

## Face-to-face or Cyberspace: Analysis of Course Delivery in a Graduate Educational Research Course

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### Abstract

Student attitudes and outcomes in a graduate educational research course in both direct instruction and online delivery methods were compared over four semesters. A *t*-test for independent samples determined that there were no significant differences in 11 out of 13 questionnaire response means for items measuring student attitudes, and an analysis of student outcomes yielded a significant difference in just one out of six assessments. Also, online delivery group means were higher for items measuring instructor's overall teaching effectiveness, overall quality of the course, organization of the course, and understanding of concepts and principles in the field. It may then be concluded that online courses in graduate research can be developed for instruction, conducted similarly, and yield similar results as direct instruction.

**Keywords:** distance learning/education, online learning/education, graduate research, asynchronous learning/education

### Introduction

Distance learning in higher education is not a new phenomenon. It has been studied from many different perspectives, such as instructor or student willingness to participate in distance education, evaluation of platforms for distance education delivery, virtual interaction of teacher and student, and student retention in web-based learning.

Many instructor hours are devoted to creating an "online presence" in distance education, a psychological perception for students that the instructor is omnipresent and responding to them in an online class. Without this psychological perception, students quickly become insecure and tend to drop the class (Smith, Ferguson, & Caris, 2001). Since most web-based courses rely primarily on asynchronous communication in delivering course information to students, instructors and students do not interact simultaneously. Instead, messages are posted on a forum, web page, or are sent as e-mail, and a reply is provided at some unspecified later time. Any follow-up questions are dealt with through additional postings or messages with requisite delays. Overall, this process limits the amount and depth of interactions regarding course materials and procedures (Wang & Newlin, 2001).

The purpose of this study was to compare a graduate-level educational research course taught by direct instruction (traditional in-person lecture) and online instruction (distance learning via the Internet) to determine whether or not there was a significant difference in student outcomes and opinions for the two methods. Comparable results in direct instruction and online instruction would ensure the continued viability of offering educational research (and other similar courses) by means of online instruction at the institution utilized in this study, DeSales University (and other similar institutions).

### **Instructors and Online Instruction**

From an instructor's point of view, an online course requires more precise planning and more time to prepare instructional materials than direct instruction (Servonsky, Daniels, & Davis, 2005), and online instructors must log on to the course web site at least three or four times a week for a number of hours each session, respond to threaded discussion questions, evaluate assignments, answer questions clearing up ambiguities, and often spend an inordinate amount of time communicating by e-mail (Smith et al., 2001). Interactions with the online instructors using e-mail or virtual chat demand greater efficiency than open oral discussion and are perhaps the greatest limitation of the online delivery method (Gallagher, Dobrosielski-Vergona, Wingard, & Williams, 2005). Lee and Busch (2005) reported in their study on distance education at The University of North Carolina at Charlotte that instructors were more comfortable and able in direct instruction than online instruction to (a) interact with students, (b) have students interact and participate in class discussions, and (c) accommodate different learning styles. Instructors' willingness to participate in distance education was a function of their perception of the adequacy of training for distance education and recognition received, and not related to effort and time needed to develop course materials for distance education.

### **Student Opinions of Online Learning**

In a study by Ryan (2000) that compared student survey responses at a University of Oklahoma course on lecture and online construction equipment and methods classes produced no evidence of quality perception differences between direct instruction and online instruction classes. A survey of students in both course formats enrolled in a gerontology course in the University of Pittsburgh Dental Hygiene program agreed that either method of instruction chosen by students was effective and beneficial (Gallagher et al., 2005). In a study of Asian open universities by Zhanga and Perris (2004), students had positive perceptions of the flexibility of the Internet in their courses along with the abilities of sharing resources with others, sharing ideas and answers with others, and the ability to have an equal opportunity to contribute, due to the democratic nature of the medium.

In terms of the class as a learning experience, and for ratings of the course and instructor overall, Gagne and Shepherd (2001) found there were no differences between direct and online instruction in an introductory graduate accounting class. However, there was a significant difference in responding to instructor availability. The research of Johnson, Aragon, Shaik, and Palma-Rivas (1999) of a graduate-level instructional design course for human resource professionals at The University of Illinois at Urbana-Champaign found that students enrolled in the traditional face-to-face course had a significantly better experience in terms of communication with other students in the class, sharing learning experiences with other students, perceptions of a sense of community, and being able to work in teams. Ryan (2000) also found in his aforementioned study that interaction was the greatest weakness of the class, and suggested that mandatory times for interaction be included in the class format. The availability of the class on the web at all times was the greatest strength of the class.

The opportunities to work independently at one's own pace and to communicate "anonymously" are two of the primary advantages of working online. In the aforementioned Zhanga and Perris (2004) study, students perceived the greatest disadvantages of online learning to be in relation to their greater comfort with more traditional mediums and their inexperience using computers. Johnson et al. (1999) noted that differences between groups for instructor support stemmed from the characteristics of instructor feedback, perception of interaction between the instructor and the students (as assessed using items covering teaching style), students being informed about their progress in the course, and student and instructor interactions during the course.

### **Student Performance in Online Courses**

There have been several studies that revealed no differences between direct instruction and online delivery methods. The performance of students in an online course was similar to the performance of students in the Gagne and Shepherd (2001) study of an introductory accounting graduate class; there was no difference in class project ratings in the Johnson et al. (1999) study involving a graduate-level

instructional design course; final grades for online and lecture participants were not significantly different for either course offering in the Ryan (2000) study on construction equipment and methods classes; and Fredda (2000) had higher internet grades in one graduate business course, and no significant difference in grades in two other business courses, at Nova Southeastern University.

Regarding student characteristics, students selecting a web-based course format demonstrated greater motivation and learning success based on final course grades, completion of assignments, and knowledge retention over time, and trouble spots included the correlation between student age and previous experience with online courses (Gallagher et al., 2005).

## Methodology

Quantitative methods were implemented in the research design. The instrument utilized in the descriptive research component of the study was the Instructor and Course Evaluation System (ICES), developed by the Center for Teaching Excellence at the University of Illinois at Urbana-Champaign to measure instructional performance (Buros Institute of Mental Measurements, n.d.) through Likert scale type responses. Students responded to 20 items on this specific ICES form, 13 of which were deemed appropriate by the author for analysis based upon relevance to this study (Table 1).

According to Christopher Migotsky, Head of Measurement and Evaluation at the University of Illinois at Urbana-Champaign Center for Teaching Excellence, validity of the ICES lies with the interpretation and use of the results based on concurrent and predictive validity with other measures of teaching effectiveness such as peer observations, alumni surveys, and, in this study, the student comments on the open-ended instructor-designed questionnaire. ICES-rated items correlate well with these measures. Reliability of the ICES is dependent on context (particularly the specific item and the number of students) and generally exceeds 0.90 (C. Migotsky, personal communication, June 14, 2006).

Numerical analysis of the methods of student evaluation in the course (three quizzes, an oral presentation, and a written proposal) comprised an experimental research component of the study. Data from an open-ended instructor-made questionnaire provided additional supporting explanations in free-form responses from students in both delivery modes (direct instruction and online). The open-ended questionnaire included the following items: (a) What did you like about this course?, (b) What did you dislike about this course?, (c) What would you specifically change about the course format?, (d) Was the instructor fair and how can you substantiate this?, (e) Compare this course to others you have taken at this college, (f) Compare this instructor to others you have had in college, and (g) Do you feel that the grade you will earn in this course will be an accurate reflection of your work?

*Participants.* Students enrolled in the masters-level educational research course at DeSales University were the participants in the study. DeSales University is a small, private, suburban, Catholic institution located in Pennsylvania's Lehigh Valley. Most students enrolled in the master of education program are employed full-time as elementary, middle school, or high school teachers. The educational research course is required of all master of education students, which means that students were enrolled in any of the programs offered at the university: Academic Standards and Reform, Biology, Chemistry, English, Mathematics, Special Education, Teaching English to Speakers of Other Languages (TESOL), or Technology in Education. Students were also matriculating at various points in their programs of study, ranging from the initial course (zero graduate credits earned) to the next-to-last course (27 or more graduate credits earned). It should be noted that some students may not have chosen to complete the educational research course based upon delivery method, but instead chose it in the particular semester offered in order to complete their program requirements in a timely fashion. The gender breakdown of participants in both course delivery options was 8 males and 24 females (32 total) in the direct instruction course, and 10 males and 19 females (29 total) in the online course.

*Course details and delivery comparisons.* Students completed the course in either direct instruction or online format. The course was offered in the fall 2004 and 2005 semesters via direct instruction, and online in the spring 2005 and winter 2006 semesters. The courses were conducted as similarly to each other as possible considering the differences in delivery methods. Assessments for both delivery methods

included three 10-question multiple-choice quizzes (completed online by students enrolled in both course formats); a 10-minute oral presentation (completed in-person on campus on the final day of the semester by students enrolled in both course formats); and a written research proposal.

Students in the direct instruction course were able to view and participate in the instructor's lectures in real-time, while students in the online course viewed the same lecture on video recorded from the previous semester, either via Internet streaming video or on a CD-ROM, and participated by sending the instructor e-mail messages with the replies sent via e-mail to all students in the class. Both groups of students participated in blind reviews of their classmates' written research proposals, and both groups of students formally evaluated their classmates' oral presentations using a standard rubric. Students in the direct instruction course were able to interact with each other freely, but students in the online course were facilitated more similarly to a one-on-one independent study course with the instructor. No discussion board postings or virtual classroom environments were utilized. Formal instructor office hours were available to both groups of students, but online students were encouraged to first e-mail the instructor to keep the online course true to its intended format.

## Results

A *t*-test for independent samples was used to determine whether or not there was a statistically significant difference (at an alpha level of .05) in the response means of the direct instruction students and the online students for 13 selected items on the ICES questionnaire. It should be noted in some instances the data below indicates different degrees of freedom because students failed to respond to one or more items on the ICES form.

Table 1 shows a comparison of ICES student responses by course delivery method. The online group ( $M = 4.35$ ) gave a lower rating than the direct instruction group ( $M = 4.72$ ) for the item titled, "The instructor evaluated my work in a meaningful and conscientious manner". It was shown to be statistically significant,  $t(59) = 2.08$ ,  $p = .042$ . The online group ( $M = 3.38$ ) also gave a lower rating than the direct instruction group ( $M = 4.38$ ) for the item titled, "There was enough student participation for this type of course". It was shown to be statistically significant,  $t(51) = 3.10$ ,  $p = .003$ . The remaining 11 out of 13 selected items did not show statistically significant differences between groups. Four items, though not shown to be statistically significant, were rated higher by the online group than the direct instruction group, and one item was rated identically by both groups.

Table 2 shows a statistical analysis of assessments/outcomes by course delivery method. The online group ( $M = 75.3$ ) scored lower on quiz 2 than the direct instruction group ( $M = 85.9$ ). It was shown to be statistically significant,  $t(60) = 2.72$ ,  $p = .009$ . Differences in group means were not shown to be statistically significant for quiz 1, quiz 3, oral presentation, written research proposal, and final average.

An analysis of the online delivery group responses on the instructor-designed open-ended survey form indicated positive responses, specifically: (a) students liked that the course was well organized and well prepared at the onset, (b) liked the inclusion of grading rubrics, (c) felt that the step-by-step breakdown of assignments made the course easier, (d) noted that it was beneficial to be able to "go at my own pace and look over (video) lectures if needed", (e) recognized the benefit to create their own schedule or that the online course fit their personal schedule, (f) felt that the instructor was helpful and strict but fair, and (g) felt that the instructor provided good, prompt, and ample feedback on the assignments. Some of the negative responses included complaints about timed quizzes, having trouble with self-motivation, difficulty understanding some items/topics without having the in-person interaction, and difficulty because of a lack of sufficient computer expertise. A common suggestion was to have an in-person meeting with the instructor midway through the online course.

## Discussion

The fact that there were no group differences in 11 of the 13 items on the ICES questionnaire may be interpreted that online courses can be developed for instruction, conducted similarly, and yield similar (or nearly identical) student outcomes in both direct instruction and online formats for a graduate educational

research course (and other similar courses). The fact that the analysis of student outcomes comparison yielded a significant difference for just one item (quiz 2) also supports this statement. A graduate level research course seems to work well in an online environment when it is set up and conducted properly. Also of note was the fact that both groups gave identical ratings in evaluating the amount of work required for the course. These findings further support the viability of offering graduate educational research and other similar courses to students in an online environment.

Table 1. Comparison of Instructor and Course Evaluation System (ICES) Student Responses by Course Delivery Method

	<u>Direct Instruction<sup>a</sup></u>		<u>Online<sup>b</sup></u>		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Rate the instructor's overall teaching effectiveness	4.34	0.827	4.39	1.137	0.832
Rate the overall quality of this course	4.25	0.842	4.26	1.021	0.966
The course was organized	4.50	0.749	4.69	0.888	0.253
This course improved your understanding of concepts and principles in this field	4.22	0.870	4.28	1.017	0.796
Your ability to solve real problems in this field improved	4.09	0.928	3.93	1.105	0.512
The amount of work required for this course was appropriate	4.00	1.078	4.00	1.129	1.000
The methods of evaluation reflected content and emphasis of the course	4.19	0.859	4.00	1.044	0.405
The instructor evaluated my work in a meaningful and conscientious manner	4.72	0.581	4.35	1.046	0.042*
The instructor was knowledgeable about the subject	4.66	0.827	4.61	0.885	0.793
The instructor motivated me to do my best work	4.53	0.621	4.33	1.091	0.316
There was enough student participation for this type of course	4.38	0.976	3.38	1.398	0.003**
The instructor treated me with respect	4.84	0.454	4.68	0.975	0.256
The instructional materials used in this course were excellent	4.26	0.631	4.11	1.089	0.461

*Note.* Group means determined using a 5-point Likert scale from Low (1) to High (5).

<sup>a</sup>n = 32. <sup>b</sup>n = 29 \**p* < 0.05; \*\**p* < 0.01.

Table 2. Statistical Analysis of Assessments/Outcomes by Course Delivery Method

	Direct Instruction <sup>a</sup>		Online <sup>b</sup>		<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Quiz #1	81.6	15.05	84.2	14.51	0.491
Quiz #2	85.9	13.16	75.3	17.37	0.009**
Quiz #3	85.3	14.59	83.8	12.22	0.668
Oral Presentation	95.3	3.40	96.0	2.67	0.411
Written Research Proposal	88.2	8.97	91.5	4.74	0.080
Final Average	90.0	5.24	89.9	4.84	0.953

<sup>a</sup>*n* = 32. <sup>b</sup>*n* = 29 \*\**p* < 0.01

### Implications

The implications are apparent for DeSales University (and similar universities) in particular and for higher education in general. According to *Distance Education at Degree-Granting Postsecondary Institutions: 2000–2001* (Waits & Lewis, 2003), college-level, credit-granting distance education courses at either the undergraduate or graduate/first-professional level were offered by 55% of all 2-year and 4-year institutions, and college-level, credit-granting distance education courses were offered at the graduate/first-professional level by 52% of institutions that had graduate/first-professional programs.

### Limitations and Generalizability

The limitations were that only students enrolled at DeSales University were included in the sample. Consumers of this research may or may not be able to generalize its findings to persons, settings, and times different from those involved in the research. Generalizations from this study for populations that are demographically different from the participants involved are done so at the risk of the consumer of the research.

### Conclusion

As graduate students in higher education become more technologically savvy and demand even more convenience in their post baccalaureate course work, online courses will only continue to follow suit and become more the rule rather than the exception. Continuing to seek and demand instructional quality that mirrors the traditional classroom environment is then of similarly increasing importance for universities when offering more courses (and entire degree programs) online. This study supports the continuance of online course delivery in graduate education.

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