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Rhonda Polak
NABA Consulting

Jeanette Francis
Lynn University

Mark Cameron
University of Phoenix

Johnny Morris
University of Phoenix

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A COMPARATIVE STUDY OF QUALITATIVE AND QUANTITATIVE COURSES ACROSS THREE EDUCATIONAL DELIVERY MODALITIES

Rhonda Polak, NABA Consulting
Jeanette Francis, Lynn University
Mark Cameron, University of Phoenix
Johnny Morris, University of Phoenix

This study investigated differences in student satisfaction between qualitative and quantitative courses across three modalities: online, on ground and blended. With 21,000 respondents results indicate there are significant differences in student satisfaction between qualitative and quantitative courses. Satisfaction was higher for qualitative courses across all three modalities; it was highest for the online modality for both qualitative and quantitative courses.

Introduction

Classroom-based face-to-face instruction has been the most common method of instruction and the standard for higher education for many years. Since the early 1990s the ubiquity and widespread availability of the Internet steadily increased bringing the convenience of online learning to an ever-increasing number of students. At the same time, its popularity with students and faculty and its widespread acceptance led to an ever increasing number of students enrolled in online courses over the last ten years. This modality involves students utilizing Internet based technology for interaction with both instructors and other students in the class.

The current void in academic research validates the need for this study. Even though there are many studies on adult learners (Aslanian 2001, Barbian 2002, Brookfield 1986, Cross 1991, Knowles, Haulton & Swanson 1998, Mezirow 1991, Hoffman 2002), online learners, traditional learners and student satisfaction, research has not yet addressed the issues of hybrid modalities (i.e. FlexNet modality) and its use in both qualitative and quantitative courses on such a large scale as reported here. Furthermore, the current literature focuses on e-learning in corporate environments, soft skills learning, sales or employee motivational courses, and does not examine academic environments. This research fills this gap and provides the groundwork for further work.

During the 1994-1995 school year, approximately 754,000 students were enrolled in college-level, credit-granting distance education courses in the U.S. By 1997-1998, the number nearly doubled to more than 1.3 million enrollments in more than 47,500 college level courses (Loane, 2001). By the fall of 2002, more than 1.6 million students had completed at least one online course (Allen & Seaman, 2003).

Not only is online learning becoming even more widely available and generally accepted, it is generally part of standard college offerings. Institutions are beginning to blend elements of online learning with face-to-face instruction in order to capitalize on the advantages of both modalities and minimize their disadvantages. This form of educational delivery is commonly described as blended learning and can include many different ways of combining pedagogical approaches in order to attain optimal learning outcomes (Driscoll, 2002, Rosenberg 2001, PEW Foundation 2002, Lamb 2001, Singh, & Reed 2001, Wilson and Beatty 2001). Indeed, the term "blended learning" is constantly taking on new meanings. According to Driscoll (2002) it denotes four different variations: (1) combine or mix modes of Web-based technology; (2) combine various pedagogical approaches to produce an optimal learning outcome with or without instructional technology; (3) link any form of instructional technology with face-to-face instructor-led training; and (4) mix or combine instructional technology with actual job tasks to harmoniously blend learning and working.

In the rush to offer higher education courses and programs, whether strictly online or in a blended format, educators must ensure that the course content and the ways the content is delivered is appropriate for the delivery modality. Institutions are finding economies of scale and economic and instructional advantages to online and blended courses. However, there is a delicate balance between the needs of students for a satisfactory and effective learning experience and the needs of a university for instructional efficiency (Waddoups, Hatch and Butterworth, 2003). Finding the appropriate balance is a challenge for educators as they strive to create effective blended learning and online learning environments (Cooper 2001, Cook 1995, Chizmar, & Walbert 1999, Devi 2002, Moore & Kearsley 1996).

Creating and maintaining the balance between effectiveness and student satisfaction in certain types of course can be more challenging than in others. Some courses are more qualitative in nature while others are more quantitative. An organizational behavior course differs dramatically from a statistics course. Similarly, a communications course is very different than a finance course. Although much of the research on online and blended learning addresses the effectiveness and mechanics of the different delivery methods, very little research has examined overall student satisfaction with both online and blended learning modalities (Osguthorpe & Graham, 2003; Waddoups, Hatch, & Butterworth, 2003; Bunderson 2003, Alreck, & Settle 1995, Phipps & Merisotis 1999).

There is, in addition, very little research on differences in student satisfaction with courses that can be described as more qualitative and those that can be described as more quantitative. More specifically, very little research compares student satisfaction with quantitative and qualitative courses across the three different learning environments of online, on ground, and blended learning. As innovations in delivery systems evolve, it is increasingly important that educators and designers of college programs better understand which types of courses lend themselves best to various educational delivery modalities and learning environments. It is possible that not every course lends itself equally to online or blended delivery, something that educators and educational institutions involved in online and blended learning should consider when designing their programs and course offerings. Hence, institutions would benefit from a study that examines student satisfaction with qualitative and quantitative courses across the three delivery modalities: face-to-face, online, and blended.

Purpose of the Study

This study provides a baseline assessment of student satisfaction with quantitative and qualitative courses across three types of delivery modalities. The findings may benefit educational administrators and curriculum designers. Hence, the information may guide future decisions about the types courses that are most appropriate for a given delivery modality.

Research Questions

The research questions and hypotheses guiding this study were:

- To what extent, if any, is there a difference in student satisfaction between courses defined as

qualitative and courses defined as quantitative?

H₀: There is no difference in satisfaction in quantitative versus qualitative courses

H_a: There is a difference in satisfaction in quantitative versus qualitative courses

- To what extent, if any, is there a difference in student satisfaction between courses defined as qualitative and those defined as quantitative across these three delivery modalities?

H₀: There is no difference in satisfaction by modality or type of course

H_a: There is a difference in satisfaction by modality or type of course

Nature of the Study

The study assessed student satisfaction with courses with an end-of-class survey in a 4-year accredited university in the U.S. It was administered anonymously to 21,000 students (7,000 in each of the three modalities) who completed courses between January 1, 2003 and December 31, 2003. For the purposes of this study, the courses that were considered qualitative and quantitative were restricted to those defined by the college deans and generally understood within the university to be the most qualitative or quantitative. Qualitative courses included Skills for Professional Development, Communications, Organizational Behavior, and Marketing. Quantitative courses included Statistics and Quantitative Analysis, Finance, and Accounting. This study relies on Driscoll's (2002) third meaning of "blended modality;" it combines any form of instructional technology with face-to-face instructor led training. In this university blended courses were delivered in this format: the instructor met with students twice during the course (the first and last sessions) in a face-to-face environment while the remaining sessions take place using a Web-based learning platform.

The survey instrument contained both dichotomous variables and scales with a 5-point Likert-type response format. It incorporates items that assess strategic indicators for the university and items that address faculty, curriculum, educational effectiveness, classroom environment, university student administrative services, and overall satisfaction. For the purposes of this study, the researcher included all strategic indicator items as well as questions about faculty, curriculum, educational effectiveness, and overall satisfaction. For this study, the measure of student satisfaction is a proxy for educational effectiveness.

The demographic data were evaluated with both descriptive and inferential statistics. Descriptive statistics such as nominal measurements, response frequencies, percentages, means, standard deviations, and cross-tabulation were used to sort and organize the data. The survey has four sections: 1) strategic indicators, 2) faculty, 3) curriculum, and 4) educational effectiveness. Each section had three questions with 12 questions in all. The first section, with its three dichotomous items, was titled "Strategic Indicators" because of the nature of the questions. The other sections, with Likert-type scale formats, were combined to form a section with nine questions.

The three dichotomous items on strategic indicators required a "no" or a "yes" response. A "no" answer was assigned a value of zero and a "yes" response was assigned a value of one. The responses were averages to obtain a single score which could range in value from 0.00 to 1.00 with higher scores representing more "yes" responses and thus, more favorable attitudes.

The other nine questions (non-strategic indicators) used a Likert-type response format ranging from 1 =

"disagree" to 5 = "strongly agree." The nine items were stacked and combined to assess students' overall experience in one summated average score to assess non-strategic indicators. As with the strategic indicators, the higher the score, the more favorable was the response.

Research Question 1

The first research question is: To what extent, if any, is there a difference in student satisfaction between courses defined as qualitative and courses defined as quantitative?

H₀: There is no difference in satisfaction in quantitative versus qualitative courses

H_a: There is a difference in satisfaction in quantitative versus qualitative courses

Results were evaluated for both strategic and non-strategic indicators by qualitative and quantitative course content. The results for strategic indicators by qualitative and quantitative courses appear in table 1.

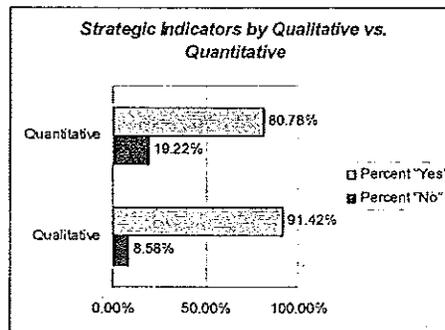
Table 1: Descriptive Statistics on Stacked Strategic Indicators Average Score of Qualitative versus Quantitative 1.0 – 5.0 Scale

Type	Total Count	Number	Missing Data	Percent	# of Yes	# of No	Mean
Qualitative	43,194	42,425	769	67.34	38,784	3,641	.914
Quantitative	19,806	19,275	531	30.60	15,571	3,704	.808
Totals	63,000	61,700	1,300		54,355	7,345	

Of the 63,000 data points (7,000 x 3 questions x 3 modalities) more than two thirds were qualitative courses and nearly one third were quantitative. The results indicate that qualitative course mean of .914 was higher than the quantitative course mean of .807. Of the 61,700 responses received, 88% were "yes" and only 12% were "no". This represents a high percentage of favorable responses to the strategic indicators,

demonstrating that students were generally happy with their institutional experience and would recommend both the university and the instructor to others.

Table 2 shows that more students answered "yes" on the strategic indicators for qualitative courses than for quantitative courses. While over 91% answered "yes" on the qualitative courses, only 81% answered "yes" on quantitative courses.



A chi-square test examined the percentage of students answering "Yes," (would recommend) by qualitative versus quantitative on the strategic indicators.

The Pearson Chi-Square (1 df) = 1429.210, p-value = 0.000, indicates that the null hypothesis can be rejected; the percents are not the same by type of course; students

are much more positive about the qualitative courses than the quantitative courses. The results for student

satisfaction on the non-strategic items for qualitative and quantitative courses appear in table 3.

Table 3: Descriptive Statistics on Stacked Non-Strategic Indicators Average Score of Qualitative versus Quantitative 1.0 – 5.0 Scale

Type	Total Count	Number	No Data	Percent	Mean
Qualitative	129,582	123,131	6,451	65.15	4.09
Quantitative	59,418	58,410	1,008	30.90	3.90
Totals	189,000	183,541	7,459		

Qualitative courses received higher satisfaction ratings (4.09) than quantitative courses (3.90) indicating that students are more satisfied with qualitative courses than with quantitative courses, a finding that is consistent that of the strategic indicators. A one-factor analysis of variance test (ANOVA) showed there are significant differences by modality (F-Observed (1,181,539), = 1114.11, MS(error) = 1.4, p about 0.000). Qualitative courses received significantly higher scores on the non-strategic indicators, signifying that the averages are different. Therefore, the null hypothesis is rejected. There was a 95% confidence interval for the

population mean, based on the pooled standard deviation of 1.166. Table 4 summarizes the strategic and non-strategic indicators by qualitative and quantitative courses. There is a difference in student satisfaction with quantitative and qualitative courses. For strategic indicators, overall qualitative courses received a score of .914, while quantitative courses received a score of .808. The difference of .11 indicates a fairly strong preference for qualitative courses. For non-strategic indicators, the difference between qualitative (4.09) and quantitative (3.90) is a difference of .19, again indicating a preference for qualitative courses.

Table 4 Summary Descriptive Statistics Stacked Strategic and Non-Strategic Indicators by Qualitative and Quantitative

Strategic Indicators 0=N 1=Y		
Qualitative		.914
Quantitative		.808
Non-Strategic Indicators 1.0-5.0		
Qualitative		4.09
Quantitative		3.90

The results for strategic and non-strategic indicators show a difference in student satisfaction with qualitative and quantitative courses. The null hypothesis can be rejected. There is a difference in student satisfaction in quantitative versus qualitative courses.

Research Question 2

The second research question is: To what extent, if any, is there a difference in student satisfaction between courses defined as qualitative and courses defined as quantitative across these three delivery modalities?

H_0 : There is no difference in satisfaction by modality or type of course

H_a : There is a difference in satisfaction by modality or type of course

The results of the evaluation of the strategic indicators by qualitative and quantitative courses and across the three delivery modalities appear in table 5. They indicate that not only were the qualitative courses rated higher across all three modalities, but also the online modality had the highest score for both qualitative and quantitative courses. Online was followed by the on-ground modality for both types of courses, and the blended delivery received the lowest scores for both qualitative and quantitative courses.

Table 5: Descriptive Statistics on Stacked Strategic Indicators Average Score of Qualitative versus Quantitative and Modality 0=N 1=Y

Modality	Type	Total Count	Number	Missing Data	Percent	Mean
Blended	Qualitative	14,964	14,699	265	23.33	.905
On-ground	Qualitative	12,414	12,183	231	19.34	.917
Online	Qualitative	15,816	15,543	273	24.67	.921
Blended	Quantitative	6,036	5,862	174	9.30	.788
On-ground	Quantitative	8,586	8,341	245	13.24	.814
Online	Quantitative	5,184	5,072	112	8.05	.821
Totals		63,000	61,700	1,300		

The results of the non-strategic measures by course type (qualitative and quantitative) and by delivery modality are indicated in table 6. For qualitative courses, the online and on-ground modalities were nearly equally

rated, with blended slightly less. For quantitative courses, online again had the highest score, followed by on-ground, and finally, the blended modality. This was consistent with the strategic indicators as well.

Table 6: Descriptive Statistics on Stacked Non-Strategic Indicators Average Score of Qualitative Versus Quantitative and Modality 1.0 – 5.0 Scale

Modality	Type	Total Count	Number	Missing Data	Percent	Mean
Blended	Qualitative	44,892	42,622	2,270	22.55	4.05
Online	Qualitative	47,488	44,878	2,270	23.75	4.11
On-ground	Qualitative	37,242	35,631	1,611	18.85	4.12
Blended	Quantitative	18,108	17,808	300	9.42	3.88
On-ground	Quantitative	25,758	25,339	419	13.41	3.89
Online	Quantitative	15,552	15,263	289	8.080	3.94
Totals		189,000	181,541	7,459		

As indicated in table 7 there is a difference in satisfaction by modality and by type of course. In the case of strategic indicators, the online modality scored the highest in both qualitative and quantitative courses, with on-ground being second in both instances.

For the non-strategic indicators, the online modality again received higher scores than the other two for qualitative courses, with on-ground being

second and blended coming in last. In the case of non-strategic indicators for quantitative courses, online and on-ground scored basically the same, with on-ground showing minimally higher than online. In both categories once again, the blended delivery modality scored the lowest in both strategic and non-strategic indicators for both qualitative and quantitative courses.

Table 7: Summary Descriptive Statistics on Stacked Strategic Indicators for Qualitative versus Quantitative by Modality

Strategic Indicators 0=N 1=Y	Qualitative	Quantitative
Blended	.905	.788
On-ground	.917	.814
Online	.921	.821
Non-Strategic Indicators		
Blended	4.05	3.88
On-ground	4.12	3.89
Online	4.11	3.93

Because the statistical tests for strategic and non-strategic indicators for both type of instructional modality and qualitative versus quantitative courses show that there is a difference in student satisfaction, the researcher must reject the null hypothesis that there is no difference in satisfaction by modality by type of course.

The results indicate that student satisfaction is higher

for qualitative courses than it is for quantitative courses. For strategic indicators qualitative courses had a score of .914 while quantitative courses had a score of .808, a difference of .106. For non-strategic indicators qualitative courses had a score of 4.09 and quantitative courses had a score of 3.90, a difference of .19. Table 8 is repeated here to illustrate the results.

Table 8: Summary Descriptive Statistics Stacked Strategic and Non-Strategic Indicators by Qualitative and Quantitative

Strategic Indicators 0=N 1=Y	
Qualitative	.914
Quantitative	.808
Non-Strategic Indicators 1.0-5.0	
Qualitative	4.09
Quantitative	3.90

This indicates that overall, students are very satisfied with the University, would recommend both the University and the instructor, and felt the course met their expectations. Therefore, the researcher must reject the null hypothesis.

The study results indicate that there are significant differences in student satisfaction between qualitative and quantitative courses and across the delivery modalities. For strategic indicators of qualitative courses online showed the highest score at .921, on-ground second at .917, and blended learning the lowest at .905. For strategic indicators of quantitative courses online again showed the highest score at .821, followed by on-

ground at .814, and blended at .788.

For non-strategic indicators, the difference in the score for qualitative courses between the highest and lowest rating was .07 (4.12 – 4.05). The on-ground modality score was the highest (4.12) with online a close second (4.11) and blended the lowest (4.05). For quantitative courses online scored the highest (3.93) with blended the lowest (3.88).

The difference in quantitative courses was minimal at only .04. This indicates that students are very satisfied with all three delivery modalities; while there is a small difference, it is not of practical relevance. Table 9 is repeated here for illustrative purposes.

Table 9: Summary Descriptive Statistics on Stacked Strategic Indicators for Qualitative versus Quantitative by Modality

Strategic Indicators 0=N 1=Y	Qualitative	Quantitative
Blended	.905	.788
On-ground	.917	.814
Online	.921	.821
Non-Strategic Indicators		
Blended	4.05	3.88
On-ground	4.12	3.89
Online	4.11	3.93

SUMMARY AND CONCLUSIONS

Results indicate that there is a difference in student satisfaction with qualitative and quantitative courses, among the three delivery modalities, and also between qualitative and quantitative courses across these three modalities. The differences are most pronounced between qualitative and quantitative courses, with qualitative courses showing higher satisfaction than quantitative courses. This finding, consistent across all three delivery modalities, was expected and somewhat intuitive since university experience indicates that students seem to express more frustration and difficulty with quantitative courses.

Overall, student satisfaction was relatively high with both strategic and non-strategic indicators for both qualitative and quantitative courses. Also as anticipated, student satisfaction is higher with qualitative courses than quantitative courses for all three delivery modalities.

Blended Learning Summary

Because students interact both online and face-to-face, the blended delivery modality has the potential to meet the learning needs of a wider range of student learning styles. The results of the study, however, indicate the lowest rate of student satisfaction with both strategic and non-strategic courses of the three tested modalities. This may be due to a number of factors.

First, the blended delivery modality is relatively new to the organization. Each year this university develops greater expertise and experience with the modality generally, and campuses and individual faculty are developing greater individual facility with the modality. The blended delivery modality is currently the fastest growing modality in this university. In the last three years, several campuses have been opened and operate exclusively in the blended delivery modality. Students attending these campuses have no other modality to which to compare their experience. Repeating this study at some future date to get more current data, or comparing blended delivery-only campuses to those that offer both blended and on-ground may indicate different results.

Second, not every campus has the same level of expertise with the modality. The study included all campuses, irrespective of their maturity with offering the blended delivery format; and all students, irrespective of whether or not they had experienced any of the other delivery modalities. Because of the relative newness of the blended delivery format; for campuses, faculty, and students; it is possible that the delivery experience was not as smooth or effective during the time for which students were surveyed as it will be as campuses develop maturity with the modality.

Third, it is possible that the current format in which the blended delivery is offered is not the most effective format. Currently, students meet face-to-face for the first

and last night of a five or six week course, with the interim weeks being handled online. It is possible that there may be a more effective way to structure and organize the blended delivery courses. For example, with most college courses the first meeting is spent dealing with housekeeping issues related to the course. Perhaps this could be handled more efficiently in an online format so that face-to-face class time could be exclusively devoted to subject matter content. The online-only modality handles all classroom housekeeping items online, and reflects the highest levels of student satisfaction. There may be lessons from the online modality that can be applied to the blended delivery to increase its effectiveness.

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