

A COMPARATIVE ANALYSIS OF ON-LINE AND CLASSROOM-BASED INSTRUCTIONAL FORMATS FOR TEACHING SOCIAL WORK RESEARCH

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Abstract. *Research comparing courses taught exclusively in traditional face-to-face settings versus courses taught entirely online have shown similar levels of student satisfaction. This article reports findings from a comparative study of student achievement in research skills from classes using two different instructional formats. One group used a classroom-based instructional format and the other group used an online web-based instructional format. Findings indicate that there were no statistically significant differences between the two class formats for eight out of eleven outcome student performance activities and ten out of 13 pedagogical strategies. There were large effect size differences based on class format on four of the student performance activities and for student satisfaction with six of the pedagogical methods. When statistically significant differences were found, it was determined that student performance on learning activities and satisfaction with pedagogical methods were higher for the students in the traditional class. The findings support the conclusions of several studies concerning the effectiveness of online teaching. Limitations and implications for further studies are also suggested.*

Key words: *WEB-based instruction, social work research, distance education,*

Distance education has become an integral component of today's higher education system. Distance education is defined as any formal approach to learning in which the majority of the instruction occurs while the educator and the learner are at a distance from one another (Verduin & Clark, 1991, p.8). For the purpose of the article, distance education, online education, Web-base instruction, and technology-supported instructional environments will be used interchangeably to reflect the use of computer technology and advanced communication networks as the primary means for delivering instructional materials.

Approximately two-thirds of the accredited four-year colleges and graduate schools complement traditional campus based courses with courses offered via the Internet (Perrin & Mayhew, 2000). Many research studies have concluded that student learning, performance, and achievement in distance education classes is comparable to that of students enrolled in traditional campus-based classes (Dalton, 2001; Kleinpeter & Potts, 2003; Knowles, 2001; Rivera & Rice, 2002; Tucker, 2001; Ouellette & Chang, 2004; Patracchi, Mallinger, Engel, Rishel, & Washburn, 2005). Courses offered via

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Internet allow colleges to reach individuals who wish to advance their education, but who would otherwise be unable to take courses offered in a traditional classroom setting due to constraints of time, location, or lack of other resources (Perrin & Mayhew, 2000; Tucker, 2001). While much research has concluded that online learning environments have yielded positive outcomes related to student learning, performance, and achievement in other professions, less research has been conducted in social work on how to implement online courses effectively and how to evaluate online courses.

This article reports findings from a comparative study initiated to examine social work student achievement in a social work research course that used two different instructional formats. One group of students was taught research utilizing a face-to-face, classroom-based instructional format and the other group of students was taught online using web-based instructional methods. Findings indicated that there were statistically significant differences in both student performance and student satisfaction between the two groups but for a number of comparisons there were no differences. In addition, empirical findings support the conclusions of several other studies concerning the effectiveness of web-based teaching and learning. Limitations and implications for further research initiatives are suggested. To begin our discussion, we will review the literature in three areas: (a) distance education in social work courses and programs in general, (b) the use of distance education methods for teaching research skills, and (c) the evaluation of distance education in social work education.

LITERATURE REVIEW

Social work educators have had substantial concerns regarding the use of technology to provide distance education to students (Knowles, 2001). Educators have cited possible negative impact on social integration, role modeling, mutual monitoring, and social distance as reasons for not utilizing distance education in social work education programs (Knowles, 2001). However, over time and with research progressively providing more and more positive feedback concerning use of distance education, social work programs are increasingly embracing use of distance education to provide courses to students (Dalton, 2001; Knowles, 2001; Macy, Rooney, Hollister, & Fred-dolino, 2001; Seabury, 2003). Approximately 20% of social work programs now offer distance education courses (Dalton, 2001; Macy et al., 2001).

As distance education has become more widely utilized in social work courses, the number of studies evaluating the use of distance education has increased. The majority of research performed has yielded positive results when comparing distance education to traditional education (Dalton, 2001; Kleinpeter & Ports, 2003; Knowles, 2001; Macy et al., 2001; Ouellette & Chang, 2004; Seabury, 2003).

A number of social work classes taught by distance education have been evaluated. Courses concerning social work policy, substance abuse, human behavior in the social environment, social welfare history, practice methods, and field instruction have all been taught via distance education and evaluated (Macy et al., 2001). The integration of technology for teaching many social work courses has often been used as a way to enhance classroom-delivered content (Ouellette, 1999). Some have reported that students enrolled in distance education courses acquire comparable knowledge

and skills when compared to students taught in traditional classrooms (Kleinpeter & Potts, 2003; Petracchi, et al., 2005). Macy et al., (2001) reported that among students enrolled in distance education courses for social work, 77% indicated that the quality of instruction was comparable to traditional courses, and 78% felt that distance education met their learning needs. One study compared results of a web-assisted practice course with a practice course using face-to-face instruction. This study found no statistically significant differences between the two groups on assignments, a mid-term exam, and a videotaped exam project (Petracchi, et al. 2005). Another study found no statistically significant difference in actual interviewing skill acquisition at the completion of a practice course taught entirely online in a Web-based instructional environment versus the same course taught in a face-to-face classroom instructional environment (Ouellette, Westhuis, Marshall, & Chang, 2006).

Many instructors are teaching courses through traditional face-to-face instructional means and supplementing course work with online materials using course management software such as WebCT. Wernet, Olliges, and Delicath (2000) surveyed 39 students in a social work education course concerning the use of WebCT in the course as its course management platform. All students responded that they found the course materials and the course website helpful. Rivera and Rice (2002) evaluated student satisfaction and performance in an undergraduate introductory course in management information systems. Three sections of the class were offered; traditional, web-based, and a hybrid section that utilized traditional means of delivering lectures, assignments and tests, while using WebCT to deliver course materials and conduct discussions. Results of the study indicated no significant difference in student achievement across the three sections. However, student satisfaction was significantly higher in the traditional and hybrid sections of the course.

Other studies have indicated that web-based learning has been found to enhance teaching methods of traditional classroom-based courses. One study evaluated student satisfaction regarding use of the web to enhance learning in a mental health course. Students in this study strongly supported the use of web-enhanced teaching for the course and reported that the online environment enhanced their learning (Knowles, 2001). McShane (2004) reported findings from a qualitative research study that examined the teaching self-concept of university professors who combine online and traditional methods of teaching. Several themes emerged from the results of McShane's analysis. The professors reported that use of the web to enhance traditional teaching allowed for the development of a stronger rapport between students and professors. They also stated that using both online and traditional instructional methods of communication enabled them to get to know the students better, and interact with students with more ease. An additional benefit to using web-enhancement that was reported was that using the web encourages conscious planning and teaching of course materials. Professors stated that this increased consciousness promoted active implementation of methods that would best integrate online and face-to-face teaching. Professors further stated that utilization of the web to enhance teaching increased the proficiency of teaching and allowed for additional ways to teach and reach students. Utilization of web-enhancement allowed for the benefit of the immediacy and physical proximity of face-to-face teaching while also allowing students to be linked to multiple resources.

Distance Education and Social Work Research Courses

Some of the major objectives of social work research courses are to teach students how to use and evaluate quantitative and qualitative research, collect data, analyze data, and interpret data (Steckler, Farel, Bontempi, Umble, Polhamus, & Trester, 2001). Studies have shown that use of distance education to teach social work research methods is a promising approach (Dalton, 2001; Steckler et al., 2001).

Dalton (2001) compared three sections of a social work research methods course. One section of this course utilized in the comparison was a distance education course. After controlling for extraneous demographic variables, such as the participants' race, no significant differences were found between the online section of the course and the other sections.

Steckler and colleagues (2001) examined the use of a web-based model to train public health professionals to use qualitative research and evaluation methods. Results of the evaluation indicated no specific changes in knowledge or beliefs concerning qualitative methods. However, participants' self-efficacy increased, and self-reported perceptions of skills in data collection demonstrated significant changes. Participants reported that they found the information provided valuable and the teaching methods used to be satisfactory. This study demonstrates that use of computer technology and web-based instruction to teach qualitative methods is a promising approach. Participants reported that they found the information provided valuable and the teaching methods used to be satisfactory. Evaluation of this study demonstrates that use of computer technology and web-based instruction to teach qualitative methods is a promising approach.

A technology-supported training environment was also used to enhance the development of research skills of minority researchers in the children's mental health field. This Web-based training initiative provided a unique context for minority students to experience the actual research process as well as provided them with the necessary supports that beginning researchers require (Ouellette & Briscoe, 2002).

Evaluation of Distance Education in Social Work

The benefits of utilizing distance education in social work education are numerous. One of the greatest benefits of distance education is the flexibility that it allows students. Utilization of distance education provides educational access to students who otherwise may have been unable to attend more traditional classes (Knowles, 2001). Universities theorize that by utilizing distance education, they will be able to save money. As more students are able to access distance education, class sizes will increase, while overhead for the university will remain the same (Valentine, 2002). Additional benefits of distance learning may include promotion of self-directed learning, the potential for enhancing relationships and mentorship, and integration of the capabilities of technology and the vast resources of the Internet (Jurczyk, Kushner-Benson, Savery, 2004; Knowles, 2001; Valentine, 2002).

While the benefits to utilizing distance education are numerous, there are several issues to consider when utilizing distance education (Knowles, 2001; Macy et al.,

2001; Steckler et al., 2001). Knowles (2001) identifies several of these issues as: concerns about student academic performance, issues related to quality and accrediting standards, loss of face-to-face interaction, types of courses suited for online learning, loss of relationship building and mentorship, student adjustment to alternative learning, proper training for faculty teaching distance education, access to technology, and technical and institutional support. Other issues that merit consideration include thorough evaluation of student learner characteristics; students' age, gender, ethnicity, culture, professional experience, learning style, and motivation are important variables to consider in the implementation and evaluation of distance education (Macy et al., 2001). Faculty concerns and characteristics should be considered as well. The instructional style and characteristics of the instructor will substantially impact the delivery of course materials. The teaching style, pedagogy, of different courses should be considered. Methods that may be effective for teaching one course may be ineffective for teaching a different course (Macy et al., 2001). Types of technology, access to technology, and competence in utilizing technology of faculty and students should be considered in implementing and evaluating distance education. The effect of technological difficulties on the successful outcomes of courses should be evaluated as well (Macy et al., 2001).

With very few exceptions, students utilizing technology in distance education have similar learning outcomes when compared to students in a traditional classroom (Dalton, 2001; Kleinpeter & Potts, 2003; Knowles, 2001; Macy et al., 2001; Seabury, 2003). Students have cited several advantages to utilizing technology in distance education; the ability to link resources in many different formats, efficient in delivering course materials, resources can be available from any location at any time, flexibility, encourages independent and active learning, and can provide supplementary materials for use in traditional classes (McKimm, Jollie, & Cantillon, 2003). Disadvantages to utilizing technology in distance education as reported by students are as follows; problems accessing appropriate computer equipment, affordability of necessary equipment to access technology, quality and accuracy of course material may vary, and some students may feel isolated (McKimm, Jollie, & Cantillon, 2003).

In sum, the literature in distance education appears to suggest no significant difference between social work courses taught in a technology-supported instructional environment with traditional face-to-face classroom instructional settings. In addition, evaluation studies have identified teaching styles, pedagogical methods, accessibility, and learner characteristics as some of the important issues to consider in distance education courses. While the success of distance education compared to more traditional classroom education has been well established (Abels, 2005; Dalton, 2001; Kleinpeter & Potts, 2003; Knowles, 2001; Rivera & Rice, 2002; Seabury, 2003; Steckler et al., 2001), little research has been performed to evaluate how to improve distance education courses by making the learning experience more effective for students (Macy et al., 2001). More research appears needed to further investigate student achievement and student satisfaction with respect to medium-specific pedagogical strategies and assignments.

METHODOLOGY

Description of the Study

This study was initiated to investigate student achievement and student satisfaction with respect to medium-specific pedagogical strategies and assignments. This will further advance our understanding on how students learn research skills in a totally Web-based instructional environment compared to a classroom-based instructional setting. For this investigation, we defined a Web-based instructional environment as a course that uses solely Internet resources and Web-based instructional strategies to teach course content. A classroom-based environment is defined as a course taught entirely in a face-to-face classroom setting with supporting materials provided both in the classroom and some online via OnCourse, a course management software program.

Goals of the Study

The goal of this study was to compare the efficacy of learning outcomes in these two class formats. The study compared student achievement in these two groups on eleven identical topic specific assignments throughout the semester. It also compared their satisfaction on 13 pedagogical issues for the classes. The students' knowledge on two specific content areas, single subject designs, and program evaluation were measured at the start of the course by completing pretests. This was followed by assessing student learning throughout the semester on the basis of the grades they received on 11 assignments and tests. Identical assignments and tests were used for both groups. In addition, at the end of the class, each student was asked to rate their satisfaction with the 13 specific pedagogical issues (Noted in Table 3) such as quality of lecture and online content, professor's ability to communicate, professor's ability to adapt to different learning styles, professor's ability to use technology, and several other classroom processes.

Study Participants

The participants in this study consisted of students from a large mid-west university enrolled in two sections of an undergraduate social work course in research methods. The number of students enrolled in the traditional course was 24 and the number of students enrolled in the web-based section was 27. Students self selected which class format they wanted to take and also volunteered to participate in the study. Ninety-four percent of the students were females and six percent were males. Approximately 78% were Caucasians and 22% were minorities. Most of the minorities were African American.

Course Description & Format

The course used for this research initiative was an undergraduate social work course on research methods. The same instructor taught both sections of the course during the same fall semester. The research course was the second in a series of classes that all Bachelors in Social Work (BSW) students take to meet their requirement for research.

The focus of the class was on program evaluation and single subject designs. The two sections utilized the same text books and class materials. The following describes the class format used for each of the two class sections of the same course:

Course #1: Traditional Classroom Instruction

This section of the course was offered via a three hours per week, face-to-face, classroom environment that used a lecture/discussion instructional format which included individualized hands-on assignments and collaborative group assignments. Testing was accomplished via multiple choice exams using questions selected by the instructor from the text book publisher's test bank, and administered online. All lecture material was posted online for students to review. Tests were also taken online and online discussion forums were used to prepare for major assignments.

Course #2: Web-based Instruction

This section of the course was offered in a Web-based instructional environment. Students were expected to access the Web-based virtual classroom every week and access online lecture material, participate in weekly discussion groups via an electronic discussion forum and complete group and individual based assignments. The web-based instruction was delivered using Oncourse. Oncourse is a server-based, course management software product that allows students to have access to a number of online communicative resources such as class email, asynchronous discussion forums, and synchronous chat room facilities as well as online course materials. Assignments and exams were delivered through Oncourse and graded using an online grade book. Students completed assignments and turned them in to the instructor via the Oncourse class email system. Lecture notes and PowerPoint presentations were provided via Oncourse. Similar pedagogical methods were used for both the classroom-based instructional environment enhanced with Web-based instruction and the Web-based course. Table 1 describes how pedagogical methods were used and delivered for each course.

Instruments

The instruments utilized to evaluate the learning outcomes of students for each of the courses consisted of multiple choice exams using questions selected by the instructor from the publisher's test bank, grades on six class assignments, grades for classroom participation and discussion forum participation and their satisfaction on 13 classroom process variables.

Data Collection

Data were collected throughout the semester on the various assignments and tests for each class. An end of semester survey administered online gathered the data from the two classes on their ratings of the 13 classroom process variables.

Method of Statistical Analysis

Student performance was evaluated by comparing exam scores and assignment grades for the two class format using the Mann-Whitney U test. Comparisons were also done using the Mann-Whitney U test on the applicable classroom process variables. The goal was to determine if there were significant differences in student performance between classes and with their comfort with the classroom processes. Nonparametric test were used because the class sizes were below 30 and did not meet the requirement of a normal distribution needed for a parametric test (Rosenthal, 2001). Nonparametric test were used since the class sizes were below 30 and it was thought it would be difficult to meet the requirement of a normal distribution needed for a parametric test. Several of the outcome variables were also ordinal level and thus not appropriate for parametric statistics. Effect sizes (Cohen's *d*) were also computed to assist in helping to determine the magnitude of the differences between the groups since sample size was small and thus statistical power low. Effect size allows one to characterize the magnitude of the difference between the two classes rather than a raw difference score or a simple percentage difference. Cohen (1988) suggests that an absolute value effect size of 0.20 to 0.49 can be considered small, effect sizes of .5 to 0.79 to be medium, and an effect size of 0.80 and above to be large. "The effect size hypothetically could run the gamut from -3.70 to +3.70, although the most commonly reported effect sizes are in the 0 to 1.5 range." (Bloom, Fischer, & Orme, 2006, p. 350)

Table 1: Pedagogical Methods Used

Pedagogical Methods	Course #1 – Traditional Classroom Instruction	Course #2 - Web-based Instruction
Online Discussion Forums	None	Weekly
Classroom Discussion Groups	Weekly	None
Online Tests and Quiz	Two online test	Two online test
Use of Email Between Student and Professor	Weekly Use	Daily Use
Online Lecture and Resource Materials And Readings	Same materials Available to both Classes	Same materials Available to both Classes
Feedback on Graded Assignments from Professor	Feedback Provided via Face to Face Communication in the Classroom and notes on assignments	Provided via Discussion Forums, Emails and notes on assignments

Non-grade Experiential Exercise to Apply Learning Content	Done during classroom time	Done via Weekly Discussion Forums
Lecture Content	Provided in classroom	Text based Information provided via website
Use of Visual Presentation, i.e. PowerPoint, etc	Presented in Classroom	Available on website for viewing and downloading
Graded Assignments	Six Graded Assignments Completed Outside the Classroom	Six Graded Assignments Completed offline
Method of Submission of Assignments	Submitted Electronically via the Course Website	Submitted Electronically via the Course Website
Course Orientation	Student and Faculty Introduce self in Classroom and Review Syllabus in Classroom	Orientation Paper downloaded from website and students introduce selves to fellow discussion group members

Due to the multiple statistical comparisons (26) it was also decided to adjust the requirements for statistical significance based on the Bonferroni standard. Thus, the new requirement for statistical significance was changed from .05 to .0021.

Results

Student Performance

Student performance was evaluated by comparing exam scores and assignment grades. The goal was to determine if there were significant differences in student performance between classes. Statistical analysis utilizing the Mann-Whitey U revealed that at the start of the class there was no significant difference in the scores on the pretests on knowledge of program evaluation and single subject design content between the classes at the .0021 alpha level.

Statistical analysis utilizing Mann Whitney U revealed that there was a significant difference between the classes ($p < .0021$ level) for the scores on the post program evaluation exam, post single-subject exam and the group grade for discussion forum participation.

In these areas the students in the classroom-based course scored higher but difference was small enough that it would not have changed the overall class grades from an A to a B. On eight other comparisons of graded assignments there were no statistically significant differences. Table 2 outlines results between the two classes.

The effect sizes for the 11 theses outcome variables ranged from .04 to .99. Negative effect values in Table 1 indicate that the traditional class had higher scores on a variable than the online class. The absolute value of seven effect sizes were lower than

Table 2: Comparison by Learning Activity

Learning Activity	Mann Whit- ney U Test	P	**Mean scores (Standard deviation)		Effect Size
			Web-based	Traditional Class	
Group Grade for Discussion Forum Participa- tion	122.00	0.00 *	93.74 (4.00)	97.58 (3.60)	-.99
Program Evalua- tion Exam	125.00	0.00 *	92.30 (5.37)	97.13 (4.37)	-.97
Single Subject Exam	145.50	0.00 *	58.37 (11.33)	69.58 (13.54)	-.89
Program Evalua- tion Proposal	214.50	0.04	91.07 (5.10)	94.08 (2.83)	-.71
Single Subject Evaluation Ques- tion	269.00	0.21	97.04 (3.95)	98.33 (3.19)	-.35
Pretest Grade Single Subject Design	266.00	0.27	47.26 (13.32)	51.00 (13.04)	-.28
Measurement Plan for Single Subject Design	286.00	0.47	94.07 (4.16)	95.17 (4.13)	-.26
Single Subject Evaluation Project	314.00	0.85	89.67 (6.70)	90.71 (3.88)	-.18
Pretest for Pro- gram Evaluation	306.50	0.74	59.07 (13.66)	61.04 (16.10)	-.13
Intervention Plan for Single Subject Design	321.00	0.95	94.00 (3.10)	93.92 (3.37)	.02
Grade for Atten- dance and Dis- cussion Forum	310.50	0.80	94.14 (4.83)	93.94 (6.56)	.04

* Note: Statistical Significance level was set at the .0021 level. It was adjusted from .05 to .0021 based on Bonferroni method for the study due to the multiple comparisons.

** Mean scores could range from 0-100%

0.50 and thus would be considered small based on the Cohen (1988) standard. One variable had a medium effect size, grade on program evaluation proposal ($ES = -.71$) and three had a large effect size differences using the Cohen criteria. The three variables with large differences included; single subject exam scores ($ES = -.89$), program evaluation exam grade ($ES = -.97$), and the grade for group discussions ($ES = -.99$). The traditional class scored higher than the online class for these three variables. These are also the variables found to statistically difference between the two class formats.

Table 3 presents results of student's rating of satisfaction with various pedagogical components of the classes. Statistical analysis of student's rating of satisfaction between the two classes utilizing the Mann-Whitney U statistic revealed a significant difference at the .0021 alpha level for three of thirteen areas; professors ability to create a feeling of community, professor's use of course management software for course materials, and professor's organization and preparedness for the class. A lower mean score indicates a higher level of student satisfaction. The scores could range from one, which indicated "excellent level of satisfaction", two above average, three average, four below average and five unacceptable level of satisfaction. In each of three statistically significant areas, student satisfaction was higher for the classroom-based course than the online class. But, based on the mean class scores one can see that students still rated their satisfaction in these three areas as above average.

A review of the effect sizes from Table 3 indicates that for six of the 13 comparisons there were small differences using the Cohen standard, two had medium differences, and five had large differences. All medium and large effect size differences indicated that the traditional class students reported greater satisfaction for the respective variables than the totally online class members

Table 3: Comparison of Student Satisfaction

Question	Mann Whit- ney U Test	P	Mean scores (Standard deviation)		Effect Size
			Online	Tradi- tional Class	
Professor's ability to create a feeling of community	130.50	.001*	2.130 (.76)	1.375 (.65)	1.06
Professor's organiza- tion and preparedness	166.50	.001*	1.583 (.72)	1.041 (.20)	1.01

Professor's communication ability	170.50	.004	1.583 (.72)	1.087 (.29)	.90
Professor's use of Oncourse for course materials	179.00	.002*	1.541 (.78)	1.041 (.20)	.88
Rate small group discussion or discussion forums	140.50	.005	2.875 (1.15)	1.952 (1.02)	.83
Rate lecture/online material	204.00	0.052	2.083 (.78)	1.666 (.57)	.61
Fairness of course policies, grades, and procedures	201.50	0.039	1.666 (.70)	1.291 (.56)	.59
Professor's ability to adapt to different learning styles	206.00	0.23	1.739 (.81)	1.454 (.60)	.40
Relevance of written assignments	233.00	0.22	1.833 (.82)	1.541 (.66)	.38
Professor's use of technology for course objectives	243.00	0.27	1.583 (.77)	1.333 (.57)	.36
Professor's availability for consultation	217.00	0.32	1.478 (.67)	1.272 (.46)	.36
Professor's timely return of assignments	262.00	0.686	1.250 (.54)	1.304 (.56)	.29
Relevance of tests	251.50	0.76	2.652	2.695	-.04

* Note: Statistical Significance level was set at the .0021 level. It was adjusted from .05 to .0021 based on Bonferroni method for the study due to the multiple comparisons.

Discussion

The result of this study indicates that there were no statistically significant differences between the two class formats for eight out of eleven outcome student performance activities and ten out of thirteen pedagogical strategies. There were large effect size differences based on class format on four of the student performance activities and for student satisfaction with six of the pedagogical methods. When statistically significant differences were found, it was determined that student performance on learning activities was higher for the students in the traditional class. Students also reported greater satisfaction with pedagogical methods. These findings do not support the findings of previous literature stating that online learning is as effective as traditional learning. The researchers believe that this statistical difference in student performance occurred for several reasons. First, while the online class had access only to Oncourse for lecture materials, assignments, exams, and communication tools, the traditional classroom-based section had access to the same Oncourse materials and communication tools in addition to the face-to-face communication with peers and instructor. In this situation, the traditional class was at a communicative advantage. They were able to communicate with the professor and peers during class time, in addition to class email and online discussion groups for answering questions and sharing information. This result does support the findings of several studies concerning the effectiveness of online teaching (Knowles, 2001; McShane, 2004; Potts, 2005; Rivera & Rice, 2002).

Limitations

Limitations of this study include the lack of random assignment to the two different class formats and the small sample size. Student variables such as access to technology, knowledge of web technology, and motivation may have affected student selection of class type and it is unclear if they affected student performance as well as selection. The small sample size and the lack of variability in demographic, primarily Caucasian females sample, makes it difficult to generalize the findings to other student groups.

A further limitation that may have negatively impacted the performance of students in the online section is that this was the first time this class had been taught online. Other difficulties that may have impacted the online section include the design of the Web-based instructional environment for presenting course materials and the lack of consistent instructional support provided to students.

IMPLICATIONS FOR FUTURE RESEARCH

Research comparing courses exclusively taught in traditional face-to-face methods versus courses taught entirely online has shown that students in both types of classes report similar levels of satisfaction and perform similarly. Future research should take into account variables such as the technology being used, specific learner characteristics, faculty concerns and characteristics, pedagogical strategies, content areas of courses, and administrative and broader community issues. In order to accurately assess student performance and achievement in an online and/or a classroom-based

research class, further studies should be done to examine specific pedagogical strategies used for teaching research skills. For example, one section of the course would be taught strictly in the classroom using entirely traditional teaching methods with students having no access to online materials as addendums to lecture materials. The second section of the research class would be taught completely in a Web-based instructional environment using only pedagogical strategies conducive to an online context. A third section would examine how combining both classroom-based instruction with online pedagogical strategies would impact learning outcomes with respect to specific research skills. The classes should have the same instructor, course content, course materials, assignments, and be allotted the same time frame for the completion of assignments. Comparing three sections of the course would allow for more accurate evaluation of student performance as well as the extent to which pedagogical strategies impact learning outcomes.

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