Comparing the Success of Students Enrolled in Distance Education Courses vs. Face–to–Face Classrooms

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Introduction

As we enter the 21st century and embark further into the information age, many institutions and schools are turning to technology to enhance their programs and to expand their horizons. Geography is no longer a barrier for preventing people from accessing information and education (Dixon, 1996). Rapid developments in telecommunication technologies, tightening budgets, and changes in student demographics have stimulated an increasing interest in distance education in all educational settings (Honeyman & Miller, 1993). Through the use of videoconferencing, computers, modems, and the Internet, schools are able to deliver courses and degree programs to students in distance locations without requiring them to set foot in a traditional classroom. Virtual environments, instant access to information, and talking machines make the Jetsons' world seem more like a nearby reality rather than fiction.

Distance education is an emerging technology intended to deliver both resident and remote site instruction. Educators who use distance education must provide educational experiences to off-site students that will equal resident education in terms of quality and quantity. Both resident and distance education are intended to provide students with valid, useful information that promotes learning. Resident or host-site education occurs when the instructor and students meet at a predetermined location, thus providing easy face-to-face interaction. The instructor can be in different buildings, cities, counties, states, or even countries. According to Swan and Brehmer (1994), distance education refers to "the simultaneous delivery of instruction from a host site or classroom to remote site(s), coupled with real time live audio and real time live video interaction between teacher and student(s)-not correspondence, video, or internet courses" (p. 18) Distance education, according to the U.S. Department of Agriculture, is a process to create and provide access to learning when the source of information and the learners are separated by time and distance, or both. In other words, it is the process of designing educational experiences that best suit the learner who may not be in a classroom with an instructor at a specific time. Murphy (1997) defined distance education as a premeditated and persistent attempt to promote learning in an environment that includes geographic, temporal, or pedagogical distance.

Swan (1995) noted that advancements in communications technology have dissolved some of the major distinguishable characteristics between distance education and traditional education. According to Swan and Jackman (1996), strategies of teaching at a distance and host site are converging because traditional teaching strategies are being abandoned or modified in favor of a problem-based, resource-based, or activity-based approach that de-emphasizes the teacher as the main source of knowledge. In 1990, Moore and Thompson analyzed resident and distance education and developed a framework for determining the relationship between the two methods of instructional delivery. They noted that developing technology will eventually merge distance education with the traditional approach so that distinctions cannot be made between the two methods. However, Kelly (1990) indicated that the transition from resident instruction in the traditional classroom to distance education requires educators to develop new skills in instructional strategies, methods of teaching, timing, teacher/student interaction, feedback, printed supplemental materials, and evaluation.

Souder (1993) compared distance learners and

traditional host-site learners. The distance education learners performed better than the host-site learners in several areas or fields of study, including exams and homework assignments. This finding was attributed to the extraordinary commitment, higher maturity level, and motivation of the distance learner. However, this finding is contrary to other evidence that distance learners are at a disadvantage in their learning experience, especially in the evaluation of their cognitive performance (Moore & Thompson, 1990).

Although there is a controversy over the usefulness of traditional indicators such as grade point averages (GPAs) and standardized test scores in determining an individual's rank in a competitive admissions process, the historical evidence indicates that such information is valuable and predictive if used in a balanced and equitable manner (Lewis, Alexandria, & Farris, 1998). There have been challenges to admissions committees to place less emphasis on traditional admissions variables such as GPAs and standardized test scores and more emphasis on subjective evaluations.

The increasing availability of telecommunications has provided vocational or applied education faculty with unique opportunities to plan and deliver distance education courses and programs. Vocational education students are also enrolling in more distance courses and programs due to availability, time, and place. However, there is a lack of studies that compare student achievement by students receiving instruction via distance technology versus students receiving the same instruction through the traditional resident, host-site, classroom setting.

Purpose/Objectives

The purpose of the study was to ascertain if students' achievement differences existed in courses delivered via distance education. Specific research objectives were as follows:

1. Describe students' enrolled, in distance education courses, both remote site and host site, on selected demographic characteristics.

2. Ascertain if differences existed between remote-site and host-site students' achievement based on GPA obtained by grade level.

3. Ascertain if differences existed between remote-site and host-site students' achievement (final grade received) based on individual course success.

Methodology

Definitions

Host site: The school where the instructing teacher is located and where the course originates during the course sessions. The teacher is physically in the classroom with the students.

Remote site: The classroom where the students are physically in the school setting but the instructing teacher is teaching students via an electronic format. The teacher is *not* physically in the classroom with the students.

Populations

The population of remote-site and host-site schools was identified from an alphabetical list of secondary schools utilizing distance education technologies supplied by the State Department of Public Instruction. The schools were all located within one midwestern state. Each of the identified schools' administration was asked to participate in the study. From the total list of schools using distance education, the total population of schools willing to participate were identified (N=46). From this revised list of schools, a study sample was selected using appropriate cluster sampling methods outlined by Wiersma (1995).

As each secondary school was selected, all classes being offered via distance education from that school were selected for this study. Each student in the study (N=623) was enrolled in at least one course being offered via distance education. To retain the confidentiality of the student, administrators or the assigned school representative was asked to assign an identification number to each student. This number was used to report all data concerning that student. The researcher did not know student's name, only her assigned number.

Instrumentation/Data Collection

The study instrument, adapted from the Souder study (1993), was completed from students' records by the administration or assigned school representative. The instrument was assessed for content and face validity by graduate students, teacher educators, and state supervisors in vocational education. This procedure was followed because more than one person in a school was responsible for providing the data

required by the researcher. Reliability of the instrument was .89 (Cronbach's alpha coefficient). They were asked to report gender, grade level of student, period(s) taking distance education courses, name(s) of specific distance education course(s), location of student (remote or host site), total daily assignment scores, exams and/or quiz scores, and final exam score. All grades reported were based on or converted to a 0 to 100 point system. If conversions were made, they were made by the administration or assigned school representative using a scale provided by the researcher. This grading scale was one recommended by the state superintendents and principals association.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS Version 6.1) for Windows. Data were summarized using descriptive statistics. Frequencies, percentages, means, and standard deviations were utilized to analyze and describe findings. One-way analysis of variance was used to analyze differences between the grade levels of students, the location of student, and gender. All tests were run at the .05 alpha level.

Results

Objective 1: Demographic Characteristics

Demographically, students in the study were predominately located at remote sites: 424 at remote sites (68.1%) and 199 at host sites (31.9%). The students in this study included 378 female students (60.7%) and 245 male students (39.3%). The study identified 10 individual courses being offered via distance education. One course was eliminated from the study because no results were made available to the researcher. The total number of students by grade level included:
9^{th} = 56 (9%),
10^{th} = 126 (20.2%),
11^{th} = 161 (25.9%),
and 12^{th} = 280 (44.9%).

As shown in Table 1, the study group is divided into groups identified by specific course name and by location receiving the course. Frequencies and percentages are used to identify students enrolled in distance education courses at all sites in the study. Students in the 12th grade reported taking more distance education courses than did 9^{th} grade students.

Table 1. Individual Course Enrollment Frequencies and Percentages.

Course Name	All Sites		Host Site		Remote Site	
	N	%	N	%	N	%
Foreign language	231	37.1	91	39.4	140	60.6
Ag business mgt.	77	12.4	3	3.9	74	96.1
Vocational marketing	21	3.4	14	66.7	7	33.3
Natural resources	42	6.8	4	9.5	38	90.5
Math-calculus	119	19.1	63	52.9	56	47.1
Chemistry	70	11.2	9	12.9	61	87.1
Art	14	2.2	5	35.7	9	64.3
Statistics	14	2.2	6	42.9	8	57.1
Animal science	35	5.6	4	11.4	31	88.6
Total	623	100	199	31.9	424	68.1

Objective 2: Comparing Overall GPA's

One-way analysis of variance was used to test if differences in student achievement existed between remote-site and host-site students based on mean GPA. No significant differences were found.

Table 2 identifies the mean GPA of students located at remote sites and at host sites. The grade point averages of students enrolled in distance education courses at both the remote and host sites were very similar. This indicates that the students in this study were alike when examining academic achievement using GPAs.

Analysis of variance was used to test for differences in student achievement between grade levels based on mean GPA. Significant differences were found and the analysis of the data yielded an F value of 2.84 (p = 037). The 9^{th} grade students earned a GPA significantly higher than 11^{th} grade students (p = 045), and the 9^{th} grade students earned a significantly higher GPA than did 12^{th}-grade students

Table 2. Grade Point Average According to Location Receiving Course.

Location	N	GPA	SD
Remote site	424	3.19	.76
Host site	199	3.14	.84
Total	623	3.18	.78

(p = .005) as reported in Table 3.

What this means is that when examining GPAs within grade level, students in this study were very similar. When comparing GPAs among grade levels, differences that were not considered to be within a normal range were found. This study was not designed to determine why the differences occurred.

Objective 3: Course Differences

One-way analysis of variance was used to test if differences existed between remote-site students' GPAs and host-site students' GPAs by individual course. There were no significant differences among the two groups (remote site and host site). The analysis yielded an F value of .51 (p = .47) as reported in Table 4. Significant differences existed between the groups by grade level. The analysis yielded an F value of 12.23 (p = <.0001). Analysis of data of student achievement (GPA) by remote site or host site by individual course identified no significant differences. The analysis yielded an F value of .77 (p = .62) as reported in Table 4.

Table 3. Comparison of Students Grade Point Average by Grade Level and by Site.

Grade Level / Site	N	GPA	SD	SE
9th Total	56	3.43	.72	.09
10th Total	126	3.22	.65	.05
11th Total	161	3.18	.71	.05
12th Total	280	3.10	.87	.05

9th to 10th p = .095
9th to 11th p = .045*
9th to 12th p = .005*
10th to 11th p = .712
10th to 12th p = .171
11th to 12th p = .297

When comparing students' GPAs by courses differences are seen in individual courses. In all courses GPAs were identified as being significantly higher than GPAs in vocational marketing. Foreign Languages GPAs were significantly higher then GPAs in vocational marketing. GPAs in natural resources, chemistry, and Art were significantly higher than GPAs in foreign languages. GPAs in natural resources were significantly higher than GPAs in ag business mgt., math, and animal science as reported in Table 6. Significant differences were found when grouping traditional vocational courses (Ag Business Mgt., Vocational Marketing, Natural Resources, and Animal Science) together and comparing to the traditional academics in student achievement as measured by GPA. Students in traditional academic courses had a higher GPA (3.25) than did students in vocational courses (2.99 GPA). The analysis yielded an F value of 13.56 (p = .0003) as reported in Table 6.

Conclusions

1. Students enrolled in distance education courses were primarily located at remote sites. Without this opportunity, most of these students (424) would not have been able to enroll in these courses. Distance education students had the opportunity to enroll in more than one distance education course.
2. As students progressed through high school, they enrolled in more courses being offered via distance education.
3. Receiving instruction by distance education resulted in no differences in GPA for all students at either remote site or host site. Students in 9 th grade did have higher GPAs than did 11th-grade and 12th-students. This may be attributed to the specific courses and complexity of courses taken by these groups of students. Twelfth-grade students located at host sites had a significantly lower GPA than 12th-grade students located at remote sites. This area needs further analysis to determine exact reason for this occurrence.
4. Significant differences in GPA did not exist between all remote-site students and all host-site students in this study. However, it did make a difference if a student was in the same room with the teacher or if they were at a different location.

Table 4. Analysis of Variance for Grade Point Average on Site Location and Individual Course.

Source	df	SS	MS	F	p
Site	1	.262	.262	.511	.4749
Class	8	50.194	6.274	12.231	<.0001
Site * Class	8	3.186	.398	.776	.6237

Table 5. Individual Course Success (GPA) by Host Site and Remote Site.

Course Name	Host Site		Remote Site	
	N	GPA	N	GPA
Foreign language	91	3.29	140	3.06
Ag business mgt.	3	3.23	74	3.09
Vocational marketing	14	1.70	7	2.00
Natural resources	4	3.68	38	3.43
Math-calculus	63	3.11	56	3.21
Chemistry	9	3.57	61	3.58
Art	5	4.00	9	4.00
Statistics	6	3.50	8	3.50
Animal science	4	3.43	31	2.88

Table 6. Analysis of Variance for Grade Point Average on Academic and Vocational Courses.

Source	df	SS	MS	F	p
Between	1	8.18	8.18	13.56	.0003
Within	621	374.34	.60		

Significant differences in GPA were found when grouping students by grade level and remote site or host site. Remote site students in 9^{th}, 10^{th} and 12^{th} grades had a higher GPA than did their counterparts located at the host site.

5. Individual courses being offered via distance education revealed differences in student achievement. Vocational marketing was significantly different than all other courses. After placing a telephone call to the local administrator, it seemed that the cause could have been that the teacher was new and this was the first distance education course he had taught.Generally, it did not matter if the teacher was at the remote site or host site for the instruction; student success was high or above average for all courses except one. Students taking traditional academic courses received a higher GPA than those students taking vocational courses.

6. Student success, as measured by GPAs, was above average (mean GPA whole group = 3.18) in distance education courses.

Recommendations

1. Faculty preservice and in-service programs should be developed in the appropriate use of distance education technologies.

2. Further research needs to be con ducted with populations of students to determine if there are student learning style differences for those who are enrolled in distance education courses versus those electing traditional classrooms. This factor could have attributed to the success rate of students enrolled in these courses. Additionally, the quantity of distance education courses being taken by students may be a contributing factor to success. As students and teachers become more familiar with the distance delivery medium and courses more suited to the medium are offered, perhaps students' grades will improve.

3. Research should be conducted to determine which courses can best be delivered utilizing distance education technologies.

4. Research should be conducted to determine which teaching styles are best utilized to deliver distance courses.

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