finds that while high-status executives may be more likely to engage in financial statement manipulation, middle-class offenders tend to engage more often in asset misappropriation or corruption. Beasley et al. (2000) report that revenue recognition schemes are more common among technology companies, while asset misappropriation is more common in financial service companies. In sum, fraud can occur anywhere and be perpetrated by anyone, and it is not appropriate to assume it usually happens among managers in large, publicly traded companies.

Fraud education has become very important to accounting majors. In the wake of many high-profile accounting scandals, one of the core competencies outlined by the American Institute for Certified Public Accountants for future accountants is an understanding of fraud and business risk. Pedagogical research also stresses the importance of including fraud education for accounting majors (e.g., Peterson 2004, Rezaee 2004, Bierstaker et al. 2006), and many papers offer various suggestions on how to incorporate these components into accounting curriculum (e.g., Seda and Kramer 2008, Curtis 2008, Heitger and Heitger 2008, Kranacher et al. 2008, Pearson and Singleton 2008). Research also delves into how to structure fraud classes for accounting students, and a number of different approaches have been recommended. For example, Peterson (2003) suggests using cases and videos while Amernic and Craig (2004) propose exploring the rhetorical and ideological nature of accounting and its history. Albrecht et al. (2009) and Ramamoorti (2008) advocate including psychological and sociological aspects of fraud to address both behavioral and financial components, and Wilks and Zimbelman (2004) discuss including game theory and strategic reasoning concepts.

Many institutions have responded to the call for more education among accounting majors. Seda and Kramer (2008) issued a survey to accounting academics, and report that among the 150 respondents, 34% have a curriculum that offers a course on forensic accounting or fraud, and an additional 34% indicate that forensic accounting is integrated throughout traditional accounting and auditing courses. Meier et al. (2010) investigate websites of 171 AACSB accredited schools and find that 20 offer at least one course in forensic accounting, 27 offer courses in fraud, and four offer courses in both. While an inclusion of fraud education can be beneficial to the accounting major, strong evidence exists that this is not enough to effectively curtail fraudulent activities. One reason for this is because of a common misconception held by the public—that it is the responsibility of the accountant, specifically the external auditor, to discover all fraudulent activity (often referred to in accounting literature as the “expectations gap”, e.g., Zikmund 2008, Lee and Ali 2008, Hassink et al. 2009, Bailey 2010, Bedard et al. 2012).

However, according to the Securities Exchange Commission, the external auditor’s main role is not to look for fraud. Instead, the auditor “...examines the company's financial statements and provides a written report that contains an opinion as to whether the financial statements are fairly stated and comply in all material respects with GAAP (Generally Accepted Accounting Principles)” (<http://www.sec.gov/investor/pubs/aboutauditors.htm>). Taken together, this indicates a general expectation that if fraud exists the external auditor will discover it, even though that is not the role of the auditor or the purpose of the audit. Evidence in the ACFE report also supports that this is a common misperception. Specifically, the report finds that external audits are the most relied on method for detecting fraud, but ultimately were responsible for detecting only 3.3% of the actual cases (ACFE report, 15); furthermore, they “...ranked poorly in limiting overall fraud losses...and their usefulness as a means

of uncovering fraud is limited” (5). Instead, the most common and effective method of detecting fraud early is the anonymous tip (43.3%), followed by reviews by management (14.6%). This being the case, it is reasonable to assume that fraud could have been discovered even sooner if more employees were trained to detect and recognize fraudulent activities. In fact, one of the strongest recommendations made by the ACFE report is for all internal employees to be trained to detect fraud:

“Targeted fraud awareness training for employees and managers is a critical component of a well-rounded program for preventing and detecting fraud... our research shows organizations that have anti-fraud training programs for employees, managers and executives experience lower losses and shorter duration frauds than organizations without such programs in place. At a minimum, staff members should be educated regarding what actions constitute fraud, how fraud harms everyone in the organization and how to report questionable activity (5).”

In summary, fraud can occur in many different forms in any type of organization. While significant progress has been made in training accountants to detect fraud, companies are still losing trillions on a global scale due to fraudulent activities. Therefore, introducing fraud education into the curriculum for all business majors will be extremely beneficial—not only will it potentially save employers training costs, but also provide future employees with prized skills and abilities and may result in avoiding thousands or even millions of dollars in losses for their respective organizations.

METHODOLOGY

The purpose of this section is to introduce a method that could be used to provide fraud education to all business majors, without needing to create a standalone course. We first propose that a module on corruption be included in a business law class. Then, we suggest that professors in various disciplines could use the ACFE report as a guide to discover which types of fraud are the most prevalent within that particular major, and include a module on those fraud schemes within a class required by students majoring in that discipline. Explanation for this particular proposal can be gleaned by exploring the ACFE report in more detail. First of all, according to the ACFE report (5), asset misappropriation is by far the most commonly reported fraudulent activity (86.7% of companies), followed by corruption (33.4%), and finally financial statement fraud (7.6%)—note that the percentages add up to more than 100% because in many cases, more than one category of fraud was discovered. However, asset misappropriation (theft and misuse of cash and other assets) is a very broad category. To aid in understanding, the ACFE provides a list of the more common subcategories within asset misappropriation, as well as the frequency of occurrence and median losses, which is replicated in Table 1.

For example, the first row discusses the most common cash receipt scheme—skimming—which is defined as “any scheme in which cash is stolen from an organization before it is recorded on the organization’s books and records” (ACFE report, 12) and was reported by 14.6% of the cases. The remaining rows discuss the other prevalent asset misappropriation schemes: cash larceny, billing, expense reimbursement, check tampering, payroll, cash register disbursements, misappropriation of cash on hand, and non-cash misappropriations.

Furthermore, the ACFE report provides an analysis of the five departments in which fraud is most prevalent (not including accounting), and within those departments, which of the eleven fraud categories—corruption, the nine asset misappropriation subcategories, and financial statement fraud—is the most common. This information is partially replicated in Table 2 (up to the top seven schemes). For example, an analysis of the day-to-day operations shows that of all cases of fraud discovered within this department, 32.8% involved corruption, followed by billing schemes (24.1%), expense reimbursement (19.4%), non-cash misappropriations (17.7%), skimming (12.9%), misappropriation of cash on hand (11.6%), and cash larceny (11.2%).

Table 1: Description and Frequency of Various Asset Misappropriation Schemes, As Reported By The 2012 Association Of Certified Fraud Examiners *Report To The Nations*

Category	Description	Percent of All Cases	Median Loss
Skimming	Schemes Involving Theft of Cash Receipts Any scheme in which cash is stolen from an organization before it is recorded on the organization's books and records	14.6%	\$58,000
Cash Larceny	Any scheme in which cash is stolen from an organization after it has been recorded on the organization's books and records	11.0%	\$54,000
Billing	Schemes Involving Fraudulent Disbursements of Cash Any scheme in which a person causes his or her employer to issue a payment by submitting invoices for fictitious goods or services, inflated invoices or invoices for personal purchases	24.9%	\$100,000
Expense Reimbursements	Any scheme in which an employee makes a claim for reimbursement of fictitious or inflated business expenses	14.5%	\$26,000
Check Tampering	Any scheme in which a person steals his or her employer's funds by intercepting, forging or altering a check drawn on one of the organization's bank accounts	11.9%	\$143,000
Payroll	Any scheme in which an employee causes his or her employer to issue a payment by making false claims for compensation	9.3%	\$48,000
Cash Register Disbursements	Any scheme in which an employee makes false entries on a cash register to conceal the fraudulent removal of cash	3.6%	\$25,000
Misappropriation of Cash on Hand	Other Asset Misappropriation Schemes Any scheme in which the perpetrator misappropriates cash kept on hand at the victim organization's premises	11.8%	\$20,000
Non-Cash Misappropriations	Any scheme in which an employee steals or misuses non-cash assets of the victim organization	17.2%	\$58,000

This Table is replicated using information presented on page 12 in the 2012 Association of Certified Fraud Examiners Report to the Nations. The report collected data on 1,388 cases investigated by fraud examiners during 2010 and 2011. The sum of the percentages of all cases is greater than 100 percent because many cases included more than one type of asset misappropriation.

Table 2: Frequency of the Top Seven Fraud Schemes within Departments with a High Occurrence of Fraud, As Reported by the 2012 Association of Certified Fraud Examiners *Report to the Nations*

Day-to-Day Operations	Sales	Upper Management/ Executive	Customer Service	Purchasing
Corruption (32.8%)	Corruption (31.2%)	Corruption (53.5%)	Corruption (20.7%)	Corruption (68.4%)
Billing (24.1%)	Non-Cash Misappropriation (22.4%)	Billing (32.7%)	Non-Cash Misappropriation (19.6%)	Billing (35.5%)
Expense Reimbursement (19.4%)	Skimming (18.2%)	Expense Reimbursement (21.4%)	Skimming (13%)	Non-Cash Misappropriation (19.7%)
Non-Cash Misappropriation (17.7%)	Expense Reimbursement (15.3%)	Financial Statement Fraud (20.8%)	Misappropriation of Cash on Hand (13.0%)	Expense Reimbursement (6.6%)
Skimming (12.9%)	Billing (14.7%)	Non-Cash Misappropriation (15.7%)	Cash Larceny (10.9%)	Skimming (3.9%)
Misappropriation of Cash on Hand (11.6%)	Cash Larceny (11.2%)	Skimming (15.1%)	Billing (7.6%)	Payroll (3.9%)
Cash Larceny (11.2%)	Misappropriation of Cash on Hand (9.4%)	Misappropriation of Cash on Hand (13.8%)	Expense Reimbursement (7.6%)	Financial Statement Fraud (3.9%)

This Table is created using information presented on page 55 in the 2012 Association of Certified Fraud Examiners Report to the Nations. The report collected data on 1,388 cases investigated by fraud examiners during 2010 and 2011. The reported percentages are the frequency of that particular fraud category of all fraud cases within that specific department. The sum of the percentages within each department is greater than 100 percent because many cases included more than one type of fraud within that department.

As an analysis of Table 2 shows, after separating the asset misappropriation schemes into subcategories, corruption is the most common throughout each of the departments analyzed. Because corruption is so predominant, we propose that all business majors should be exposed to education on corruption. An ideal place for this exposure would be in a business law class, for reasons that will be discussed in the next section. Once students have been exposed to the concept of corruption, then classes within respective majors could include a component on fraud that outlines the fraud schemes that are the most prevalent within careers related to that major. For example, after examining Table 2, marketing professors could

include a module on the most common frauds within sales departments (e.g., non-cash thefts, skimming, expense reimbursement, billing, and cash on hand thefts). Majors that tend to produce CEOs and CFOs (e.g., management or finance) could learn about the schemes common to upper management. Operations majors could learn about schemes found in production and purchasing. Other majors that do not necessarily lend themselves to one of the departments found in the report (e.g., information systems, entrepreneurship, and business administration) could learn about the schemes most prevalent in day-to-day operations. The remainder of this section will include a discussion on the corruption module for inclusion in the business law class, followed by suggestions on incorporating fraud education modules within various majors.

Business Law / Corruption Module

Corruption schemes occur when an employee “...misuses his or her influence in a business transaction in a way that violates his or her duty to the employer in order to gain a direct or indirect benefit” (ACFE report, 10). Because 34% of all the reported cases involved corruption, and because it is the most common scheme within each occupational area, the business law course would be an ideal time to expose all business students to recognizing corruption. According to Miller and Crain (2011), over 97% of AACSB colleges and universities have a required business law component as part of their business core, which is typically met with a single three-semester credit hour course or its equivalent. The required law course in many cases has a 200-level prefix, generally indicating that the course is designed to be taken during the sophomore year of study. However, in a review of several leading business law texts (e.g., Clarkson et al. 2009, Kubasek et al. 2011, Mallor et al. 2010, and Melvin 2011), fraud is often only discussed in the context of legal or equitable defenses to contracts or negotiable instruments (i.e. fraud in the inducement or fraud in the factum). Corruption and other forms of occupational fraud, if covered, are typically limited to a cursory description of several types of white-collar crime and may include mail or wire fraud, bribery, embezzlement and computer crimes.

Therefore, we recommend that the business law course could include a module on corruption. It could begin with a description of corruption schemes. Examples include conflicts of interest (purchase and sales schemes), bribery and extortion (coercing an employee to act a certain way under either the promise of a reward or the threat of punishment, respectively), and receiving or giving illegal gratuities. The course could also include review of selected cases, and the ACFE website recommends use of *Bribery and Corruption Casebook: The View from Under the Table* (2012, edited by Wells and Hymes), a collection of various corruption cases. In order to lay the groundwork for further study with respect to fraud in each student’s chosen major, the business law class could also include a discussion of the “fraud triangle.” Typically introduced to accounting majors in an auditing class, the fraud triangle is a tool designed to assist individuals in understanding and detecting the potential for fraudulent activities. The fraud triangle has three sides—perceived pressure, perceived opportunity, and rationalization—and the basic idea is that when each of these “sides of the triangle” are present, a fraud is most likely to occur. Perceived pressure comes in the form of an individual need to engage in fraud, which can be either financial or nonfinancial. Common examples include pressure from coworkers or supervisors, personal greed or financial problems, or a desire to report results and activities in a more favorable light. Perceived opportunity occurs if a situation arises that leads an employee to believe that a fraud would be successful (e.g., infrequently examined cash records or other internal control weaknesses).

For the final leg of the fraud triangle—rationalization—Ramamoorti (2008) suggests that studying the psychology and sociology of rationalizing fraud could be valuable tools in understanding why fraud occurs. For example, one popular rationalization is the notion that the company owes more to the employee (i.e., the employee is not properly rewarded for his or her work). Another example is the “Robin Hood Rationalization,” occurring when the employee believes that there is a higher purpose behind the fraud that makes committing fraud acceptable. Yet another rationalization is that the act is not

really fraud because it is only temporary (e.g., the employee is not really “stealing” cash because he/she plans to replace it later). In summary, as stated by the ACFE report, all employees should be trained to understand and recognize fraud. By beginning with a business law course, two objectives will be met. First, because corruption is the most common type of fraud within many different departments in an organization, all students will receive knowledge that will be useful, regardless of their chosen major. Second, discussing the fraud triangle will lay the foundation for later in their academic careers, when they will be exposed to more specific types of fraud that are the most prevalent in their chosen majors, as discussed next.

Fraud Education Modules

After business majors have been exposed to the topics of fraud and corruption through their business law course, including a module in their specific majors that discusses common frauds would be beneficial in training future employees to detect fraud. Our proposal is that selected intermediate or upper level courses within specific majors should include brief modules discussing the most common fraud within the respective discipline. The reason for placing the fraud modules in intermediate or advanced courses is twofold. First, this ensures that the students have already taken the business law class and been exposed to preliminary education on corruption and the fraud triangle. Second, education on recognizing, detecting, and preventing fraud within their specific disciplines would likely be more useful after students receive a significant amount of foundational content pertinent to their respective major.

As mentioned previously, professors can use the ACFE report as a guide to determine which fraud schemes are the most prevalent within their respective fields (e.g., a marketing professor could include a module that discusses some of the more common fraud schemes within the sales department). Table 2 shows the most common frauds within five different departments. According to the information in Table 2, some schemes are common throughout all of these departments, most notably: billing, skimming, expense reimbursements, and non-cash asset misappropriations. Furthermore, these four are also the most common asset misappropriation schemes found throughout a company, as shown by Table 1. Each of these will be briefly discussed in turn, followed by suggestions on how to explore the schemes in the fraud education modules. Billing schemes are one of the most common types of fraud found throughout an organization. As shown by Table 1, billing schemes account for 24.9% of all cases and the median reported loss is \$100,000. A billing scheme is defined as occurring when “a person causes his employer to issue a payment by submitting invoices for fictitious goods or services, inflated invoices or invoices for personal purposes” (ACFE Report, 12).

Because many businesses disburse hundreds or even thousands of checks within a relatively short time period, employees can attempt to engage in various billing schemes. One example is if an employee were to create a fictitious dummy company, and have that company submit invoices to their employer for payment. Alternatively, an employee could collude with an individual at another company, and have that other company submit an invoice for services that were never actually provided. These invoices can be for relatively innocuous services that were never actually provided, such as carpet cleaning, catering, or repairs to company cars; basically, expenses that are relatively common and not likely to raise any questions or trigger extensive review. In the first example, the perpetrators open bank accounts for the dummy or shell companies, list themselves as signers on the dummy company’s accounts, and then simply endorse the checks from their employers when they arrive. In the collusion example, the individual at the other company cashes the checks and shares the money with the colluding employee.

Skimming occurs when cash is stolen before it has been recorded on the company’s books. As shown in Table 1, skimming accounted for 14.6% of frauds and the median loss was \$58,000. This may take the form of a cashier not recording (or under-recording) a sale and pocketing the cash (or the difference). A related form of fraud can also include stealing from the cash register, or entering in a refund to a customer

that never existed and pocketing the cash. Expense reimbursements also provide opportunities for fraudulent activities and as evidenced by Table 1, account for 14.5% of all fraud schemes resulting in median losses of \$26,000. An example of an expense reimbursement scheme would be an employee taking a business trip and overstating the amount of reimbursable expenses. Another example would be purchasing a personal item but charging it to the company as a business expense for reimbursement.

Another comparatively common fraud as indicated in Table 1 is non-cash asset misappropriation (accounting for 17.2% of reported cases and resulting in median losses of \$58,000). These schemes include two main categories: theft and misuse. Theft of assets is a problem many companies face. For example, by its nature, inventory is typically handled by many employees—inventory clerks, warehouse personnel, shipping clerks, and sales and floor personnel. With so many individuals handling inventory, it could be relatively easy for an employee to steal without risk of being detected. Another way theft can occur is if employees order more materials than necessary from a supplier and keep the excess themselves. A third example is if an employee were to take excess leftover raw materials when the manufacturing process is complete.

Misuse of assets is also a problem companies may face. Examples include individuals using company vehicles to run personal errands, or using company supplies and printers to print personal items. These examples can become especially problematic if the employees do not see these activities as wrong, but instead as a socially acceptable workplace practice. Another misused company asset could be proprietary information. Employees who have access to information on a company's projects or customers could potentially sell this information to competitors, or use it themselves to start up their own businesses.

Ultimately, for business students to effectively understand fraud, they first need to learn about the various schemes and how they can be committed by those working in their business disciplines. After professors define and give examples of various schemes, we recommend a more in-depth discussion on how the fraud could be perpetrated within that particular discipline as well as recommended control mechanisms that could decrease the likelihood of fraud. For example, operations or supply chain majors could spend time exploring the importance of supervisory review of all costs attributable to a product or operation, as well as creating inventory control points as an effective tool to establish responsibility for the safeguarding of inventory. Sales and marketing students need to be advised of the temptation and common occurrence of rationalizing the padding of expense accounts, and how to properly review reimbursement requests. Students in information systems management could study the risk associated with misuse of sensitive information.

Once students have received education about the types of fraud most prevalent in their chosen discipline, the next step is to include a discussion on how to detect various fraud schemes. For example, if one wanted to create a discussion of warning signs and suggestions to control non-cash asset misappropriations, a possible topic could be windows of time for delivery. To illustrate, many companies have standard windows of time when products are shipped or received in order to allow for proper supervision and record keeping. However, if one notices that some items are entering or leaving at unusual times, this could be a warning sign that someone might be taking advantage of less scrutiny and fewer individuals being around to engage in a fraud. A control mechanism could be to place cameras over delivery docks and in the warehouse, or require electronic logs that record the exact time and amount of product changing hands. Another example could be discovering that certain employees have excessive interactions with specific suppliers or customers. Under normal circumstances, businesses attempt to spread their sales and purchases among numerous suppliers or customers to decrease the risk of adverse financial outcomes should a supplier or customer go out of business. Additionally, transactions above a certain percentage threshold must be reported in the annual report. If transactions with specific suppliers or customers grow in unexplainable frequency or magnitude, it may indicate that collusion or bribery may

be occurring. A regularly examined record of transactions sorted by customer or vendor (and illustrated in graphic format) will call attention to unusual trends and justify investigation.

A third example could be discovering an unusually high production of waste, scrap, or byproduct. When inventory is used inefficiently, it is often attributed to faulty material, employee error, or unexpected decrease in product demand. It is possible that some employees might intentionally be working inefficiently or reporting higher scrap or waste than actually occurred, in order to steal assets. Charting production inefficiencies by workstation, shift, and days of the week or month will help to identify the source of the waste; additionally, exact records for how the excess is accounted for and disposed of should be maintained. By no means are these the only examples of non-cash asset misappropriation, and non-cash asset misappropriation is not the only fraudulent activity, but discussions like the examples given above could be very valuable in training future employees about frauds within their respective majors. Once students learn about fraud schemes that are the most common in their respective fields, to be better prepared to spot fraud, we also recommend a short discussion on red flags with respect to the individual engaging in fraudulent activities. The ACFE report (57) finds that in 81% of reported fraud cases, the perpetrator engaged in at least one (frequently more than one) “red flag” behavior.

Within the asset misappropriation schemes, the most commonly reported behaviors among perpetrators were: living beyond one’s means (35.6%), having financial difficulties (27.1%), unusually close associations with vendors or customers (19.2%), having control issues and being unwilling to share duties (18.2%), having divorce or family problems (14.8%), having a “wheeler-dealer attitude” (14.8%), and frequently being irritable (12.6%). Education about warning behaviors can be helpful, and further discussions can often be found in fraud textbooks. For example, Albrecht et al. (2009) suggests that engaging in fraud creates stress, which in turn prompts many of these unusual and observable behaviors, and suggests other red flags such as: insomnia, drinking and drug use, difficulty relaxing, lack of pleasure in things usually enjoyed, inability to look people in the eyes, defensiveness, and unusual belligerence, among others. Frequently arriving early or staying late can be a warning sign; despite the fact that sometimes these employees may receive praise for their work ethic, it also may give them opportunity to access inventory and records when no one else is around.

Overall, the ways in which fraud can be perpetrated is limited only by the imagination of the fraudster, but the workplace circumstances listed above provide examples of how any employee could detect and have reason to report suspected fraudulent activity. Learning about these red flags would likely be most useful to those majoring in human resources and/or management, as they might be the ones best suited to observe behaviors. However, to increase employee diligence, it would be beneficial for all majors to learn about these typical “red flags.” The ACFE report recommends that employees should be on the lookout for these types of behaviors: “These red flags...will not be identified by traditional internal controls. Managers, employees, and auditors should be educated on these common behavioral patterns and encouraged to consider them—particularly when noted in tandem with other anomalies—to help identify patterns that might indicate fraudulent activity” (5).

Ultimately, professors within each discipline should discuss the way these schemes are most likely to be perpetrated within their respective area of study, and there are many resources one can use to explore the various schemes in order to conform to a discussion within the individual majors. For example, the ACFE website (<http://www.acfe.com/fraud-resources.aspx>) and the Appendix of this paper provide a list of potential sources for review in order to custom-create a fraud module within the respective disciplines.

Assessment

All effective business programs regularly assess their curricular components in various ways, but ultimately, academics and their accrediting bodies want to be certain that the instruction methods are

appropriate and students are benefitting from both the content and the delivery of course material. Most programs want their students to be able to demonstrate knowledge, skills, and abilities in conceptual content, research and analysis, written communication, and verbal expression. Depending on what the instructor or department wishes to achieve, assessing the effectiveness of including fraud education modules in the business law course and in courses related to a specific major could take on a variety of forms. Students' conceptual abilities after receiving fraud education can easily be determined by tabulating the results of multiple choice, matching, and other objective questions on tests. To assess analytical skills, written communication, and/or verbal expression, the instructor could assign either a real world or a hypothetical case provided by books, current events, or movies. Both analytical skills and written communication could be developed by requiring students to write an essay or answer a series of questions, for example, how the fraud triangle was represented in a fraud case. Verbal expression (and analytical skills) could be determined by requiring students to engage in individual or small group presentations on assigned cases. These presentations can take the form of debates, mock interviews, individually prepared responses, and individual or group presentations.

As an example, assume an instructor for a finance class wishes to include a module on fraudulent activities relating to the insurance industry. After teaching fundamental insurance concepts, the professor could introduce various fraud schemes that can occur within that industry. Then, students could be asked to watch the film *Double Indemnity*. On a test, they could be asked objective questions regarding who was the policy owner, who was the beneficiary, who was the insured, etc. The film could then be used as a case where students are asked to write a short essay identifying the elements of the fraud triangle as they appeared in the film. Individuals or groups of students could be asked to give a short presentation on fraud statistics as they pertain to the insurance industry, based on information in the most recent ACFE report. By including this array of assignments, the students would have 1) gained a familiarity with key concepts regarding insurance, 2) engaged in analysis and research, and 3) demonstrated both written and verbal communication skills while learning both the key concepts of insurance and how insurance is subject to fraud. Each business program will need to determine to what degree it wants its students to understand how to prevent and detect fraud, as well as how it will incorporate learning assessment after the module is complete. However, with the wide array of resources available, incorporating fraud education and assessing its effectiveness can be easily tailored to the needs of the individual professor or department.

CONCLUSION

As indicated by the ACFE report, companies who educate all of their employees (and not just the accountants) in fraud tend to experience fewer losses and detect fraud sooner than companies who do not implement such programs. However, by providing fraud education while these future employees are still students has the potential to save companies significant amounts in training costs and losses due to fraud. The purpose of this paper was to provide a recommendation on how to implement fraud education at the college level without the need to create a standalone fraud course. By including a module in business law on corruption and the fraud triangle, and a module in an intermediate or advanced level course about fraud schemes most prevalent in the students' selected major.

As with any suggested changes to course curricula, there are some potential difficulties. First and foremost, adding new content to already crowded curricula is never easy. However, faculty who wish to discuss fraud are not limited to needing to review and recite potentially dry or intimidating textbook material. There are a multitude of resources besides textbooks that could be used to facilitate discussion and generate ideas. For example, the ACFE website (<http://www.acfe.com/fraud-resources.aspx>)—besides posting the ACFE report—includes a multitude of resources, including: books, manuals, videos, and articles on fraud detection and prevention, and modules on how to spot weaknesses within a company. Other websites can also provide training materials, research results, and other helpful resources.

Faculty could also use local, national, and international news stories as real-world examples of fraud in a variety of industries and disciplines to generate ideas for class discussion. Books and movies—both fiction and non-fiction—can be great ways to engage students in the “who, what, when, where, and why” aspects of white-collar crime. Even cartoons can prompt a fruitful class discussion. A list of potential resources is presented in the Appendix.

Another potential difficulty with the current proposal is that we recommend two levels of fraud education: first corruption and the fraud triangle in a business law class, and then modules on specific frauds in higher-level classes specific to a student’s major. While we believe that this is the ideal approach, it should not be assumed that this is required. Fraud education, even if it comes from only the business law course or only a module in the student’s major, could still be very valuable. Finally, it is worth mentioning that our recommendations are only one suggestion. There are undoubtedly other methods that could be used to introduce all business students to fraud education. Future research could be aimed at exploring tangible and measurable results of our proposal and/or others to ultimately determine the most effective educational methods. In summary, the ACFE report states that employee education may be the most crucial tool in detecting and reducing fraud, and training in detecting and controlling fraud should not be limited to only accounting majors. Therefore, we believe that if educators incorporate our suggestions (discussing corruption in the business law course and then including modules on recognizing and detecting common fraud schemes in the respective business majors), it is possible that students will receive valuable skills that will save employers thousands or even millions of dollars in the long run.

APPENDIX

Appendix A: Supplemental Fraud Teaching Resources

DOCUMENTARIES:	Length	Release Date	Disciplinary Relevance
Unraveled	84 min	2011	Management/Organizational behavior, finance, accounting
Inside Job	109 min	2010	Economics, finance, accounting, marketing, real estate, banking, management/organizational behavior
The Smartest Guys in the Room	110 min	2005	Economics, finance, accounting, marketing, banking

FRONT LINE VIDEOS:	Length	Release Date	Disciplinary Relevance
The Untouchables	55 min	2013	Accounting, law, finance
Money, Power, and Wall Street	3 hrs, 47 min	2012	Economics, law, finance, management/organizational behavior
The Warning	55 min	2009	Economics, finance, management/organizational behavior
Breaking the Bank	55 min	2009	Finance, banking, economics
The Madoff Affair	55 min	2009	Finance, accounting, economics, management/organizational behavior
Black Money	54 min	2009	Economics, law, international business
Inside the Meltdown	56 min	2009	Economics, finance, banking, law, accounting, management/organizational behavior

FILMS:	Length	Release Date	Disciplinary Relevance
Double Indemnity	75 min	1973	Insurance, marketing, finance, management/organizational behavior, law, human resources
The Counterfeiters	99 min	2007	Economics, management/organizational behavior
Wall Street	126 min	1987	Finance, investing, marketing, law, management/organizational behavior
Wall Street: Money Never Sleeps	123 min	2010	Finance, law banking, investing, management/organizational behavior
Catch Me If You Can	141 min	2002	Management/organizational behavior, marketing, law, human resources
Boiler Room	120 min	2000	Finance, marketing, management/organizational behavior, law, human resources
Owning Mahoney	103 min	2003	Banking, management/organizational behavior, law, human resources

CARTOONS, COMICS, ETC:	Content
www.cartoonstock.com	General business cartoons
www.stus.com	General fraud cartoons, comics
www.offthemark.com	General fraud cartoons, comics
www.cartoonistgroup.com	General fraud cartoons, comics, illustrations
www.grantland.net	General fraud cartoons, comics
www.glasbergen.com	Insurance fraud cartoons, comics

WEBSITES:	Commentary on Content
www.stopfraud.gov	Financial Fraud Enforcement Task Force report; established by executive order by President Obama in November 2009; 2010 was their first year report; initial report includes some data and statistics; website includes links to various types of fraud, explanations of types of fraud, etc.
www.krolladvisory.com	Global Fraud Reports - now in the 6th edition; excellent resource for types of fraud being committed around the world; appropriate resource for an international business course; laid out in "article format" so instructor can focus on just one or two sections of the report; older editions of the report are open access; the most current edition requires a subscription; also refers to data provided by Economist Intelligence Unit
www.kpmg.com	Who Is the Typical Fraudster? Excellent resource containing very current information; provides foundational information appropriate for general business classes and check-sheets to determine if the organization is susceptible to fraud; students and instructors will find this document relevant and easy to understand
www.pwc.com	Global Economic Crime Surveys include charts, graphs, demographic data, and geographic info; in its 6th edition; most recent report focuses on cybercrime but includes information on other types of fraud as well - asset misappropriation, corruption, bribery, etc.; good charts
www.ey.com	Global Fraud Survey now in the 12th edition; not quite as user friendly as the resources listed above; most recent issue has a strong focus on board of directors and high-level management
www.acfe.com/fraud-resources.aspx	Contains a wide variety of resources including books, manuals, videos, articles, etc.

BOOKS	Author	Date	Publisher	Pages
Provenance: How a Con Man and A Forger Rewrote the History of Modern Art	Salisbury and Sojo	2010	Penguin	352
Octopus: Sam Israel, the Secret Market, and Wall Street's Wildest Con	Lawson	2012	Crown	368
History of Greed: Financial Fraud from Tulip Mania to Bernie Madoff	Sama	2010	Wiley	398
No One Would Listen: a True Financial Thriller	Markopolos	2010	Wiley	376
The Wizard of Lies	Henriques	2011	Times Books	448
The Art of the Steal: How to Protect Your Business...	Abagnale	2002	Broadway	225
Stolen Without a Gun	Pavlo, Jr. and Weinberg	2007	Etika	312
The Bribery and Corruption Casebook: The View from Under the Table	Wells and Hymes	2012	Wiley	385

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A SOCIAL MEDIA CAMPAIGN APPLICATION IN A MARKETING FIELD EXPERIENCE COURSE

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ABSTRACT

Most university students today use social media daily, are knowledgeable about a myriad of applications, and can navigate numerous platforms, such as Facebook and Twitter. Despite their affinity for social media, however, it is not clear whether or not they understand how social media can be used to create effective marketing strategies. This paper describes a social media assignment that was incorporated into a marketing field experience course for undergraduate students. The aim of the paper is to inspire other instructors who may wish to use social media campaigns in their marketing courses. The objective of the assignment was to teach the effective use of social media in marketing by allowing the students to engage in a real-time social media campaign with a major fashion marketer. Student testimonials indicate that this active learning approach successfully assisted our students in understanding the marketing potential of social media.

JEL: M31

KEYWORDS: Social Media, Experiential Learning, Marketing, Field Experience

INTRODUCTION

Most university students today use social media daily, are knowledgeable about a myriad of applications, and can navigate numerous platforms, such as Facebook and Twitter. Despite their affinity for social media, however, it is not clear whether or not they understand how social media can be used to create effective marketing strategies. Business educators, aware of the needs of today's businesses for social media-savvy employees, are increasingly teaching, applying, and utilizing Web 2.0 technologies in business courses. However, both the rapid changes in this technology and the lack of precedents in the literature require these educators to learn by trial and error. As the paradigm in teaching philosophies shifts further away from lecture-based passive knowledge transfer towards more hands-on applied experiential learning, the importance of field experience courses becomes more and more evident. This paper describes the innovative way in which a social media marketing assignment was incorporated into a field experience course for undergraduate students.

The aim of the paper is to inspire other instructors who may wish to use social media campaigns in their marketing courses. The paper starts with a brief discussion of the use of social media and experiential learning in business education. It continues by describing the assignment, the objective of which was to teach the effective use of social media in marketing by allowing students to engage in a real-time, social media marketing campaign. While acknowledging its limitations, the author provides readers with possible applications of similar assignments in marketing courses and contributes to the existing limited literature on social media applications in experiential learning and marketing courses. Student testimonials indicate that this active learning approach successfully assisted our students in understanding the marketing potential of social media.

LITERATURE REVIEW

Social media is unquestionably a reality in our lives. The latest editions of marketing textbooks dedicate entire chapters to social media, and the number of books on social media is increasing rapidly. Given the importance of social media in marketing strategy and communication, marketing professors are finding it

a necessity to incorporate it into their courses (Demirbag Kaplan, Piskin, & Bol, 2010, Hollenbeck, Mason, & Song, 2011, Lowe & Laffey, 2011, Buzzard, Crittenden, Crittenden, & McCarty, 2011, Granitz & Koernig, 2011, Payne, Campbell, Bal, & Piercy, 2011, Rinaldo, Tapp, & Laverie, 2011). The Internet technology once deemed to be the future of marketing education (Atwong and Hugstad, 1997) has become its present. The traditional paradigm of education characterized by lectures with passive knowledge transfer from instructors to students and impersonal relationships between the two is being replaced by new paradigms that advocate socially co-constructed knowledge through experiential learning (Granitz and Koernig, 2011). Kolb (1984, p. 41) defines experiential learning as “the process whereby knowledge is created through the transformation of experience.”

Research indicates that experiential projects increase student motivation and engagement, enhance team management and communication skills, and promote the learning of technical and theoretical knowledge (Payne, Campbell, Bal, & Piercy, 2011). By nature, marketing is an ever-evolving discipline that must keep up with the latest technological and cultural changes. In order to have a distinct advantage over their peers in the job market, marketing students should be well equipped with the latest knowledge and technology in the field of social media marketing. Twitter has been used successfully to engage students in experiential learning and also as a medium for direct communication with students to generate discussion and interest in the course topics and examples (Rinaldo, Tapp, & Laverie, 2011, Lowe & Laffey, 2011). Similarly, blogging as part of a marketing management course has been shown to provide an experiential exercise in marketing while producing significant improvement in students’ soft skills (Demirbag Kaplan, Piskin, & Bol, 2010).

Granitz and Koernig (2011) claim that “[a]lthough both experiential learning and Web 2.0 tools focus on creativity, sharing, and collaboration, sparse research has been published integrating a Web 2.0 paradigm with experiential learning in marketing” (p. 57). They position Web 2.0 as “a philosophy that can advance experiential learning through greater student construction of pedagogical materials, by bringing more of the outside world into the classroom and by modifying the role of the professor” (p. 57). In an effort to keep up with the latest shifts in educational philosophy, our marketing department highly encourages industry collaborations in which our students work for and with business partners. Examples of experiential learning and Web 2.0 applications can be found throughout our curriculum. This paper contributes to the field of marketing education by describing and analyzing an application of social media combined with experiential learning.

The Course and the Assignment

Field experience courses are a required part of the marketing curriculum at our university. The Principles of Marketing course is a prerequisite for all other marketing courses. All marketing students are required to have an understanding of the basic foundation of marketing concepts and theories before moving on to more application-based, theory-heavy courses. It is also mandatory for the students to prepare a complete marketing plan in their principles course. The course in this case was a field experience in New York City that was offered in the spring semester of 2012. A group of ten female and three male marketing and fashion marketing undergraduate majors at a West Coast university spent a week in NYC in March during their spring break as part of their field experience course. During a period of five business days, students visited several companies across a variety of industries, including a clothing design firm, a marketing communications agency, an automotive company, an international magazine for teenagers, and a media and entertainment company. The students interacted with company executives during presentations on a wide range of topics. For example, the Senior Vice President of Global Communications of a company we visited focused on how the effectiveness of social media campaigns used for public relations is measured, and the Director of Digital Event Marketing of the automotive company described how they use social media to market automobiles via their sponsorship of New York Fashion Week.

For the purposes of the social media assignment, all of the female students were given a tote bag by a well-known international shoe/bag/accessories brand and were required to carry this bag with them at all times during the field trip. The company which provided the bags requested that the students take photos of the bag and post them on social media sites such as Facebook, Instagram, Tumblr, and Twitter. All students either had existing accounts already or opened accounts for the first time in the above-mentioned social media applications. Some of the students also had their own micro-blogs, which they utilized for the purposes of this assignment.

Assessment of the Assignment's Effectiveness

The main learning goals of the assignment were to demonstrate communication skills and incorporate theory with practice by using social media as part of their field experience. As mentioned above, throughout the duration of the assignment, students were given presentations by industry executives on how they utilize social media in their campaigns. These campaign examples improved their understanding of how social media can be used and also increased their appreciation for this new medium. Among the many skills students acquired, they learned what a hash tag (#) is, how to use it, and its importance. The photos they posted on various social media platforms were distributed to other outlets reaching social audiences. The students were able to immediately observe the impacts of the photos they posted online on their accounts. The company which sponsored the campaign was extremely pleased with the results and subsequently expressed the desire to work with our students again. According to the company's social media reports, the tote bag became the bestselling handbag on the company's website for the duration of the social media campaign. While not all of the campaign's success can be attributed to our students, they had a remarkable role in it. The students who participated in the social media assignment were asked to write about their experiences related to the assignment at the end of the course in May 2012. As can be seen in the following accounts, the students' learning experiences were all very positive:

Student 1: Throughout the trip we would take pictures of the bag, with the bag, pretty much anything we can think of that included the bag. Then the images were posted on Instagram using a special hash tag. Prior to this campaign, I had only heard the term hash tag; now I know how they are used throughout platforms such as Instagram and Twitter. I only used Instagram for this campaign since the iPhone app had recently become a popular channel to share images. However, after the campaign I decided it would be beneficial as a future marketing professional to open a Twitter account as well. The [name of the company] campaign was a great experience for me, considering I was not using social media prior to this. Promoting the bag on social media was not only fun; it reached a vast audience without the costs of advertising. During the trip we learned that impressions made on social media platforms can actually be measured in terms of advertising costs. Friends and random individuals were commenting on the bag, ultimately engaging with us and building awareness of the brand. I think of it as a cheap form of product placement in the lives of somewhat ordinary people. Since we are more approachable and are not explicitly trying to sell something, others feel more at ease and will listen to the message they are being given about the product. Overall the [name of the company] campaign made me realize the importance of social media for the new age of marketing.

Others shared the experiences reported by Student 1. The experiential learning enabled by this assignment added to their knowledge about social media.

Student 2: The feedback I received along with what other fellow students received blew my mind. We were actually marketing this tote and marketing it right. It was truly a great learning experience. For me personally, it made me love marketing on a different level because it allowed me to view it from a different perspective.

There is only so much you can learn from school, but the way you apply your knowledge proves your passion and love for the field you go into. The [name of the company] Campaign taught me that marketing holds the key for many companies and reminded me of the importance of a good marketing plan. It allowed me to use the tools I was taught about marketing and applying it to this campaign. People were quick to respond to the tweets and Instagram posts I had and people were growing more interested in this tote as the days went by. I think by day 5 of our trip, this tote was famous. Numerous professors have taught me that social media holds a certain power in marketing and this campaign justified that. It taught me firsthand the high response rate when marketing a product on social media. I was shocked at the amount of retweets and positive feedback I was receiving on the different social media platforms. The word spreads fast on social media. What fascinated me were people posting the link to where consumers interested in the tote can purchase it. I have always been a strong believer in marketing because, in my opinion, without marketing the world would not go round. The [name of the company] Campaign was my first stepping-stone to the exciting and fascinating world of marketing. When I think back and reminisce on my New York City trip, the first memory that pops to mind is the Other Bag by [name of the company].

The following student emphasizes the innovative and creative nature of the assignment and compares social media marketing to traditional marketing.

Student 3: It was a phenomenal experience for my fellow classmates and I to have because we learned that even students can bring awareness to a brand or product not through billboards or commercials, but through our very own social media platforms with a few little hashtags. It was a fun experience and taught our class how to be creative and innovative with products. Social media has taken over the marketing world and brings more attention to a brand than traditional campaigns.

As mentioned above, social media is still relatively new and is slowly making its way into marketing education. The lack of precedents in the literature compels instructors to learn from their own experiences. A limited number of learning outcomes can be achieved in one course or assignment. Experiential learning and social media application were the emphasis of this assignment. While it was mandatory for the female students to participate in the assignment, they were not graded on it. The students did not prepare the social media marketing plan but had a role in applying it. This in itself, as is evident from the students' testimonials, was a valuable learning experience. It was also a valuable learning experience for the instructor, who subsequently used this experience in a media marketing course in which students were required to create a complete social media marketing plan.

Possible Challenges and Limitations of Adaptability

Given that the majority of the students were highly familiar with social media and owned a smart phone, no major challenges were encountered during this particular experience. Possible challenges might include finding a company to work with and students not having smart phones, both vital factors for the effectiveness of the assignment. In this case, the product—a tote bag—was something the students could easily use. However, due to the nature of the product that the company wanted the students to market, the three male students had to be excluded from the assignment. Still, almost any consumer product could be used and perhaps make the assignment more inclusive, as well as more challenging and interesting.

This assignment can easily be adapted for other marketing courses. Even though the fact that our students visited New York City for a week was the main reason why the fashion company wanted to work with them, this campaign could also be executed without tying it to a field experience course. As part of a consumer behavior course, for example, students might work with different companies and target

different target markets. For a marketing research course, students could be asked to focus on social media analytics and measure the effectiveness of their campaign in terms of outreach. Finally, it would be a most suitable assignment for a course in social media marketing.

CONCLUDING COMMENTS

As an educator, I strive to prepare my students to enter the business world upon graduation. This requires them to have solid theoretical knowledge and opportunities for practical applications. I believe that marketing is best taught with hands-on experience that allows them to apply theory to real-life situations. The main objective of this paper was to describe an assignment that was carried out in 2012 and to inspire business school instructors in general and marketing professors in particular to utilize web-based technologies in their courses. As a result of this assignment, students executed a social media marketing campaign and applied their marketing knowledge and skills in a real-world situation. Some of the students were introduced to some of the applications for the first time, and others were already familiar with them and had been using them for a while. In both cases, the students experienced firsthand the impact of social media by engaging in a campaign. This assignment added a new dimension to their field experience.

The presentations on social media marketing campaigns given by the company executives we visited enhanced their knowledge on the topic. The students' comments about their experiences with the assignment express their belief that the application of a social media marketing campaign in a field experience course was an invaluable learning experience resulting in enhanced learning outcomes. While the assignment might pose certain limitations in terms of applicability, such as students not having smart phones or not finding a business partner with whom to collaborate, it can also be altered and adapted to a variety of marketing and business courses, as suggested above. Combining the latest technology in the field of marketing with an experiential learning assignment enabled the students to practice what they learn in their marketing courses. Social media is integral to the future of marketing strategy and application. Therefore, it is imperative to create a marketing curriculum that encompasses the latest technological changes.

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COLLABORATIVE EDUCATION: NEW FRONTIER FOR FUTURE EDUCATION AND YUNUS SOCIAL BUSINESS

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ABSTRACT

The concepts of 'sharing' Economy and Collaborative Consumption are gaining popularity in the business world because of internet based products and services. The widespread use and virtue of one of the extensions of collaborative consumption is collaborative education, which is discussed with some useful application. The main purpose is to show the existing and future potentialities of collaborative education, and how it would pave a pathway to effectively promote Yunus Social Business. Studies have shown the effectiveness and usefulness of present models of collaborative education and in order to further promote Yunus Social Business, collaborative education model is indeed holding the key. This claim was analyzed thoroughly through literature research and also through interviews. The paper suggested that the enrichment of the online portal – the Yunus and Youth tube (YYtube)– with the concepts of collaborative education will be an appealing and emerging platform from where Yunus Social Business can be taught to aspiring young minds of the future.

JEL: I23, I25

KEYWORDS: Collaborative Consumption, Collaborative Lifestyle, Collaborative Education, Yunus Social Business, Sharing Economy, Online Education

INTRODUCTION

In recent times, there has been substantial increase in the popularity of the concept of 'sharing' Economy. The concept has been prevailing in the economy form sharing a private jet to sharing luxurious holiday resorts/ apartments, to a concept sharing luxurious products or services. Because of higher price of luxurious assets, this concept of sharing or collaborative consumption provided opportunity to many customers to avail those products and services by sharing access and ownership (Wali et al., 2012). Recently, this concept has been brought into limelight in front of business world again by Rachel Botsman in TedTalks, and also by the book 'What's Mine is Yours: The Rise of Collaborative Consumption' (Botsman and Rogers, 2010).

Diverse array of products and services are gaining popularity for sharing day by day, starting from simple concept of cars, drilling machines, DVDs and Audio CDs from neighbors and others, through internet, in many websites all around the world (Wali et al., 2012). Eventually, this concept has started to spread in education arena as across the world 200 million young people leave school without the skills they need to prosper in life (UNESCO, 2012). This paper has highlighted some ongoing collaborative education models and proposed to develop similar models for the spread of Yunus Social Business concept.

The paper is divided into five parts. First of all, the paper critically reviews the existing literature on Collaborative Education, concepts of Yunus Social Business and how both the topics can be linked together. The next section deals with the data collection and analysis methodology used for the research. Following that, the paper looks into the way the concept of collaborative lifestyle can effectively be extended to the academic arena and give rise to the models of Collaborative Education. Then, the information gathered from the literature review and the interviews are gathered together to form a model

of collaborative learning for Yunus Social Business. Finally, the last section sums up the whole paper.

LITERATURE REVIEW

Collaborative Education and Learning Explained

The concept of collaborative education and learning enables students to be actively involved in the process and when they do so, they can better understand certain concepts or retain knowledge in their long-term memory (Nayan et al., 2010). Here, participants come together as a community to discover, learn and solve problems (Zhu et al., 2009). Numerous studies have been carried out on collaborative learning and many have shown that when students were given the opportunity to work collaboratively, they were able to perform better (Ocker & Yaverbaum, 2001), use advanced strategic thinking skills (Wentzel & Watkins, 2002) and gained many other benefits from it (Nayan et al., 2010).

A study by Nielsen, 2008 highlighted the usefulness of collaborative education in terms of sharing of information and two-way communication in classrooms and contexts that are miles apart. The study has also shown the usefulness of collaborative education while teaching subjects that require practical exposure (Nielsen, 2008). Another study outlines the barriers to the use of collaborative practices (Nayan et al, 2010) and focuses on the following- to examine university lecturers' preference for collaborative practices, to identify the types of the collaborative practices and to examine the reasons for collaboration. This study has found that majority of the respondents prefer to implement collaborative learning activities and believe that collaborative learning activities done in class and beyond the class promote learners' academic progress, interaction skills as well as encourage learners' intrinsic motivation. These activities also create the added dimension of practical exposure to the contexts of the lessons.

Social Business

In recent times, the concept of social business has gained significant importance following the debut of Dr. Yunus, the winner of the 2006 Nobel Prize for Peace for his pioneering work in micro credit. One definition of social business is that it is a business owned and operated by a group of individuals, who are not driven by profit motive, but rather by the desire to maximize certain social benefits. Social business is an organization devoted to a social objective, not to make profits or dividends for the shareholders (Yunus et al., 2010). Hence, social business catalyzes social change and addresses social needs through innovative use and combination of resources (Mair and Marti, 2006).

The purpose is to develop a paradigm which provides future entrepreneurs an economic and social system where a world without poverty can be realized (Yunus, 2009). Social business elevates the social and economic positions of the under privileged (Yunus et al., 2010). It is designed to encompass the under privileged to equally participate in the market based economic activities. According to the pyramid of economic prosperity, very few business enterprises target the bottom of the pyramid because it comprises of people with limited or no purchasing power (Prahald and Hammond, 2002). However, the social business paradigm includes the bottom of the pyramid and addresses their needs (Yunus, 2009).

Although there have been models and frameworks explaining the concepts of Social Business, there have been a distinctive lack of means to teach Social Business concepts to the younger and eager minds (Yunus, 2009). The need for an effective mean of teaching Social Business has been challenge in the perspective of a normal academia as well (Yunus et al., 2010). According to Yunus, 2009, the core concept of social business requires the experiencing the social difficulties first hand and this requires more than formal classroom education.

Linking Collaborative Education with Social Business

The work of Paavola et al., 2004 combines the recent models of knowledge creation by looking into the models of Nonaka and Tekuchi, Engestrom's model and Bereiter's model. The work suggested that any

model of knowledge creation should view knowledge creation as a social process, goes beyond propositional and conceptual knowledge and should encourage interaction through shared objects (Paavola et al., 2004). These requirements are very much required for any approaches to teach and create knowledge for Yunus Social Business, as the concept is highly relevant to the context described in the study.

Case study analysis of success stories of implementation of Collaborative Education approach showed that this approach has an edge over other approaches while teaching concepts which have a diverse viewpoint, and which require a thorough understanding of the concept and collaboratively working out a solution (Trentin, 2004). The study also showed collaborative education can be a good approach to contexts which are beyond the capacity of a classroom environment, where the participants are expected to develop metacognitive skills (Trentin, 2004). Similarly, collaborative education requires a greater degree of interaction and understanding among the teacher and the student (Summers et al., 2005). The task of the teacher/instructor is to establish the intersubjectivity: a basic understanding of the problem or issue before the problem is being faced by the learners.

The studies above give an idea on how collaborative education can be used as an effective approach to teach Yunus Social Business Concepts. It can be seen from the literature review section that there exists a gap in coming up with a proper method of teaching Social Business. The following sections of the paper will attempt to gather the distinctive advantages of teaching through Collaborative Education methods and the specific needs for teaching Social Business together.

DATA AND METHODOLOGY

This paper was aimed to propose Collaborative Education as an approach to teach Yunus Social Business. So, the research was exploratory in nature, and the deductive reasoning approach was used (Denscombe, 1998). The data gathered was qualitative in nature, as the concept of teaching Yunus Social Business has not yet developed to the stage of collecting quantitative data and carrying out empirical analysis (Yunus, 2009).

The research was carried out in two steps. First, a thorough literature review was done in order to understand the advantages of Collaborative Education and how it applies to teaching Yunus Social Business. The review was also carried out to find out an appropriate model for teaching Yunus Social Business. Due to the fact that both the concepts are new, comparatively few relevant literatures could be found, and this has been one of the limitations of the study (Yunus *et al.*, 2010). As such, the information from the existing literature was critically reviewed in order to provide further direction for the research (Grbich, 2007).

The next step was to carry out interviews. First of all, experts in the field of Yunus Social Business were interviewed by the researchers in Bangladesh. These were in-depth interviews, where the findings of literature and the first stage was shared with the experts in order to obtain their opinion (Robson, 2002), and also to gain insight on the best approach to develop a model for teaching Yunus Social Business. Based on the outcome of these interviews, Focused Group Discussions were carried out in Bangladesh, France and UK, involving students, lecturers and practitioners of Social Business. The three layer FGD was carried out to give the research thoroughness and a 360 degree approach, analyzing the viewpoints of all those involved (Denzin and Lincoln, 2008). Finally the findings of the literature review, together with the findings from the interviews were used together to generate the model for teaching YUNUS SOCIAL BUSINESS through Collaborative Education.

COLLABORATIVE LIFESTYLE – PAVING THE PATH TO COLLABORATIVE EDUCATION

The concept of collaborative lifestyle is the sharing of intellectual assets and skills over the economy. This form of sharing has very profound implication and applicability in the society and economy. In the advent of the 2020s, good portion of the world are connected through internet and availing the benefits of internet

services from every nooks and corners. The technological advancement lowered cost structure, investment and operating costs and collaborative business also started to take advantages out of it. As a result, more and more organizations started to come up with different array of products and services with the concept of collaborative consumption (Young, 2011; Shaheen *et al.*, 2012; Rachel and Botsman, 2010).

One in every five young people in developing countries needs second chance for education to gain skills for work (UNESCO, 2012). One of the factors for leaving education is that the cost of education has risen over times and some form of education has gone out of reach for certain groups of people. For example, let us consider the case for a young business executive or a regular student from a country where main language is not English, plans for a Master's degree from a good business school that requires GMAT score. The learner can get into some assistance courses that have professional teaching instructions for appearing GMAT examination but often it would be difficult to spare time on a regular basis for these courses, or it could be out of reach due to course fees. So what are the options? The answer can be simply provided by visiting the Khan Academy's website (Khan 2012), looking up for the GMAT preparation videos, and download a GMAT official preparation guide from the official GMAT website and practice at a time convenient for the learner. The learner will have the support at home and can avail the lecture at convenient time. Any student or learner can enjoy the same benefit from any part of the world.

In another case, a young executive or innovator wants to perform better by exhibiting good business awareness, passing up strong and stimulating new ideas. Although some of these qualities require practical experience, others require learning recent business practices that have been appreciated by the business world. Given workload, yet again, most of the time it is feasible. So what are the options to have all the new business updates in one platform? The innovator can log in to TedTalks website, look for themes in business that are relevant to areas of interest. Watching some of the videos that are given by very outstanding speakers and movers and shakers of the business world will help to get the desired edge in the concerned business sector.

Both these examples require further education. The easiest option is to log into websites dedicated in developing the skill base of the users through the sharing of skills of intellectuals who has accomplishment in their own fields. This is the concept of Collaborative Education – to have a portal where people can share their educational expertise. People with experience, knowledge and qualification will share learning with the people in need. It can be free, on payment basis or both. This will benefit those who will be sharing in terms of building up their network, profiles and images in the community. We have just introduced two websites as examples to collaborative education, but in effect there are many websites and portals around the world which act in the same way, may be not by sharing videos, but by information through text and presentation.

A similar example of one such platform is common among many university students, who use cloud computing facilities to share subject specific lectures and tutorials with students from other disciplines. The ease of access to these cloud storage websites (DropBox and Microsoft SkyDrive) makes this sharing and collaboration of education a very simple matter. Whenever a student needs to learn something specific which may not be directly related to the classes, need to do log into these sharing portals and look for the course materials that may help him or her learn the concept. Although sharing of lectures started in informal ways, today there have been emergences of websites providing interactive lectures by instructors in the World's best universities and also sponsored and controlled by them to maintain a very high quality of instruction.

Three such appropriate examples are Coursera, EDX and UdeMy, all of which are sponsored by and instructions provided by the very top ranking universities of the world and it is free of cost. Everyone can log into these sites and look for particular courses to enrich own skill base. The future of the education will be in collaborative education of young aspiring individuals all around the world. They may also go through tests and exams that they need to learn conveniently and cost-effectively.

The collaborative education not only addresses the problem of cost of education but also has the added

advantage of convenience and distance learning. It is true that only the presentation files and the course materials are not good enough to recreate the classroom learning situation but with the help of multimedia, there are now interactive and noninteractive videos that are shared across internet which provide closest to classroom experience. This form of education is already being popularized by the websites already mentioned in this section along with the increase in popularity in AudioBooks and Podcasts from iTunes stores, which serve the very same purpose.

BUILDING A PLATFORM FOR COLLABORATIVE EDUCATION (CE) ON YUNUS SOCIAL BUSINESS (YSB)

The concept of Yunus Social Business has gained popularity for solving a recurring problem in the society with the help of the daily operations of the business. Success is measured in terms of addressing the problem rather than maximizing profit. Investors will only get back the initial investment and profit would be reinvested for future expansion (Yunus, 2010). Yunus Social Business and collaborative consumption stem more or less from the same root – there are people in the economy with commodities who can and want to contribute services; there are people in the economy who are in need of those services (Yunus et al., 2010). Both these ideas lean heavily on the effective sharing of information and the use of a good information medium, notably the internet (Palmer et al., 2012). Given this similar core, the ‘sharing’ economy can be used as a new platform to promote Yunus Social Business.

It has been observed from experiences in teaching social businesses that the traditional classroom approach is effective to ignite the idea of the socially responsible business practices (Wali, 2012). The concept of Yunus social business is far more effective than other business concepts due to the fact that Social Business offers the growth of investments made by the concerned parties as well as aiding in the development of the society (McCann, 2011). Proper and effective means of teaching social business requires the exposure to the real scenarios of bottom of the pyramid people (BoP), and other highly underdeveloped areas to give the students/learners an idea of how social business can help in the development of the society and this is where the usefulness of collaborative education comes into play (Wali, 2012).

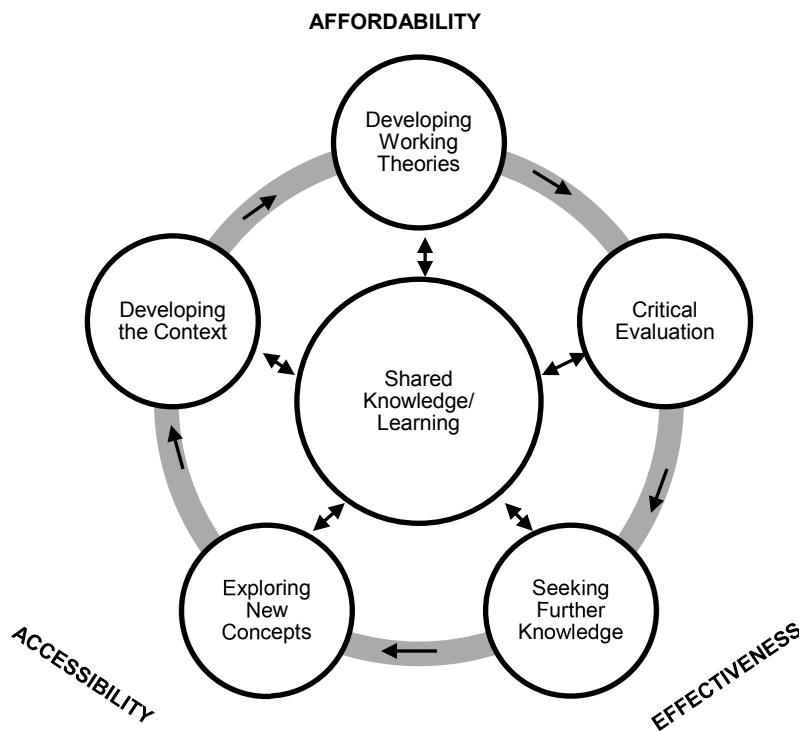
Although it may be possible for the students/learners in the underdeveloped countries to grasp the concept of Yunus Social Business, due to the ease of their exposure to the needs of the society and BoP people, it may be challenging for the students/learners of the highly developed countries to get a clear and interactive picture of the benefits that can be contributed by Yunus Social Business. Whereas, this segment can significantly contribute by thinking outside the box approach only if they can get the exposure of BoP society and market. They can develop social business in this arena by addressing social issues from that particular community. The model of ‘YY (Yunus & Youth) tube,’ can be a leading example in this arena. While YY tube gets access to talks of Professor Yunus in different events, they can make it available for all interested learners across the world to view those talks. Besides, some universities and institutions are offering courses on SB as well. However, those courses are not in reach of most of the learners. Apart for ‘YYtube’ website, online courses or lectures can be developed in collaboration with universities, academic institutions, above stated websites or even with some new websites.

Yunus Social Business is still at its introductory face. It requires involvement of experts, innovators and learners from different fields. Interactions among these groups will raise different queries and contexts. In order to address those queries, lots of research and experiments would be carried out that would lead to different working theories. At critical evaluation stage, experts, researchers and learners will search for possible solutions by deepening knowledge base on specific subjects. After that, if solution is found then the world will have new knowledge to share. Otherwise, a set of new working theories will be constructed to create another new favorable context for society (Borthick & Jones, 2000).

The model developed has three major factors to consider for implementation – affordability, accessibility and effectiveness. The courses and the modules will have customized pricing policy based on the financial and socio-economic background of the participants. The revenue from the higher income participant

groups will be used to subsidize the costs for lower income participant groups. The materials for the sessions will be available online, in online classrooms, having facilities for disabled participants, facilitating the involvement of guest lecturers and other experts globally. In terms of effectiveness of the model, there will be synchronous discussions for the sessions, web accessible forums to incorporate student feedback and the course assessments will be done online, with the detailed evaluation provided promptly online. This will reduce the requirement of physical presence for the participants as well (Lakkala, et. al., 2007).

Figure 1: Yunus Social Business Collaborative Learning Model



If we could build up an interactive internet based platform where the concepts Yunus Social Business will be explained by its pioneers as well as shown how those have been implemented and helped local population to develop, then not only the platform will give hands on exposure to students/learners who are interested in it but also will show the world the real effectiveness of Yunus Social Business. In addition, due to the fact that this platform is global, the knowledge, experiences and exposure can be shared at a global level. So, due to the practical nature of the Yunus Social Business education, the concept of collaborative education can help to create a very good platform for Yunus Social Business. One day, it might even possible that a collaborative education service is developed with the Yunus Social Business model where profit would be reinvested for further development. Premier fees would be charged to solvent collaborative education users to cross subsidize the cost of other users or educational institutions.

CONCLUSION

The aim of the paper was to explore the possibility of integrating the concepts of Collaborative Education to build up a model for teaching Yunus Social Business. The research was carried specifically based on the existing literature and on qualitative data from interviews and FGDs. Based on the discussions, this paper has proposed a new integration of the concept of collaborative consumption principles in education sector to show how it can be as effective as a form of collaborative education which will not only act in reducing

the cost of education through sharing but make it more interactive, interesting and convenient. The use of the collaborative education concept is developed to create platform for teaching Yunus Social Business. This paper only proposes the usefulness that can be gained in developing a platform for sharing the knowledge and experiences of Yunus Social Business to aid in the learning of its concepts. There are further research scopes in both evaluating this proposal and also in working to create a more detailed platform in line with this proposal.

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