THE COMPARISON AND TESTING OF A HYBRID-WIKI COURSE

J. Michael Weber, Mercer University

ABSTRACT

The purpose of this paper is to introduce the concept of the Wiki as a technology and educational supplement for the classroom. In addition, the study compared learning outcomes and student satisfaction between a traditional brick and mortar course, an online course, and a Hybrid-wiki course. The results indicate that the Hybrid-Wiki course provided the highest level of learning outcomes and course satisfaction among the three formats. The Wiki provides a creative and collaborative learning environment that facilitates many of the practical applications being experienced in the online marketing environment.

INTRODUCTION

Are we (i.e., Marketing Educators) ready for the Wiki? Are we utilizing the most collaborative tools and techniques that foster both learning and skills development? The students are actively engaged in the online environment via blogs, podcasts, webinars, Youtube, Facebook, Myspace, etc., so it seems that their educational environment should borrow from this fascinating and collaborative environment. The Wiki provides this interactive and collaborative environment. It is interesting to think that our students are engaging in a new type of writing that can be considered online writing, which entails designing web sites, writing weblogs, and creating and managing Wikis. New writers are redefining writing online, creating new forms and approaches for new audiences.

The Wiki can be described as a combination of a Web site and a Word document. At its simplest, it can be read just like any other web site, with no access privileges necessary (access restrictions are recommended for educational endeavors), but its real power lies in the fact that groups can collaboratively work on the content of the site using nothing but a standard web browser. Beyond this ease of editing, the second powerful element of a Wiki is its ability to keep track of the history of a document as it is revised. Since users come to one place to edit, the need to keep track of Word files and compile edits is eliminated. Each time a person makes changes to a Wiki page, that revision of the content becomes the current version, and an older version is stored. Versions of the document can be compared side-by-side, and edits can be rolled back if necessary. The Wiki is gaining traction in education, as an ideal tool for the increasing amount of collaborative work done by both students and teachers. Students might use a Wiki to collaborate on a group report, compile data or share the results of their research, even help to create their test, while faculty might use the Wiki to collaboratively author the structure and curriculum of a course.

(For current and more detailed information on Wikis, please refer to the following web sites: [http://en.wikiversity.org] or [http://www.ibm.com/developerworks/wikis/display/WEinstructors/Courses]).

Over the last 15 years there has been a proliferation of courses and programs that have been available over the World Wide Web. This includes both distance education and resident student instruction. There are a variety of technology platforms that have been utilized, such as Blackboard, WebCT, Web 2.0, and Sharepoint, among others, and the integration of new technology tools such as blogs (Levin and Davis 2007). There has also been a variety of discussions regarding the effectiveness of the various tools versus traditional brick and mortar delivery methods (Peltier et al. 2007).

Traditional bricks and mortar courses have a long history of proving how effective they are through exams, student evaluations, and student feedback. Yet, there has been a lingering debate in the literature and halls of academia as to whether online courses are as effective as traditional courses (Hansen 2008; Chen and Jones 2007; Hiltz 1993). This study actually initiates a precursory investigation into comparing the effectiveness of three different types of courses. The first type of course is a Wiki-based course, while the second course is a traditional brick and mortar courses and the third course is a Web-based course. In other words, the Wiki course is positioned as a "hybrid" alternative to the traditional course and the web-based course. More specifically, this study investigates if there are differences in learning across the three course formats and whether there were any differences in student satisfaction.

LITERATURE REVIEW

When looking at the effectiveness of Web-based and bricks and mortar formats researchers have found very different outcomes (Vat 2006). Weber and Lennon (2007) found that learning outcomes were virtually the same between traditional brick and mortar classes and web-

based courses. Vogt, Atwong, and Fuller (2005) found that students in an advanced business communication course did achieve a high level of proficiency and they did so equally in both traditional and online classes. Bata-Jones and Avery (2004) in research on nursing students who took a pharmacology course found that there were no significant differences between the mean exam scores of students in enrolled in the web-based and traditional courses. In 2004, Kearns, Shoaf, and Summey found that students in a Web-based second-degree bachelor of science (in Nursing) program scored significantly higher on the final examination and the comprehensive examination than did students in the traditional course. Buckley (2003) found that students in a web-based nutrition course received a lower mean course evaluation score than students in a traditional similar course. In 2002, Maki and Maki found that students in a Web-based course (psychology) learned more than students in a bricks and mortar section of the same course. Arbaugh and Duray (2002) compared two web-based MBA programs, one with some on-site meetings and the other totally online. They found that larger class sizes were negatively associated with perceived learning. Sankaran, Sankaran, and Bui (2000) researched the amount learned in Web-based and bricks and mortar versions of an undergraduate business computer course. No significant difference in learning gain from pretest to the final exam was found. Wang and Newlin (2000) compared Web-based and bricks and mortar sections of a statistics course. They found that the bricks and mortar students scored higher on the final exam than did the Web-based students. Hiltz (1993) compared Web-based and bricks and mortar sections of several courses and found equal learning in the Web-based and bricks and mortar section in almost all courses and superior learning in the Web-based computer science course.

When looking at level of student satisfaction in Web-based courses versus bricks and mortar courses results also varied in the studies we found. Chen and Jones (2007), Stanley (2006) and Arbaugh (2005) all find that satisfaction was similar to traditional course delivery systems. In contrast to theses results, Weber and Lennon (2007) found that student satisfaction was lower for web-based classes because there was a disconnect with the professor and a lack of meaningful collaboration with their fellow students. Additionally, Kearns, Shoef, and Summey (2004) found less satisfaction for students in a Web-based second-degree bachelor of science (in Nursing) program than the traditional course method. Bata-Jones and Avery (2004) in research on nursing students who took a pharmacology course found that students enrolled in the web-based course were more positive about their experience than those enrolled in the traditional course. In 2003, Buckley in her study on students in nutrition classes had much more neutral findings, where the students expressed both positive and negative

aspects of the online instruction. In 2002, Wills found that students seemed to favor an online format for the teaching of graduate level nursing courses versus the traditional classroom environment. Maki et al. (2000) found lower satisfaction in the Web-based than in the bricks and mortar version of introductory psychology, a finding replicated by Maki and Maki (2002). Arbaugh and Duray (2002) in their investigation of Web-based MBA programs found that more experienced on-line students tended to be more satisfied with Web-based delivery mechanisms. They also found that smaller class sizes were positively associated with satisfaction. Wang and Newlin (2000) found fairly equivalent satisfaction. Hiltz (1993) found that satisfaction was high in the Web-based courses (but did not compare Web-based vs. bricks and mortar).

While there has been a dutiful amount of research assessing the degree of effectiveness and satisfaction with brick and mortar vs. web-based delivery formats, there appears to be no real consensus as to whether one is better than the other. That is a fair conclusion in of itself suggesting that both formats may be appropriate for differing topics, differing audiences, and differing faculty. The evidence also seems to suggest that relatively little if any research has been done which compares a third type of delivery format, the "hybrid," which incorporates traditional brick and mortar lectures/discussions, with online technologies such as Wiki. That is the focus of the study and the premise of the methodology.

METHODOLOGY

Design

For the comparison process, a study was conducted that measured learning outcomes and student satisfaction across three different learning platforms. The same course (MBA level Principles/Foundations of Marketing) was delivered during three different eight-week sessions. The course was first delivered as a web-based course (lectures, discussions, evaluations were delivered in modular format via Blackboard) during the Summer term of 2007. Then the course was delivered as a traditional brick and mortar delivery (1st eight-week session of Fall 2007) with very little web-based ancillaries (the course notes, syllabus, and exam reviews were posted to Blackboard). The third version of the course was delivered (1st eight-week session of Spring 2008) as a hybrid model which incorporated traditional in-class lectures, online content and the committed use of the Wiki platform. The goal of the study was to assess whether there was a difference in effectiveness and satisfaction between the three delivery formats. Effectiveness was measured via the following:
1. Learning Achievements
    a. Final Exam
    b. Semester Project
    c. Final Grade in Course

While satisfaction was measured as:

2. Overall Course Satisfaction
   a. With Course
   b. With Instructor

The course that was delivered as a web-based section during the Summer term was advertised as such, and therefore introduces some self-selection bias in the results. In regards to the other two sections, there were no special announcements that one section would have an alternative technology or delivery format.

As noted before, the web-based section was conducted via the Internet, which meant that all course lectures and materials were delivered via web-pages (Blackboard was the delivery format). This used a modular format which presented information and incorporated learning activities on a weekly basis that was relevant and comparable to information being presented in the lecture-based section (Su 2005). The traditional section of the course was conducted in a traditional "brick and mortar" environment with moderate utilization of technology such as, PowerPoint presentations, TV/VCRs, overhead projectors, notes posted on Blackboard, etc. It was essentially a lecture-based format in a classroom setting that met once a week for four hours. Finally, the "hybrid" course was delivered as a combination of traditional lectures/discussions, with technology support via Blackboard, and most importantly the inclusion of Wiki capabilities. Wiki (via SocialText Inc.) provided the students with the opportunity to: (1) easily create simple, collaborative websites; (2) develop projects with peer review; (3) group author projects; (4) track a group project; (5) coordinate data collection; (6) develop collaborative presentations; and (7) contribute to course content and even help in the development of their own exams.

Demographic Variables

At the beginning of each term, the demographic variables were measured across each section. The demographic variables are as follows:

GPA: Student grade point averages were taken from official University records.

Academic Level: Student academic level was taken from official class rosters. The students were categorized as 1st year, 2nd year or imminent graduation.

Web-Based Experiences in classroom settings: Information was taken from pretests, indicating student self-reported experience with prior web-based classroom settings.

Perceived Knowledge: Information was taken from pretests, indicating student self-reported prior perceived knowledge with the Internet.

Course Format: This is not a measured variable, but it may influence the dependent variables.

The variables were measured utilizing standard dichotomous questions and a series of likert-scale ques-

tions. For instance, experience questions were literally based on a series of yes/no questions that assessed whether they had participated in a particular online activity. The perceived knowledge questions were based on a series of questions that utilized a 5-point likert-scale, which assessed the degree to which the respondent believed they had knowledge of the specific issue.

Outcome Variables

At the end of each term, the dependent variables were measured, based on the following variable descriptions:

Learning Achievement: This information was taken from the various assignments that students submitted for the courses, such as the final exam, the semester project and the overall final grade.

Course Satisfaction: Information was taken from the student evaluations of the course at the end of the term.

The measurement procedure for learning achievement was fairly straightforward as it was based on actual scores that were achieved by the students. While course satisfaction was measured utilizing a series of questions with likert-type scales ranging from "strongly agree" to "strongly disagree." These questions are illustrated in Table 2.

DATA ANALYSIS

The demographic variables are described in detail in Table 1.

As illustrated in Table 1, the demographic variables have insignificant differences between the groups. This is important for establishing predictive validity as we examine the outcome variables. Multivariate normality was examined by both a graphical examination of the data distribution and statistical test for the remaining items. Histograms of the data distributions of the relative influence variables did not exhibit departures from normality. In addition, the skewness and kurtosis statistics of each of these variables were within an acceptable range (less than ± 1.96, which corresponds to a .05 error level). Finally, the Shapiro-Wilke's test further confirmed that there were no departures from normality, and that the distributional characteristics of the data would not influence the results. In terms of GPA's, we found that there was no significant difference in GPA's between the three sections. Therefore, we assumed that each section started with similar academic backgrounds and potential for learning. The only variable with a notable difference was group size, because the online group was smaller than the traditional class.

RESULTS AND DISCUSSION

The following results compare the three delivery formats utilizing the pre-test and post-tests. The implica-

TABLE 1
DEMOGRAPHIC VARIABLES

Variables		Online	Trad.	Hybrid	Sig-Diff
Enrollment		29	35	34	N/A
Average GPA		3.72	3.75	3.68	Insig.
Gender:	Male	19	15	13	N/A
	Female	10	20	21	N/A
Academic Level	1st Year	15	21	17	N/A
	2nd Year	9	10	14	N/A
	Imminent Graduation	5	4	3	N/A
Web-based Experiences	Perceived Knowledge of Web-Based Courses	2.90	3.07	2.96	Insig.
	Experience in Online Course	1.98	1.93	1.94	Insig.
	Experience with Online Course Components	1.89	2.00	1.98	Insig.

tions of each question are discussed. The statistical procedures utilized involved frequency analysis, means analysis, and a *t*-test to assess significant differences between means.

Learning Achievement

In terms of learning achievement, we assessed results on the final exam, results on the semester project, and overall results in the course. In terms of course performance, we found that the final course grade was significantly higher for the hybrid section compared to the traditional and the online course. In addition, the hybrid section scored significantly better on the final exam than the traditional section, and scored significantly higher on the final project than the online section. This is an indication that the students in the hybrid section performed at a higher level than the students in the traditional section or the online section.

Course Satisfaction

In order to measure general course satisfaction, there were eight questions which are evaluations of the course and instructor, which utilize a 5-point likert type scale ranging from "strongly agree" to "strongly disagree." The actual questions are illustrated in Table 2. The general results indicate that there are a variety of differences between the sections. In general, it can be stated that the students were satisfied with all measurable components of satisfaction across all three sections, but the study was seeking to determine if there were significant differences in those perceptions.

The results indicate that hybrid section performed better than both the traditional and the online sections in terms of their self-perception of learning and the overall collaborative environment. The online section was significantly lower on the perception that the classroom environment encourages learning. The online section was also lower in overall course satisfaction, while the hybrid section had the highest level of overall course satisfaction.

These results are interesting because it certainly suggests that technology integration into the classroom provides comparable and even higher outcomes than traditional delivery systems. It also suggests that the hybrid – Wiki course may provide the ideal learning scenario for today's wired student. They get the personalized interaction with the professor during the live lectures and discussion, and they get to develop online writing and creativity skills through collaborative efforts with their class mates and professor.

CONCLUSIONS

Overall, the outcomes of this study lend strong support for the development and utilization of online technologies in the delivery of course materials. The following items represent the top five outcomes that we found while conducting this research:

1. Similar course objectives and goals are achieved in all three environments.
2. The same degree of learning outcomes was achieved in all three environments.
3. Course satisfaction was significantly higher for the Hybrid-Wiki section.

TABLE 2
OUTCOME VARIABLES

Variables	Questions	Trad.	Online	Hybrid	Sig. Dif. 1[*]	Sig. Dif. 2[**]	Sig. Dif. 3[***]
Learning	Final Exam	84%	85%	88%	Insig.	.046	Insig.
Achievement	Final Project	88%	87%	91%	Insig.	Insig.	.045
	Final Grade GPA	3.52	3.51	3.75	Insig.	.034	.034
Satisfaction	Q1: Excellent Teacher	1.13	1.18	1.14	Insig.	Insig.	Insig.
	Q2: Overall, I learned a great deal in this course.	1.22	1.25	1.17	Insig.	.041	.038
	Q3: The course created a collaborative learning environment	1.25	1.20	1.09	Insig.	.026	.033
	Q4: The instructor keeps students interested and motivated.	1.22	1.25	1.20	Insig.	Insig.	Insig.
	Q5: The instructor creates a classroom environment that encourages students to learn.	1.17	1.25	1.15	.041	Insig.	.037
	Q6: The instructor presents course materials in a clear and organized manner.	1.09	1.12	1.12	Insig.	Insig.	Insig.
	Q7: The instructor utilizes time effectively and appropriately.	1.22	1.25	1.24	Insig.	Insig.	Insig.
	Q8: Overall, I am very satisfied with this course.	1.17	1.25	1.09	.041	.028	.021

*   **Sig. Dif. 1 = Trad. vs. Online**
**   **Sig. Dif. 2 = Trad. vs. Hybrid**
*** **Sig. Dif. 3 = Online vs. Hybrid**

4. Students are comfortable with the technology and delivery environment.
5. The Hybrid-Wiki provides both personal interaction with the professor and collaboration opportunities with peers, which generates higher performance and satisfaction outcomes.

It appears that the use of online technologies can be very beneficial for the university community, and that it has many benefits in the learning environment. Essentially, online technology makes education available at any time and any place. This precursory research indicates that online technologies provide comprehensive and comparable learning environments.

Implications

The technology and potential for the integration of technology into courses changes rapidly, therefore it is imperative to conduct ongoing research. A continuous longitudinal research approach would help to facilitate the continued development and refinement of technology integration and online courses to ensure that various benchmarks are being achieved. In terms of benchmarks, it would be in the best interest of a university to establish a series of benchmarks, evaluation guidelines, online course strategy, etc., as we can expect the integration of technology in the education community to continue to grow.

Wikis might be the easiest and most effective Web-based collaboration tool in any instructional portfolio. Their inherent simplicity provides students with direct (and immediate) access to a site's content, which is crucial in group editing or other collaborative project activities. A Wiki's versioning capability can show the evolution of thought processes as students interact with the site and its contents. These collaborative projects help promote ownership in the team's activities. In addition, Wikis are being used as e-portfolios, illustrating their utility as a tool for collection and reflection. Collaboration using a Wiki is not limited to students. Faculty can use Wikis to collaborate on projects, whether editing a textbook, preparing a journal article, or assembling a syllabus or reading list. Wikis might also prove to be an ideal vehicle for soliciting ongoing input for research or projects where community input can help inform and direct subsequent investigation. The possibilities for using Wikis as the platform for collaborative projects are limited only by one's imagination and time. Wiki-en-

abled projects can provide various levels of site access and control to team members, offering a fine-tuning element that enhances the teaching and learning experience. It appears that the Wiki can be an effective tool, and it provides a collaborative environment that mirrors many of the non-academic environments that our students readily participate in.

REFERENCES

Arbaugh, J.B. and R. Duray (2002), "Technological and Structural Characteristics, Student Learning and Satisfaction with Web-Based Courses: An Exploratory Study of Two On-Line MBA Programs," *Management Learning,* 33 (3), 331–47.

_____ (2005), "Is There an Optimal Design for Online MBA Courses?" *Academy of Management Learning & Education,* 4 (2), 135–43.

Bata-Jones, B. and M. Avery (2004), "Teaching Parmacology to Graduate Nursing Students: Evaluation and Comparison of Web-Based and Face-to-Face Methods," *Journal of Nursing Education,* 43 (4), 185–89.

Buckley, K.M. (2003), "Evaluation of Classroom-Based, Web-Enhanced, and Web-Based Distance Learning Nutrition Courses for Undergraduate Nursing," *Journal of Nursing Education,* 42 (8), 367–70.

Chen, C.C. and K.T. Jones (2007), "Blended Learning vs. Traditional Classroom Settings: Assessing Effectiveness and Student Perceptions in an MBA Accounting Course," *The Journal of Educators Online,* 4 (1), 1–15.

Hansen, D.E. (2008), "Knowledge Transfer in Online Learning Environments," *Journal of Marketing Education,* 30 (2), 93–101.

Hiltz, S.R. (1993), "Correlates of Learning in a Virtual Classroom," *International Journal of Man-Machine Studies,* 39, 71–98.

Kaynama, S.A. and G. Keesling (2000), "Development of a Web-Based Internet Marketing Course," *Journal of Marketing Education,* 22 (2), 84–89.

Kearns, L.E., J.R. Shoaf, and M. Summey (2004), "Performance and Satisfaction of Second-Degree BSN Students in Web-Based and Traditional Course Delivery Environments," *Journal of Nursing Education,* 43 (6), 280–84.

Levin, M.A. and D.F. Davis (2007), "Virtual Third Places and Experiential Learning: A Case Study of Blogging in a Marketing Promotions Course," *Journal for Advancement of Marketing Education,* 10 (1), 18–26.

Maki, W.S., R.H. Maki, M. Patterson, and P.D. Whittaker (2000), "Evaluation of a Web-Based Introductory Psychology Course: 1. Learning and Satisfaction in Web-Based Versus Lecture Courses," *Behavior Research Methods, Instruments & Computers,* 32, 230–39.

_____ and _____ (2002), "Multimedia Comprehension Skill Predicts Differential Outcomes of Web-Based and Lecture Courses," *Journal of Experimental Psychology: Applied,* 8, 85–98.

Martins, L.L. and F.W. Kerrmanns (2004), "A Model of Business School Students' Acceptance of a Web-Based Course Management System," *The Academy of Management Learning and Education,* 3 (1), 7–26.

Peltier, J.W., J.A. Schibrowski, and W. Drago (2007), "The Interdependence of the Factors Influencing the Perceived Quality of the Online Learning Experience: A Causal Model," *Journal of Marketing Education,* 29 (2), 140–53.

Sankaran, S.R., D. Sankaran, and T.X. Bui (2000), "Effect of Student Attitude to Course Format on Learning Performance: An Empirical Study in Web vs. Lecture Instruction," *Journal of Instructional Technology,* 27, 66–73.

Siu, W-S. and L.F. Chau (1998), "Teaching Marketing Research on the Internet," *Journal of Education for Business,* 74 (1), 44–49.

Stanley, O.L. (2006), "A Comparison of Learning Outcomes by 'In-Course' Evaluation Techniques for an On-Line Course in a Controlled Environment," *The Journal of Educators Online,* 3 (2), 1–15.

Su, B. (2005), "Examining Instructional Design and Development of a Web-Based Course: A Case Study," *International Journal of Distance Education Technologies,* 3 (4), 62–77.

Vat, K.H. (2006), "Developing a Learning Organization Model for Problem-Based Learning: The Emergent Lesson of Education from the IT Trenches," *Journal of Cases on Information Technology,* 8 (2), 82–110.

Vogt, G. (2005), "Student Assessment of Learning Gains (SALGains)," *Business Communication Quarterly,* 68 (1), 36–43.

Wang, A.Y. and M.H. Newlin (2000), "Characteristics of Students Who Enroll and Succeed in Psychology Web-Based Classes," *Journal of Educational Psychology,* 92, 137–43.

Weber, J.M. and R. Lennon (2007), "Multi-Course Comparison of Traditional Versus Web-Based Course Delivery Systems," *Journal of Education Online,* 4 (2), 1–19.

Wills, C. and M. Stommel (2002), "Graduate Nursing Students' Precourse and Postcourse Perceptions and Preferences Concerning Completely Web-Based Courses," *Journal of Nursing Education,* 41 (5), 193–201.