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## **Online Learning Versus Face-to-Face Instruction in a Project Management Course**

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### **Abstract**

The increase in online distance learning has led to the creation of courses using a hybrid approach consisting of a blend of online learning modules and face-to-face instruction. To validate that student learning outcomes are being achieved, exams and other assignments results should be compared. Four chapters from an undergraduate project management course were covered using online learning modules. The other ten chapters were taught through face-to-face instructions. A statistical analysis was conducted between two semesters using two sections and there was no statistical difference between test scores for the third exam and optional final exam. The instructional approaches for the hybrid course along with a discussion of the results will be described.

### **Introduction**

Outcome-based assessment has allowed business schools to measure the achievement of program specific and course learning objectives. This approach is supported by the business school accrediting agencies, including AACSB International<sup>1</sup> and ACSBP<sup>2</sup>. The former placing more

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<sup>1</sup> The Association to Advance Collegiate Schools of Business

<sup>2</sup> Association of Collegiate Business Schools and Programs.

emphasis on discipline-based research and the later placing emphasis on pedagogical research. In either case, it is widely recognized the importance of assessing learning outcomes. Some of the push for assessment is to ensure employers of business school graduates are in touch with skills that are in demand. Aranda, et al., (1991) found that international business programs in business schools are out of touch with the business community. In response to this body of research, instructional accountability has taken a forefront. In addition to the outcome-based assessment are formal teaching evaluations conducted at the end of each semester. These serve as a general tool to evaluate the course and to use the results and comments as a means of continuous improvement. A final way to understand student learning, is through informal surveys to gauge the level of understanding of the course content, instructional methodology, or usage of technology course management (i.e., eCollege, Blackboard, etc.). A combination of the outcome-based assessment and other evaluations methods can provide a holistic approach to offering an optimal learning environment for students.

As course instruction moves from face-to-face, hybrid (combined face-to-face and online instruction), and online distance learning through the use of Internet-based course management software, it can play a role in measuring successful outcomes. Testing can occur in multiple settings. Questions from course examinations can serve as one tool for assessment of student learning. Another tool is the overall average on a given exam to assess the learning of chapters and/or conceptual content.

When a traditional face-to-face course is reengineered to integrate online learning modules, it is important to measure the success or failure of the process change. One way to measure the

success or failure is looking at the exam averages prior to and after the change. The remaining sections describe some of the relevant literature related to assessment and evaluation. A discussion of the results of a short survey used to assess the level of training and preparation for using Blackboard as well as if they liked and would recommend the use of online modules will be described. A multiple regression model was then created to understand what would drive students to want to have the online modules continued for this course. Finally, there was no significant difference in test results between a face-to-face course and a hybrid course for one exam.

### **Literature Review**

The concept of adaptability is a relevant one when discussing changes in pedagogical practices. Adaptability is the quality of being adaptable, potential fitness, the ability to be pliable (Russow, 1998). Students in traditional face-to-face learning may experience issues with adaptability. In other words, they become so accustomed to a specific form of education, that some are unable or unwilling to adapt to the changes. A number of studies have supported the use of Information Technology (IT) as a supplement or replacement for traditional education (Ignatius and Ramayah, 2007, p. 2). The rapid growth of virtual course offerings has led to a need to better understand the effectiveness of using IT. It is assumed by many that since students use many forms of electronics, that they are capable of using the course management software and other software tools. As self-learners, it is also assumed that they will teach themselves the necessary skills to use the course management software because they have taught themselves how to be proficient in using a gamut of electronics in the form of cell phones, social networks, PDAs, etc. Since the later tools are for entertainment and social purposes, students have more of an

incentive to stay “connected” with their peers and family members. Revisiting the concept of adaptability, it is believed that students do not adapt quickly to online information technology as it requires the students to move from being a passive learner to be an active learner in the educational process (Khalifa and Lam, 2002).

A proposed intermediate step may be heavy utilization of course management software with a face-to-face offering to prepare students for replacement of traditional brick and mortar classroom (Ignatius and Ramayah, 2007). Mutala (2002) conducted a study that suggests that e-learning is an effective method for instilling active and life-long learning. This requires the formation of a new culture of learning referred to as ‘virtual learning’ (AFT, 2001). The development of e-learning and wide availability web-based training has led to a problem of assessing students’ learning and knowledge (Dowling, et al, 1996). Given that there is a plethora of technologies for effective course-content delivery, the technologies alone do not guarantee successful implementation, level of student acceptance, or increase in students’ performance (Ignatius and Ramayah, 2007). Based on an initial review of the literature, there is a two-pronged need to understand the ability of students to effectively and efficiently use the course management software and to assess their ability to learn the course concepts in a ‘virtual classroom environment.’

### **Research Questions**

There are several questions to be answered by this research:

- Are students adequately prepared to complete online learning modules, as measured by their training and preparation?

- Given that most students can function well in a face-to-face course requiring heavy utilization of course management software, are they technically prepared from an IT perspective and able to be successful on exams in comparison to a traditional bricks and mortar course offering?

### **Research Methodology**

The project management course is offered by the business school at a primarily engineering and sciences university. The enrollment is about 50% students from business and the remaining 50% are from science and engineering disciplines. Until Fall 2009, the project management course had been solely offered in a traditional face-to-face format with a relatively well developed presence and sophistication in usage of course management software, Blackboard. It was assumed that students were relatively competent in using the software as there did not appear to be any issues with students accessing information, submitting assignments, or using any of the other functionality required to complete the course requirements.

In Fall 2009, the author decided to use a series of four online learning modules. The topics selected were primarily qualitative topics and fundamental methods associated with project management and seemed to be a good fit for online learning module instruction. These chapters were chosen because there were no complex mathematical methods used and the material was relatively straightforward. The four chapters covered through online learning occurred near the end of the course. The project management topics covered included project risk management and planning, project quality management, project supply chain management, and project closeout. These were four of the last five chapters in the course. To ensure the students completed the

online learning modules after completing the instructional component, they were assessed through a series of short answer and/or fill-in-the blank type questions. The students did not appear to struggle with completing the assessment with missing very few questions from each of the chapters. To gauge their level of training, attitude towards online learning, and their opinions regarding future usage of online learning modules in project management, the students were surveyed.

An informal survey was developed to gather information. The survey was not pretested and initially there was no intention to statistically analyze the results. The intent was to gather information and draw conclusions based on attitudinal and short answer responses as a means to formulate ideas for continuous improvement.

## **Survey**

The survey was conducted in two sections of a junior/senior project management course offered by a School of Business and Economics. There were two sets of questions: attitudinal and short answer. The survey questionnaire is provided below:

The survey consisted of five attitudinal questions:

1. I would describe my level of sophistication using Blackboard.
  - a. Responses: exceptional, above average, average, below average
2. I liked the use of combined learning, both online and face to face.
  - a. Responses: strongly agree, agree, neutral, disagree, and strongly disagree
3. I had adequate training and preparation to use Blackboard at the level required in this course.

- a. Responses: strongly agree, agree, neutral, disagree, and strongly disagree
4. There should be more chapters covered online.
- a. Responses: strongly agree, agree, neutral, disagree, and strongly disagree
5. Would you recommend using online modules in the course again?
- a. Responses: yes, maybe, no

There were four short answers and included:

- 6. What did you like about the online learning modules?
- 7. What could be improved using the online learning modules?
- 8. Do you have any suggestions on improving the use of Blackboard for instruction in this course?
- 9. Do you have any suggestions on improving the use of Blackboard (general and not specific to this course)?

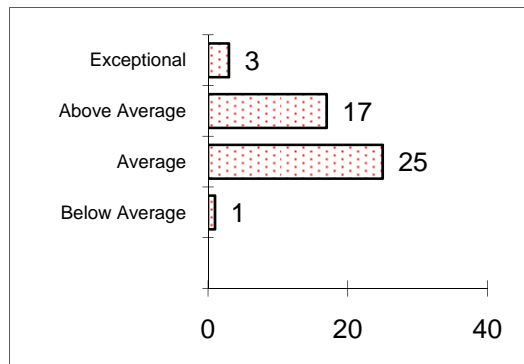
The results of the attitudinal questions are provided in the next section.

### Summary of Results

There were 70 students composing two sections that were taught back-to-back by the same instructor. There were 46 students who anonymously answered the survey. This represents a 66% return, much higher than expected.

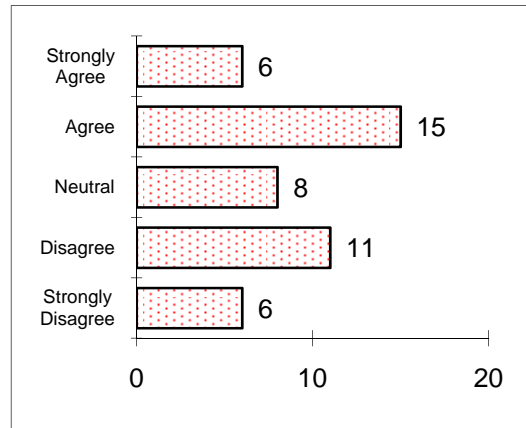
*Q1. I would describe my level of sophistication using Blackboard.*

<u>RESPONSE</u>	<u>NUMBER</u>	<u>%</u>
Exceptional	3	7%
Above Average	17	37%
Average	25	54%
Below Average	1	2%



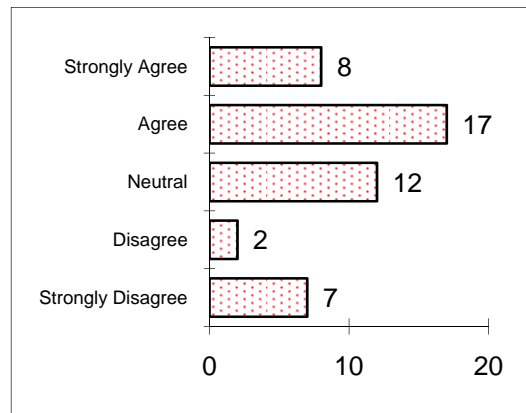
*Q2. I liked the use of combined learning, both online and face to face.*

<u>RESPONSE</u>	<u>NUMBER</u>	<u>%</u>
Strongly Agree	6	13%
Agree	15	33%
Neutral	8	17%
Disagree	11	24%
Strongly Disagree	6	13%



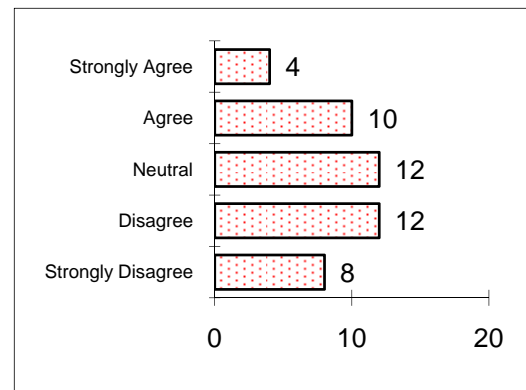
*Q3. I had adequate training and preparation to use Blackboard at the level required in this course.*

<u>RESPONSE</u>	<u>NUMBER</u>	<u>%</u>
Strongly Agree	8	17%
Agree	17	37%
Neutral	12	26%
Disagree	2	4%
Strongly Disagree	7	15%



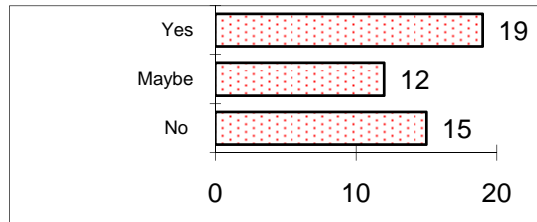
*Q4. There should be more chapters covered online.*

<u>RESPONSE</u>	<u>NUMBER</u>	<u>%</u>
Strongly Agree	4	9%
Agree	10	22%
Neutral	12	26%
Disagree	12	26%
Strongly Disagree	8	17%



*Q5. Would you recommend using online modules again in this course?*

<u>RESPONSE</u>	<u>NUMBER</u>	<u>%</u>
Yes	19	41%
Maybe	12	26%
No	15	33%



### **Discussion of Survey Results**

Based on the results of the survey, the general consensus is that the level of sophistication and training are closely related. The majority of students were average or below in level of sophistication (Q1) and about 45% felt that they were either neutral or in disagreement regarding their level of training and preparation. Blackboard, or its primary variant WebCT, has been used at the university for over five years. It was surprising that the students were not more sophisticated and it was presupposed that they had sufficient training. There has been no formal training for students and limited training on the course management tools for faculty and staff. There is different level of usage by individual faculty that range from a repository of grades to rather sophisticated use of online learning tools. As the university grows its online degree offerings, it is suggested that tutorials and training manuals are part of the orientation process. Even though tutorials are accessible by all users; they are not used at a high enough frequency. This addresses both research questions regarding the level of sophistication and training. It confirms what prior research (Ignatius and Ramayah, 2007; Khalifa and Lam, 2002) suggests regarding effectiveness of online learning. Without sufficient training students will not be able to be effective in the use of tools and it could impede their learning. Because of this lack of training, the students did not respond favorably to the use of hybrid instruction or additional online modules. Based on the responses from questions 2 and 4, the majorities of students were

neutral or had some level of disagreement regarding their attitude towards hybrid instruction and the use of online learning modules for more chapters in future offerings of this course.

Another issue is their performance on the exam. A standardized exam has been validated and used repeatedly over time. The answers are rotated as well as the order of questions. The overall reliability for the exam has averaged about 85%. The questions were carefully crafted and refined to achieve a high level of validity. The two-year average for the same set of chapter taught in a face to face setting was 78-79%. In Fall 2009, the average for the exam where four out of five chapters were taught through online learning modules, resulted in an average of 79%. Another informal look at students' prior exam performance during Fall 2009, on exams one and two it was noted and there were no differences in prior performance for most students. However, a statistical analysis was not conducted to validate this last statement.

Out of curiosity, to better understand what predicted students' interest in having the online learning modules continued in the course, multiple regression was performed. The results of the multiple regression are shown below.

<b>Summary Section</b>	
<b>Parameter</b>	<b>Value</b>
Dependent Variable	Use of Online Modules Again
Number Ind. Variables	4
R2	0.6549
Adj R2	0.6212
Coefficient of Variation	0.1244
Mean Square Error	0.262374
Square Root of MSE	0.5122246
Ave Abs Pct Error	11.589

### Descriptive Statistics Section

Variable	Count	Mean	Standard Deviation	Minimum	Maximum
Sophistication (Q1)	46	3.45	0.639	2	5
Hybrid (Q2)	46	3.07	1.273	1	5
Training (Q3)	46	3.48	1.009	1	5
More Online (Q4)	46	2.73	1.188	1	5
Use of Online..(Q5)	46	4.12	0.832	3	5

### Regression Equation Section

Independent Variable	Regression Coefficient b(i)	Standard Error Sb(i)	T-Value to test H0:B(i)=0	Prob Level	Reject H0 at 5%?	Power of Test at 5%
Intercept	2.318	0.4412	0.525	0.9992	No	0.0007
Q1	-0.007	0.1402	-0.051	0.9599	No	0.0503
Q2	0.197	0.0922	2.138	0.0385	Yes	0.5509
Q3	0.043	0.0931	0.463	0.6461	No	0.0737
Q4	0.391	0.0955	4.090	0.0002	Yes	0.9789

Sophistication (Q1) and training (Q3) are predictors of whether a student would recommend using online learning modules in the class the next time it was offered.

### Conclusions

Based on the survey results and multiple regression model, prior to using online learning modules in a traditional bricks and mortar course, it would be useful to conduct a survey regarding the level of sophistication, training, and preparation that each student has prior to requesting students to complete online learning modules. A pre-survey would alert the instructor regarding the level of IT sophistication using course management software. Basic and fundamental instruction can be weaved into the regular course without it being intrusive. At the end of the online learning modules, the students would be surveyed again using similar questions. This would serve as a basis for continuous improvement and to gauge whether the training in Blackboard was effective. Again, the outcome on the third exam would serve to validate that the material is being adequately learned by students taking the course.

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