

Successful Course Transition from Traditional Delivery Methods to the Online Format

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Abstract

Instructors and course development experts are trying to define methodologies that will facilitate the effective transfer of learning from the traditional classroom to the online environment. Many agree that the most difficult item to emulate in the online environment is effective interpersonal communication between students and instructors. This study examined two lower level information systems courses at Northwest Missouri State University that are mapped to the IS 2002 model curriculum. The purpose was to determine if there were differences in grades between online and traditional students. The researchers were also interested in determining any differences in student–instructor interaction that might exist in the online delivery method between the two courses. Course grades for a management information systems course were compared by instructor, grade point average, number of credit hours completed, and delivery mode. The only significant difference that surfaced was for delivery mode. Individual assignment grades and course grades for a computer literacy course were also compared with no significant difference found between online students and classroom students. A major component difference between these two courses was the use of multimedia delivery of instruction. The computer literacy course utilized streaming video components and planned student–instructor interaction while the management information systems course made limited use of these tools. These findings led to a redesign of the management information systems course for the Fall 2005 semester with increased use of these methodologies in hopes of increasing online student performance.

Keywords: online learning, distance learning, course delivery methodology

1. INTRODUCTION

A Sloan Consortium study stated that the number of online students in post secondary education will rise to over 2.6 million in fall of 2004 with an expected 20% growth rate in the future (2005). Reflecting this trend, there are web sites devoted to providing information to potential students regarding online degree programs at the associate, bachelor, and graduate level (ClassesUSA, 2005: dx: the distanceXchange, 2005). Further documenting the popularity and demand for online education, top management at Eduventure (an online education research firm) reported in July 2005 that "77% of prospective college students in the United

States would consider enrolling in an online distance education program (Distance Education Report, 2005 p. 3)."

Educators have often questioned whether student performance levels in the online environment are comparatively equal to the traditional classroom environment. Some practitioners have suggested that online instruction is inferior because it lacks the interpersonal environment created when students and teachers communicate face-to-face (Jackson, 2005). To appropriately evaluate and compare the effectiveness of various instructional delivery methods, data measuring student performance must be collected, compiled, and evaluated. This in-

formation can then be used to improve instructional methods, as well as ensure similar student performance outcomes regardless of delivery method. Jackson suggested that student learning was improved to a comparative level across mediums when interpersonal communication was improved in the online environment by the inclusion of opportunities for students to communicate with the instructor on a regular basis.

Gaide (2005) supported Jackson's advocacy of interpersonal communication between the instructor and the student as a key to effective learner performance in online courses. This author advocated that students must hear from an instructor personally and be convinced that an instructor cares about his or her performance in order to gain the confidence needed to pose questions and check for understanding at important junctures in the learning process.

Another study established the theory that perceived friendliness and approachability of the instructor was a key to student persistence, participation, and satisfaction. The authors concluded that social presence did not, however, impact student performance levels beyond the enhancement of encouraging students to complete a course (Wise et al, 2004).

Survey results reported by several researchers indicate that online courses offer flexibility with no loss of performance. Cooper (2001) reported that given the proper subject coupled with the right student and a capable teacher, online instruction can provide effective educational results. "A 2003 Sloan Survey of Online Learning polled academic leaders ... [and] asked [them] to compare the online learning outcomes with those of face-to-face instruction; a majority said they are equal (Roach, 2003 p1)."

Limited resources have been employed to examine the equality of student performance in online education when compared to traditional classroom instruction. Primarily, studies have fallen into the two general categories of pretest-posttest models and opinion surveys. Most of the studies have contained relatively small sample sizes, have been performed over short time periods, and measured a single teacher's experience with the two delivery methods of traditional and online (Ury, 2005).

As online programs have grown, longer range studies have begun to appear. Many of these studies have utilized quantitative research methods that measured actual student performance. The findings of these studies were mixed. A five-semester study of students in a required undergraduate business statistics course at Indiana State University documented no significant difference in performance between online and classroom students (McLaren, 2004). University of Wisconsin - La Crosse researchers found no significant difference in performance between online and classroom students completing an educational and media technology course required for preservice teacher education students (Ali & Elfessi, 2004). Steinweg, Davis, and Thomson (2005) conducted a comparative research study in which they found "no statistically significant difference in knowledge and attitude measures or in the skills project scores between online and traditional groups" (2005) in an Introduction to Special Education Course. A study of two master's programs at the University of Paisley in Scotland found that online students significantly outscored classroom students (Stansfield et al, 2004). At Michigan State University, researchers compared student performance in classroom and online courses for a Principles of Microeconomics course and found that online students performed significantly worse on the most complex material (Brown & Liedholm, 2002).

2. PURPOSE OF THE STUDY

The wide range of research results reported above suggest that techniques for transferring classroom learning to the online environment may be specific to particular disciplines or even individual courses. Characteristics and demographics of the students enrolled in online courses should be examined. Are these factors similar to the classroom student population or are they substantially different? If differences exist, do they contribute to performance measures?

The purpose of this study was to perform an in depth study of two lower level information systems courses (AIS, 2001) at Northwest Missouri State University to 1) identify possible differences in performance between online and classroom students, and 2) identify possible differences in student-instructor interaction.

3. METHODOLOGY AND FINDINGS

Over the past six years, the authors have developed numerous online applications at Northwest Missouri State University. These projects have included the development of learning modules, assessment instruments, and complete course delivery models. The authors have conducted both long-term and short-term research comparing student performance in online and on-ground learning environments. They measured student success in both delivery modes, using a variety of instruments and sample sizes. In some cases individual project grades were evaluated and in others complete course grades were compared. A confidence level of 99% (alpha .01) was used to determine significant differences.

Course Grades

The Management Information Systems (MIS) (IS 2002.1, IS2002.2, IS2002.3, IS2002.4) course is a high volume (multi-section) course taught and developed by three instructors in the Computer Science/Information Systems department. The curriculum was developed collaboratively by instructors involved with the course. Learning objectives and assessment instruments were similar and, in some cases, identical regardless of delivery mode (classroom and online). Exams for traditional students were given in a monitored environment. Exams for online students were sometimes given in monitored environments and, at other times, online students were given open book exams with a specified time limit.

Data was accumulated over a six year period comparing course performance of online students to that of traditional classroom students. Final course grades for 581 traditional classroom students were compared to 137 online students. The statistical software package SPSS(11.5) was used to compare final course grades by overall GPA, total credit hours completed, instructor, and delivery method.

Table 1 illustrates the results of comparing students' overall grade point average (GPA) for students enrolled in traditional classroom courses to those enrolled in online delivery of the same course materials. No significant difference was found in the GPA of traditional students and online students ($t = -0.352, p > .05$).

Table 1: Grade Point Average (GPA) for Classroom and Online MIS Students

Delivery Mode	N	Avg. GPA	t	p
Class	581	2.90	-0.352	0.297
Online	137	2.93		

Table 2 shows the result of comparing total number of credit hours completed by traditional classroom students to the number of hours completed by online students. No significant difference was found in the average number of credit hours completed by traditional students and hours completed by online students ($t = -1.812, p > .05$).

Table 2: Total Credit Hours Completed for Classroom and Online MIS Students

Delivery Mode	N	Avg. Hours	t	p
Class	581	88	-1.812	0.281
Online	137	92		

A one-way ANOVA (analysis of variance) was performed to determine possible differences between three MIS instructors who delivered instruction to traditional and online students. No significant differences were found in the final course grades when compared by instructor ($t = 1.636, p > .05$). In fact, average course grade ranges between instructors were very tight with a high average course grade of 84% and a low of 83%.

Table 3: Final Course MIS Grades Compared by Course Instructor

Instructor	N	Mean	F	sig
1	327	84%	1.636	0.195
2	225	83%		
3	166	83%		
Total	718	83%		

Table 4 shows the results of comparing the average final course grade of traditional classroom students to the average course grade of online students. The final course grade average of 84% for traditional students was significantly higher than the 81% of online students ($t = -1.812, p > .05$).

Table 4: A Comparison of Classroom and Online MIS Final Course Grades

Delivery Mode	N	Avg. Grade	t	sig
Class	581	84%	-1.812	0.074
Online	137	81%		

Class	581	84%	3.258	0.001
Online	137	81%		

Assignment Grades

Librarians tracked online and on-ground student performance on an information literacy assignment embedded in a computer literacy course (IS2002.P0) for the 2004 Spring and Fall semesters. This assignment required students to work in small teams and use the advanced interface of an Internet search engine to develop search strategies that retrieved reliable information on an assigned topic. Students communicated with a librarian by posting their search strategy to threaded discussion in Spring 2004 and via e-mail in Fall 2004. After obtaining librarian approval of their search strategy, students selected a reliable web site that satisfied three criteria: authority, accuracy, and purpose. Students submitted the web site to a librarian for approval, using the communication methods described above. Each team then completed a written report for grading that documented how their chosen web site satisfied the required criteria. The content of the information literacy assignment was delivered by a number of different librarians, but it was designed collaboratively.

Assignment grades for 536 traditional classroom students were compared to 42 online students. The average score of students from the two delivery modes were compared and analyzed with the help of SPSS(11.5). Table 5 demonstrates that there was no significant difference in student scores between the traditional classroom and online delivery modes ($t = -0.751, p > .01$).

Table 5: Information Literacy Assignment

Delivery Mode	N	Mean	t	p
Class	432	.745	-.751	.895
Online	37	.765		

The information literacy assignment and the computer literacy course included multimedia components made available to both online and traditional classroom students. These components included streaming video and audio presentations related to learning objects, video demonstrations of technical components of the assignment and the course, interaction between students and instructors through threaded discussions and

e-mail, and a CD tutorial on Microsoft Office software. The performance of online and classroom students completing the computer literacy course were compared using average course grades. It was found that online students and classroom students' average course grades were virtually equal (78%).

The comparisons made with the computer literacy course led the authors to investigate the MIS course in more depth. The only significant difference found between online and traditional students completing the MIS course was the overall course grade. The MIS course contained four assignments that also included multimedia components. Four technical assignments were compared for 162 traditional classroom MIS students and 65 online MIS students. This data represented the same two semesters in 2004 as the information literacy assignment. These assignments consisted of a database tutorial followed by a lab exam, a database project, a spreadsheet tutorial followed by a lab exam, and a spreadsheet project. For these assignments all students in all sections were supported by online, asynchronous multimedia presentations developed by the same MIS instructor.

Table 6 illustrates the findings from an ANOVA of delivery mode compared to assignment grade. There were no significant differences in average scores between online and classroom students on three of these assignments: The database exam, the database project, and the spreadsheet exam. There was a significant difference between online student average score on the spreadsheet project (81%) and traditional student average score (89%).

Table 6: MIS Assignments Compared by Grade and Delivery Mode

Event	Mode	N	Mean	F	p
DB Lab	Class	162	.90	0.494	.483
	Online	65	.89		
DB Proj	Class	162	.95	2.830	.094
	Online	65	.92		
SS Lab	Class	162	.89	0.187	.666
	Online	65	.87		
SS Proj	Class	162	.89	6.592	.011
	Online	65	.81		

4. CONCLUSIONS

The online delivery method was found to be effective with an average course grade of 81%. There were no significant differences in course grades when compared by GPA, credit hours completed, or course instructor. However, the online student average grade was significantly lower than traditional classroom students (84%) completing the same course. These facts illustrate that students' abilities to learn and instructors' abilities to teach were consistent. Of the variables represented in this study, it appears that only the mode of delivery caused a significant difference in the final MIS course grades.

The authors analyzed the delivery methods for the library assignment, finding that the librarians had effectively transferred traditional classroom learning methods to the online environment by using software that allowed them to record and deliver instruction in an online asynchronous environment. In addition, online students were required to communicate with the librarians in order to complete the assignment. The computer literacy course, which had no difference in grades between online and traditional students, also contained audio and video components intended to replace classroom attendance.

Recorded lectures were not included for the MIS course content, but component or module lectures were included as a part of the database and spreadsheet assignments within the course. In examining the data from these four assignments, no significant differences were found in average score on three of the assignments. The assignment that illustrated a significantly higher average score for classroom students over online students was a complicated decision support

system spreadsheet application. The classroom students spent a lot of time in the instructors' offices on this assignment and during class labs it was observed that students assisted each other in developing assignment requirements.

For both venues of instruction, interaction between individual students was required in the form of threaded discussion topics posted by the instructors; however, no regular communication with or from the instructors was required in any portion of the MIS course.

Student performance on the library assignment contained in a computer literacy course exhibited equally successful results in both online and on-ground delivery modes. Final course grades for the computer literacy course were virtually equal. Student performance as measured by final course grade in the MIS course delivered in the same two venues illustrated successful but significantly different average scores.

The implications are that online courses of study should not simply be translated from verbal to nonverbal modes of communication, but instead should attempt to establish modes of instruction that replace the audio/visual learning methods available in the traditional classroom. Online students who saw and heard information, as well as communicated with instructors as they completed their assignments, performed at the same level as students in traditional classrooms.

Based on this study, the MIS course is currently being redesigned to include a larger variety of media experiences and more multimedia information modules. Some lectures are being presented via streaming video technologies to help the students in developing a social experience with the instructor. Granted this experience is one way at this time, but the instructor's personality comes to the surface in this style of presentation. Difficult and intricate technical projects may remain a challenge in the online environment for students who need one-on-one assistance to work through technical problems.

The findings of this study illustrate that traditional classroom courses can evolve into successful online offerings. The data analysis also supports the fact that collaboratively developed curriculum can be delivered by

multiple instructors using both online and traditional classroom delivery modes with no adverse affect on student performance. Finally, it appears that attempting to replace traditional classroom verbal interactions with non-verbal means of instruction and communication may have an adverse effect on student performance. Instructors should continue to improve online learning methods and uses of technology to provide equal performance to classroom students. Continued collection and analysis of data is one way to guide the improvement of instruction regardless of delivery mode.

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