AN INVESTIGATION OF TRADITIONAL EDUCATION VS. FULLY-ONLINE EDUCATION IN INFORMATION TECHNOLOGY

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ABSTRACT

This study used inferential statistics to investigate the differences between the mean GPA for a traditional education program in Information Technology and a fully online program of the same courses at a public four year college in the Southeastern United States. Great efforts were taken to ensure that the online program is as similar as possible to the face-to-face Bachelor of Science in Information Technology program. The sample included 308 traditional students and 71 fully online students. The results of study found no significant difference in student success measured by GPA in the fully online program and the traditional program.

Keywords

Online learning, fully online education, information technology

INTRODUCTION

During the 21st century, there has been a growing movement toward online learning at institutions of higher education in the United States (Virkus, 2004). Institutions of higher education are increasingly offering online programs in response to the rising demand. The 2011 Survey of Online Learning conducted by the Babson Survey Research Group and the Alfred P. Sloan Foundation of more than 2,500 colleges and universities in the United States, reported that thirty-one percent, or over 6.1 million students were enrolled in at least one online course in the fall of 2010 (Allen & Seaman, 2011). Additionally, the report found that three-quarters of institutions indicated that the economic downturn had greatly increased the demand for online courses and programs. To combat budget woes in recent years, higher education administrators have looked to e-learning as a means of attracting more students and decreasing operating expenses (Patton, 2005).

Pethokoukis(2002) reported a 33% per year increase in online enrollment in the U.S. through 2002. According to a report by Allen and Seaman (2005) the largest increase in online course offerings (72%) was for associate degree institutions; sixty-five percent of schools were offering traditionalgraduate programs along with online courses, and sixty-three percent of traditional undergraduate programs offered online courses. The report also noted that there are over 6.1 million students taking at least one online course in the United States. Specifically they reported the following:

- The 10% growth rate for online enrollments far exceeds the 2% growth in the overall higher education student population.
- Thirty-one percent of higher education students now take at least one course online.
- Reported year-to-year enrollment changes for fully online programs by discipline show most are growing.
- 65% of higher education institutions now say that online learning is a critical part of their long-term strategy.

With the growing number of online programs and the increasing rate of enrollment in these programs, a major concern for institutions of higher education and students is whether the quality of the online program instruction and learning is comparable to that in a traditional classroom setting. A review of the current research literature finds mixed results.

Over the years, numerous studies have been conducted comparing online with traditional face-to-face learning concerning the design, effectiveness, and students’ performance as indicators of course quality. For example, McFarland and Hamilton (2005) examined the level of student engagement as an indicator of quality and found no difference in satisfaction or performance of students enrolled in online versus those students enrolled in traditional courses. In another study, Russell (2001) focused on student exam performance and found that learning outcomes were comparable in both online and
traditional teaching modes. Klesius, Homan, and Thompson (1997) found that learners’ satisfaction with online learning was
the same as traditional face-to-face courses. The results of a study conducted by Astani, Ready, and Duplaga (2010),
indicated that students believe that the quality of online courses offered by traditional institutions is as good as traditional
face-to-face learning. In research conducted by Palloff, and Pratt (2001), no significant difference was found in the learning
outcomes of students in online versus face-to-face settings. Thomas Russell’s (2001) analysis of 355 previous studies found
no significant difference in student outcomes based on the mode of education delivery.

While many studies have found no significant differences in traditional versus online education, other research reported
opposing results. A study by Dobbs, Waid and del Carmen (2009) measured students’ perceptions of online course
experiences. The participants of the study were 100 students who were attending traditional, “face-to-face” (on-ground)
courses and 180 students who were attending online classes. The authors found that more students perceived the traditional
“face-to-face” courses to be easier than online classes. Forman (2011) reported that on-campus CIS students taking a
computer literacy course had consistently higher GPAs and success rates than those taking online courses. Beard and Harper
(2002) cited lack of interaction, privacy issues, technological difficulties, and a focus on technology rather than content as
disadvantages of online versus traditional on-campus instruction.

In 2009, the School of Information Technology at a 4 year public college located in the Southeastern United States of
America started a fully online, four-year program in Information Technology. The college maintained the traditional
program that is available for students that wish to complete their coursework in the traditional classroom. The fully-online
program was designed so that the curriculum would be identical to that of the traditional program. Approximately 70% of
the courses are taught by full-time instructors and the remaining 30% are adjuncts. All full-time professors teach in both the
online and face-to-face setting. Approximately half of the adjunct instructors teach only online while the other half either
do both or teach just in the traditional classroom. The intent of the online program is to offer the same learning experience
and opportunities to students that chose to complete courses online. During the first two semesters after the fully-online program
was started, the enrollment was relatively low with less than 20 students declaring the online major. At the time of this study,
fully-online student enrollment was 71. Following national trends, this number is expected to increase as the demand
continues to rise. It is imperative to ensure that students enrolled in the online program performed academically as well as
students in the traditional program. The College works to follow best practices and recommendations for the accrediting
agency (ABET) and courses are evaluated using the Quality Matters rubric (“Quality Matters: Higher Education”, 2010.).

This study investigated whether there is a significant difference in student academic performance in a traditional face-to-face
program and a fully-online program in Information Technology. It involves using GPA data of students majoring in
Information Technology at a medium sized (8,884 students) residential state public college in the southeastern United States.

**METHODOLOGY**

Participants

Attention was focused on students declaring the major Bachelor of Science in Information Technology (INTE), or Fully
Online Bachelor of Science in Information Technology (INTO.) In this study it was assumed that the two majors are
independent of each other. The scores of each group were assumed to be normally distributed. The sample sizes for each
group selected were ($n_{INTE} = 308, n_{INTO} = 71$) and equal variance was assumed. The students were all from a single institution
located in a public four-year college in the Southeastern United States. The population was defined to include only students
that began the program in the year 2008 through 2011. The GPA score was measured on a scale of 0 to 4.0, with 4.0 being
the highest possible score. Transfer students in the study have three different GPAs; Institutional, Transfer, and Overall.
Students that have never taken courses outside of the home institution have a single overall GPA score. The Overall GPA
was used for all students regardless of transfer status in this study.

Procedure

The null hypothesis is that there is no difference between the face-to-face program and the fully-online program. To begin the
analysis of the data the researcher gathered all Information Technology majors with a start date of 2008 through 2011. The
Major Code and Academic GPA was collected for each student. In this study the overall GPA was used in an effort to gain
knowledge about the student’s entire academic success. In subsequent studies the researchers may investigate GPA of
Information Technology courses separate from the core courses. To conduct the first test to determine the difference between
the mean GPA for the traditional students and the fully online student, each variable was entered into SPSS version 20. Using SPSS an Independent-Samples t-test was conducted by using GPA as the test variable and the Major code of INTE or INTO as the grouping variable.

RESULTS

Homogeneity of variance of the two populations was tested using Levene’s Test for equal variance. The standard deviations were of similar size (INTE $s = .6859$, INTO $s = .6696$) with a negligible difference of 0.0162. The Levene’s test statistic of 0.94 allowed the researcher to support the assumption of equal variance at the 0.05 level. Data variances were homoscedastic as the null hypothesis was retained and it was concluded that the samples were approximately equal in variance. The results from the SPSS analysis are below in Table 1 and 2. From Table 1 it was evident that the traditional face to face program did not vary significantly from the fully online program. The difference in the means for GPA (INTE mean = 2.747, INTO mean = 2.773) between the programs was 0.026. Using Thalheimer and Cook’s effect size Excel calculator (2002) the ES value was small at -0.03615. Cohen’s $d$ calculated as 0.04 also shows a negligible effect in relation to size (Cooper & Hedges, 1994). The Independent-Samples t-test conducted to determine if the differences between the mean scores of the INTE and INTO were significantly different. Table 2 below shows that there was not a significant difference between the two programs ($t_{377} = -.275$, $p = .783$). Using an alpha level of .05 the null hypothesis cannot be rejected. Failing to reject the null hypothesis means that there was not a significant difference in the GPA scores of INTE students and INTO students.

<table>
<thead>
<tr>
<th>MAJOR</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
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<tr>
<td>GPA</td>
<td>INTE</td>
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<td>2.7473</td>
<td>.71666</td>
</tr>
<tr>
<td></td>
<td>INTO</td>
<td>71</td>
<td>2.7732</td>
<td>.71539</td>
</tr>
</tbody>
</table>

Table 1: Descriptive Group Statistics

<table>
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<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
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</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.006</td>
</tr>
<tr>
<td>GPA</td>
<td>Equal variances not assumed</td>
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</table>

Table 2: Independent Samples Test Results

LIMITATIONS

The first limitation of this study is that it utilized a convenient sample of students. Therefore, the sample may not be representative of the entire population. The sample was composed of students enrolled in information technology courses taught by instructors in the School of Information Technology at a regional Southern state college in the U.S. Future research should include random sampling to include a more diverse group of students in other areas of study and other regions of the country or world. Also, this study used the academic GPA as a measure of student success. This can be considered a limitation because GPA is only one way to measure student performance and academic success. Finally, it should be noted that a planned, quality assurance approach has been implemented to support a solid design of online courses and the fully-
CONCLUSION

This study’s primary focus was to use inferential statistics to determine the relationship between a traditional college educational program in Information Technology and a fully online program. The study was able to conclude that there was not a significant difference in GPA between student success measured by GPA in the fully online program and the traditional program. Through use of an Independent-Samples t-test it was apparent that there were no significant difference between the two programs (p= 0.783).

One possible explanation for the insignificant difference between the traditional and fully online program is the implementation of online courses policies designed to ensure organization of online courses and that students enrolled in the online environment are continuously engaged. Course organization and planning are critical in the process of teaching effective courses, particularly courses taught online (Coppola, Hiltz, and Rotter, 2002; Karuppan, Karuppan, 1999). Dykman and Davis (2008) explained that the process of course organization should go far beyond simply choosing a textbook and developing the syllabus. Instead, it is essential to include detailed planning, including developing specific objectives for the entire course as well as for each individual lesson, specifying assignments in detail, and describing specific deliverables. Floyd, Harrington, and Santiago (2009), reported a significant correlations between student engagement and course organization as well as a relationships between course organization, student engagement, and active learning. The online course policies for students include:

1. Students are required to have access to a computer and the Internet.
2. All course materials (i.e. course syllabus, course content, the assignments and the schedule of activities, etc.) are posted in the institution’s course content management web site.
3. Institutional email and/or course content management email are used only for communication between the instructor and students. The instructor will endeavor to reply to your email queries within 12 hours and no more than 24 hours of their receipt, excluding weekends and holidays or during semester breaks. Private email accounts must not be used to communicate between the instructor and students.
4. Students must immediately review the tentative course schedule (included as part of the syllabus) for the schedule of discussion activities, assignments, projects, and examinations.
5. Students must attend class if they are to be well prepared for the workplace. Online courses are no different from on-campus classroom courses in this regard. Therefore, online students are subject to the college’s attendance policy. Please see the “Attendance Policy” in the college’s catalog. For online classes, participation must be defined in a different manner. Student attendance in online courses is defined as active participation in the course as described in the course syllabus.
6. Online courses will, at a minimum, have weekly mechanisms for student participation, which can be documented using any or all of the following methods:
   a. a graded discussion activity that is integral to student engagement and learning;
   b. a graded assignment/project/examination
7. Your instructor will begin grading all assessments after the deadline and make the results available to you within one week after the due date for the assessment.

Each semester an external course quality assurance coordinator is responsible for monitoring online courses to ensure that each policy is achieved.

At a time when there is widespread integration of online programs in higher education, it is important for administrators to ensure that the success of students enrolled in online programs is equal to that of students in traditional on campus programs. The results of this study are important because they suggest the planned, quality assurance approach to online course
Future research should be conducted that utilizes a larger and more diverse sample of students in information technology programs. This study can also be expanded to look at other differences such as full-time versus part-time students as well as demographic differences between students. In future studies GPA within the major could be used instead of the overall major to investigate any differences present. Also, other indicators of academic success such as student perceptions of online course quality should be used collectively along with GPA to measure student performance in online programs.

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