Teaching a Blended Supply Chain Management Course to Marketing Majors

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Abstract – In this paper the authors report their research findings from primary research on the usage of online content in both an undergraduate and graduate level blended Supply Chain Management course utilizing a video-textbook. Both a Pre and Post-Test were administered to the students at the beginning and end of the semester respectively to gauge students' opinions about the online portion of the blended course as well as their preference between a traditional lecture format, an online class, and a blended class. Results of the survey show that the students' opinions about the online material and preference for a blended class improved over the course of the semester. Furthermore, some significant difference between Graduate and Undergraduate students and Male and Female students were found.

Keywords – Blended learning, Pedagogical, Survey

Relevance to Marketing Educators – This research reports on students' perceptions of a blended course utilizing a scripted and animated video-textbook as well as face to face instruction. Results of the study should be of interest to anyone teaching a blended or online course.

Introduction

A contemporary discussion about innovations in teaching would be incomplete without addressing the use of online instructional content. On-line content is currently being utilized by many universities around the world in their 100% online, blended, flipped and even traditional face-to-face (FTF) courses. While online content continues to evolve, the prevailing sentiment is this type of pedagogical innovation provides benefits of increased student engagement, collaboration, flexibility, and learning (Granitz and Hugstad, 2004; Neill and Etheridge, 2008).

Originally produced in VHS and then DVD formats, video recorded lectures are now distributed online via specially designed streaming video servers by university professors to provide students with place and time flexibility for course content delivery. A second common type of online content is voice-over-PowerPoint where the professor utilizes existing PowerPoint lecture slides and audio records their lecture which is distributed online via specially designed software that presents the slides visually on screen with the professor's voice heard through the computers audio speaker system.

A third common type of on-line content is an e-textbook where the content of a traditional textbook is converted to be read online. Many textbook publishers have converted their existing bound textbooks to an online e-book reader similar to Amazon's Kindle or Barnes and Noble's Nook. Finally, a fourth type of online content is the scripted and animated video-textbook. With this technique the instructional concepts are presented via short online episodes with a voice only or person on-screen describing a concept that is simultaneously drawn or animated on screen.

In this paper the authors report their research findings from primary survey research on the usage of online content in both an undergraduate and graduate level blended Supply Chain Management course utilizing a video-textbook. Pre and post-test, graduate and undergraduate, and male and female samples are compared for statistically significant differences. These comparisons contribute to the existing body of pedagogical research on blended and online learning. The university from which this research was conducted includes Supply Chain Management as a content area within the Department of Marketing and is offered to undergraduate Marketing Majors as a substitute for the College of Business core Operations Management course. Also, within the MBA program a blended Supply Chain Management course is offered as an elective seminar.

The in-class activities and lecture along with online supplemental readings and discussion boards are unique for their respective undergraduate and graduate courses; however, both courses utilized the same primary online content which was the video-textbook titled; Operations: Managing Supply Chain Processes written by Dr. Brian Gibson.

Review of Blended Literature

Much of the literature on blended learning discusses its potential in terms its ability to support learning (Garrison and Kanuka, 2004) give definitions of blended learning

(Graham, 2005; Osguthorpe and Graham, 2003) or give insight into how a faculty member might go about designing a blended course (Aycock et al., 2002; Christensen, 2003; Johnson, 2002). There is also a growing body of literature looking at student satisfaction in blended learning environments and how this student satisfaction relates to satisfaction and performance, how it compares to face to face courses, and/ or how the different elements of student satisfaction relate to each other. This body of literature relates most closely to the current paper and will be discussed in more detail in the following section.

Dowling et al. (2003) investigated the association between learning outcomes of students and course delivery method. A traditional face to face class was compared to a blended learning class. Results indicated that students in the blended learning class had higher final grades and better learning outcomes than those in the face to face class.

Utts, et al. (2003) compared differences between blended and traditional format courses in introductory statistics. Student performance in both types of class were equivalent, but students in the blended course felt that the workload was excessive and were less positive in their subjective evaluation of the course.

Priluck (2004) compared student satisfaction for both a traditional and blended format principals of marketing course. Results indicated that students in the traditional course were more satisfied with their learning experience.

Rovai and Jordan (2004) compared how students rated their sense of community in a traditional, blended, and online course setting. Results of their study showed that students in the blended course had a greater sense of community than the students in the traditional or fully online course.

Akkoyunlu and Yilmaz-Soylu (2008) developed and validated an instrument to evaluate learners' views on blended learning and its evaluation process. The authors first developed a scale, and then administered it to a group of nearly 500 students involved in blended learning at different Turkish Universities in order to validate their scale. They found a 50 item refined scale to be highly reliable and of reasonable length. They then used principle component analysis to find two main components of their scale; 35 items measured learners' views on blended learning's implementation, and 15 items measured learners' views on blended learning in general. While this study used a survey to validate the scale it developed, it did not report on the results of the survey. In 2011 Ugur et al. reported on a survey to investigate students' views on blended learning as measured by the previously developed instrument and whether differences existed for students with different learning styles based on Kolb's (1986) Learning Style Inventory. Results of the study showed that, while students were fairly pleased with the blended learning implementation and blended learning in general, there were no meaningful differences between students with different learning styles.

In 2009 Melton et al. conducted a study comparing achievement and satisfaction in a blended learning and traditional general health course at a midsize public university in Southeast Georgia. To investigate the differences, surveys were distributed to randomly selected classes with one traditional (153 students) and three blended sections (98 students) participating. Total satisfaction measures

obtained through a satisfaction survey and end of semester teacher evaluations were significantly higher for the blended classes than for the traditional class. Results comparing student achievement as measured by a pre and post-test of material that should have been learned in the class, 4 written exams, and final course grade were mixed. Students in the blended classes performed better on exam 2, worse on exam 4, and better in the final course grade than students in the traditions class. There were no significant differences between the blended and traditional classes for the other measures of student achievement.

Wu et al. (2010) developed and validated a scale to measure student satisfaction in a blended learning environment. The authors also developed and tested a rather complex model to show that computer self-efficacy, performance expectations, system functionality, content feature, interaction, and learning climate are all determinants of student learning satisfaction in a blended learning environment. Using multiple previously developed instruments, the authors develop a 21 item instrument to measure these 7 constructs. Each construct has between 2 and 4 items and had high (greater than 0.82) measures of composite reliability.

Lopez-Perez et al. (2011) reported on a study of freshman students in accounting classes at the University of Granada. The purpose of the study was to examine students' perceptions of blended learning and its impact on exam scores and dropout rates. To initially test the impact of blended learning on dropout rates and percent of students passing the final exam, a graph showing that these figures had improved during and after the implementation of a blended learning curriculum. The authors also implemented a survey to gather students' perceptions of utility, motivation, and satisfaction derived from the blended learning experience. The authors went on to show that these three constructs were positively correlated with final course grade, but that only motivation was a statistically significant explanatory variable in a regression model explaining final course grade.

Methodology

A slightly modified version of a survey developed by Wu et al. (2010) was administered to both a graduate and undergraduate Supply Chain Management class at a mid-western university during the spring semester of 2013. The graduate class was taught by one professor, and the undergraduate class was taught by another professor; both professors used the same online material in their courses. A pre-test was administered during the second week of class, after students had an opportunity to view the online content and experience the in-class content. During the last class meeting of the semester, a post-test was administered to determine if students' attitudes towards the online content had changed in a statistically significant manner. The survey instrument consisted of 27 questions on a seven point Likert scale. The seven point scale went from strongly disagree (1) through strongly agree (7) so that a higher value indicates a stronger agreement with the question. The survey also included several demographic questions. The first 22 questions relate to the seven constructs identified by Wu et al. (2010) and are virtually the same questions with "online content" replacing "BELS." The remaining five Likert scaled questions dealt with

students' attitudes of the blended class compared to online and traditional classes. Demographic questions included on the survey were gender, major, age, grade level, expected course grade, and number of previously taken blended classes. Table 1 lists the demographics of the entire sample including both the undergraduate and the graduate students.

Table 1

Demographics of Sample

Category	All	Undergrad.	Grad.
Male	46%	51%	38%
Female	54%	49%	62%
18-21	35%	50%	3.5%
22-25	60%	48%	84%
26-29	4%	2%	9%
30-33	1%	0	3.5%
Junior	31%	48%	0
Senior	35%	52%	0
Graduate	34%	0	100%
Expected A	80%	73%	94%
Expected B	20%	27%	6%
First Blended Class	39%	36%	46%
Second Blended Class	30%	34%	21%
Third Blended Class	18%	23%	9%
Fourth Blended Class	8%	5%	13%
Fifth or Greater Blended Class	5%	2%	11%

Table 2 lists the number of respondents, mean response, and standard deviation of responses for each question and construct as well as a measure of Cronbach's alpha calculated for each construct. While we had a very high overall response rate, there were missing responses for several of the specific questions, so the number of respondents varies from question to question.

Data analysis consisted primarily of ANOVA analyses to look for statistically significant differences between means. For each construct and question, an ANOVA analysis was conducted to test for statistically significant differences in students' responses from the pre-test to the post-test. These analyses were conducted for all students, graduate students, and undergraduate students. An ANOVA analysis was also conducted to test for significantly differences between graduate and undergraduate students' responses. These analyses were conducted for all survey responses, for pre-test responses, and for post-test responses. Finally, an ANOVA analysis was conducted to test for statistically significant differences between male and female students' responses. These analyses were also conducted for all survey responses, for pre-test responses, and for post-test responses. For most of the questions and constructs, there were no significant differences between groups, but there were some key areas in which students opinions were improved after completing the blended course. These findings will be discussed in the following section.

Table 2

Overall Survey Results

Question/Construct	N	μ	σ
Computer Self-efficacy (Cronbach's alpha = 0.88)	**171**	**5.29**	**1.27**
1. I could use the online content for learning if there was no one around to tell me what to do as I go.	171	5.28	1.50
2. I could use the online content for learning if I had never used a package like it.	171	5.38	1.35
3. I could use the online content for learning if I had just the built-in help for assistance.	170	5.22	1.40
Performance Expectations (Cronbach's alpha = 0.96)	**171**	**5.11**	**1.49**
4. Using the online content will improve my learning performance.	171	5.11	1.49
5. Using the online content will enhance my effectiveness for learning.	170	5.14	1.54
System Functionality (Cronbach's alpha = 0.92)	**171**	**5.81**	**1.25**
6. The online content allows learner control over his or her learning activity.	170	5.56	1.41
7. The online content offers flexibility in learning as to time and place.	171	6.03	1.37
8. The online content offers various types (e.g., audio, video, and text) of course content.	170	5.89	1.27
Content Feature (Cronbach's alpha = 0.79)	**171**	**5.58**	**1.20**
9. The presentational method of the online content is easy for understanding.	171	5.70	1.32
10. The design method of related activities in the online content is suitable and appropriate.	171	5.46	1.31
Interaction (Cronbach's alpha = 0.85)	**171**	**4.56**	**1.35**
11. The online content enables interactive communication between instructor and students.	169	4.56	1.49
12. The online content enables interactive communication among students.	171	4.82	1.49
13. The online content environment is an excellent medium for social interaction.	171	4.37	1.63
Learning Climate (Cronbach's alpha = 0.94)	**171**	**5.15**	**1.31**
14. The online content is interesting.	170	5.14	1.44
15. The climate in the online content could help me to learn.	170	5.23	1.36
16. The interaction features in the online content could help me to learn.	169	5.20	1.37
Learning Satisfaction (Cronbach's alpha = 0.94)	**171**	**5.04**	**1.35**
17. I am satisfied that the online content meets my needs in terms of learning.	170	5.34	1.43
18. I am satisfied with the online content because of how it saved me time in my week.	171	5.48	1.69
19. I am satisfied with the quality of the e-textbook.	171	5.05	1.58
20. I am satisfied with the quality of the online quizzes.	170	5.39	1.43
21. I am satisfied with the quality of the discussion board.	124	5.05	1.60
22. Overall, I am satisfied with the online content.	171	5.43	1.47
Additional Questions			
23. I would recommend this class to a friend.	169	5.57	1.44
24. I would have taken this blended class as a traditional lecture class if it was offered in the traditional format?	171	4.31	1.79
25. I think there should be more blended options for classes.	170	5.45	1.58
26. I prefer blended classes over 100% online classes.	171	5.50	1.50
27. I prefer blended classes over traditional lecture classes.	171	4.83	1.83

Discussion of Research Findings

All statistically significant research findings are discussed and the quantitative results are summarized in Tables 3 through 11 in this section. Tables 3, 4, and 5 include Pre-Test vs. Post-Test significant comparisons for All Students, Undergraduate Students, and Graduate Students respectively; Tables 6, 7, and 8 include Graduate Student vs. Undergraduate Student significant comparisons for the Pre-Test, Post-Test and all survey responses respectively; and Tables 9, 10, and 11 include Male Student vs. Female Students significant comparisons for the Pre-Test, Post-Test and all survey responses respectively.

The before taking the blended class (pre-test) vs. after completing the blended class (post-test) ANOVA yielded three statistically significant results as shown in Tables 3, 4, and 5. The most significant, coming in at the .001 level for the all student and undergraduate student samples and at the .10 level for the graduate student sample, was for the multi-item construct of Learning Satisfaction. Learning Satisfaction was measured by items 17 through 22 in Table 2. These items attempted to measure satisfaction with five specific aspects of the online experience and one overall item. Students were most satisfied because the online content saved them time, followed closely by their overall online content satisfaction, quality of online quizzes and the online content meeting their learning needs.

These results indicate both graduate and undergraduate students' expectations were exceeded by the quality of the online content. In other words, they enrolled in the blended course with lower expectations of the quality of online content than they actually experienced while taking the course. The pre-test lower expectations could have been created from word-of-mouth by other students or their actual experience in a previous blended or online course.

The next most significant result, coming in at the .05 level was for the single item measure which stated "I prefer blended classes over traditional lecture classes." This result was significant in the all student sample and the undergraduate student sample. Again, this compared the students' expectations before taking the blended course with their actual preferences after taking the blended course and provides positive support for blended course offerings with high quality online content.

Finally, the third most significant comparison between pre and post-testing for the all students and undergraduate students samples, coming in at the .10 level and .05 level for the two samples was for the single item measure which stated "I could use the online content for learning if there was no one around to tell me what to do as I go." This result indicates that the online video-textbook utilized in this blended course is well produced and could serve as a good alternative if utilized in a 100% online course too.

Table 3

All Students Pre vs. Post-Test

	N Pre-test	μ Pre-test	N Post-test	μ Post-test
I could use the online content for learning if there was no one around to tell me what to do as I go.*	89	5.07	82	5.51
I prefer blended classes over traditional lecture classes.**	89	4.54	82	5.15
Learning Satisfaction***	89	4.69	82	5.41

* Means are significantly different at the 0.10 level

** Means are significantly different at the 0.05 level

***Means are significantly different at the 0.01 level

Table 4

Undergraduate Students Pre vs. Post-Test

	N Pre-test	μ Pre-test	N Post-test	μ Post-test
I could use the online content for learning if there was no one around to tell me what to do as I go.**	57	4.93	57	5.53
I prefer blended classes over traditional lecture classes.**	57	4.26	57	5.07
Learning Satisfaction***	57	4.70	57	5.41

**Means are significantly different at the 0.05 level

***Means are significantly different at the 0.01 level

Table 5

Graduate Students Pre vs. Post-Test

	N Pre-test	μ Pre-test	N Post-test	μ Post-test
Learning Satisfaction*	32	4.68	25	5.42

*Means are significantly different at the 0.10 level

The Graduate vs. Undergraduate ANOVA yielded three statistically significant results as shown in Tables 6, 7, and 8. The most significant, coming in at the .05 level for the overall sample and at the .10 level for the post-test sample, was for the satisfaction with the quality of the discussion board. The lack of a significant difference on the Pre-Test for this survey item could be due to the low response rate (48%) on the Pre-Test when students had no experience using the discussion board. Regardless of the reasons, for the overall sample and the post-test sample, graduate students were more satisfied with the discussion board. These differences are most likely due to differences in administration between the two instructors and indicate that Graduate students were more satisfied with the quality of the discussion board by the completion of the course.

The next most significant results, coming in at the .10 level for the pre-test sample and the overall sample, was for the single item measures which stated "the online content environment is an excellent medium for social interaction" and "I prefer blended classes over traditional lecture classes." On the pre-test, graduate students

more agreed with these statements than did undergraduate students, but by the completion of the course, undergraduate students' agreement with these statements had improved to more closely match that of the graduate students.

Table 6

Pre-Test Graduate vs. Undergraduate

	N Grad.	µ Grad.	N Undergrad.	µ Undergrad.
The online content environment is an excellent medium for social interaction. *	32	4.56	57	3.96
I prefer blended classes over traditional lecture classes. *	32	5.03	57	4.26

*Means are significantly different at the 0.10 level

Table 7

Post-Test Graduate vs. Undergraduate

	N Grad.	µ Grad.	N Undergrad.	µ Undergrad.
I am satisfied with the quality of the discussion board. *	25	5.56	56	4.86

*Means are significantly different at the 0.10 level

Table 8

Pre and Post-Test Graduate vs. Undergraduate

	N Grad.	µ Grad.	N Undergrad.	µ Undergrad.
The online content environment is an excellent medium for social interaction. *	57	4.70	114	4.20
I am satisfied with the quality of the discussion board. **	39	5.54	85	4.82
I prefer blended classed over traditional lecture classes. *	57	5.16	114	4.67

*Means are significantly different at the 0.10 level

**Means are significantly different at the 0.05 level

The Male vs. Female ANOVA yielded six statistically significant results as can be seen in Tables 9, 10, and 11. The most significant, coming in at the .01 level for the overall sample and at the .05 level for the pre and post-test, was the single item measure which stated "the online content enables interactive communication among students." In all three cases, male students more strongly agreed with this statement than did female students.

The next most significant, coming in at the .01 level for the overall sample, the .05 level for the pre-test sample, and the .10 level for the post-test sample, were for the two single item measures indicating satisfaction with the quality of the online quizzes and preference of blended classes over online classes. While male students were more satisfied with the quizzes and indicated a greater preference for blended over online classes in all cases, the differences between the two groups were lower and less significant at the end of the course.

The third most significant difference between male and female students, coming in at the .05 level for the overall sample and the .10 level for the pre-test sample, was for the multi-item construct of Interaction. Interaction was measured by items 11 through 13 in Table 2. These items attempted to measure interactive communication

between students and between students and instructor and the degree to which the online content is an effective medium for social interaction. Male students felt the interaction provide by the online content was better than did female students at the beginning of the course, but by the end of the course, there was no significant difference on this construct between the two groups.

Finally, the single item dealing with the quality of the e-textbook and the multi-item construct of Learning Satisfaction were significantly different between male and female students for the overall sample, coming in at the .05 and .10 level respectively. These differences did not appear as significant in either the pre or post-test samples, but male students rated these items higher in all cases.

Table 9: Pre-Test Male vs. Female

	N Male	μ Male	N Female	μ Female
The online content enables interactive communication among students.**	42	5.12	47	4.43
I am satisfied with the quality of the online quizzes.**	41	5.59	47	4.96
I prefer blended classes over 100% online classes.**	42	5.83	47	5.02
Interaction*	42	4.70	47	4.20

*Means are significantly different at the 0.10 level

** Means are significantly different at the 0.05 level

Table 10: Post-Test Male vs. Female

	N Male	μ Male	N Female	μ Female
The online content enables interactive communication among students.**	37	5.38	45	4.49
I am satisfied with the quality of the online quizzes.*	37	5.86	45	5.29
I prefer blended classes over 100% online classes.*	37	5.89	45	5.38

*Means are significantly different at the 0.10 level

**Means are significantly different at the 0.05 level

Table 11: Pre and Post-Test Male vs. Female

	N Male	μ Male	N Female	μ Female
The online content enables interactive communication among students.***	79	5.24	92	4.46
I am satisfied with the quality of the e-textbook.**	79	5.32	92	4.82
I am satisfied with the quality of the online quizzes.***	78	5.72	92	5.12
I prefer blended classes over 100% online classes.***	79	5.86	92	5.20
Learning Satisfaction*	79	5.24	92	4.86
Interaction**	79	4.82	92	4.34

*Means are significantly different at the 0.10 level

**Means are significantly different at the 0.05 level

***Means are significantly different at the 0.01 level

Summary and Implications

This paper reported pedagogical research conducted in both graduate and undergraduate Supply Chain Management courses utilizing a blended approach of

½ FTF and ½ online teaching using an online video-textbook. The results provide significant and positive findings for faculty and administrators who are contemplating new and/or evaluating the existing use of blended courses in their curriculum.

While the research indicated that graduate students preferred blended classes over traditional classes more than their undergraduate counterparts, both groups indicated statistically significant increases in their opinions of the benefits of high quality online content with regard to six online content Learning Satisfaction measures. The measured items included, meeting needs of learning, saving time, quality of video-textbook, online quizzes, online discussion boards and overall satisfaction with the online content.

The research further indicated that male students felt that the opportunities for interaction among students were greater than did female students. Male students were also more satisfied with the quality of the online content and had a stronger preference for blended classes over online classes; however, the differences between the two groups and the significance of those differences had lessened by the end of the course.

The pedagogical implications suggest that students may have their expectations for the quality of online content set somewhat low as indicated by the pre-test survey administered at the beginning of the course. By the time the post-test survey was administered at the end of the course, students indicated a statistically significant higher level of satisfaction for the video-textbook online content. The authors attribute this low quality expectation to the lower quality online content of recorded lectures or voice-over-PowerPoint that exists in most of the online and blended course offerings. The research reported in this paper contributes to the existing body of pedagogical knowledge by providing statistically significant comparisons between undergraduate vs. graduate, pre-test vs. post-test, and male vs. female samples. Future pedagogical research should continue to explore the level of learning satisfaction and assessment of learning outcomes in traditional FTF, blended and 100% online classes. The value created by time and place utility in the delivery of blended and 100% online courses continues to increase as indicated by the number of courses offered by this type of pedagogical delivery. Therefore, future research must focus on understanding and improving the quality of these emerging new instructional techniques.

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