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Research Proposal: Evaluating the Effectiveness of Online Learning as

Opposed to Traditional Classroom Delivered Instruction

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Abstract

The purpose of this research proposal is to test the hypothesis that online learning is more effective, as judged by the students' level of understanding, than traditional classroom delivered instruction. Participants will be students attending a US Army entry level course. A quasi experimental, posttest only research design will be used. Students will be divided into two groups, with each group receiving instruction on the same topic. One group will receive the instruction in a classroom setting; the other will receive the instruction online. Scores will be evaluated to determine if online learning is superior to classroom delivered instruction. If the research hypothesis is supported, the online class will score higher on the posttest than the classroom delivered class.

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Introduction

It is undeniable that online learning, also called distance learning, is here

to stay. Online learning consists of classes that are fully delivered via the

internet, or a combination of internet delivered classes and periodic meetings in a

traditional classroom. Clark and Mayer (2003) state that almost 90% of all

universities with more than 10,000 students offer some form of distance learning,

nearly all of which use the Internet (12). One of the major advantages of online

learning is the flexibility it provides the student. Tucker (2003) states that

distance learning classes reach a broader student audience, better address

student needs, save money (for both the school and student) and more

importantly use the principles of modern learning pedagogy. Adults that cannot

attend traditional college classes due to work or family obligations can take

college classes through web-based technology that better fits their schedule.

Colleges are not the only institutions that employ online learning. Grade schools

and businesses around the world utilize online training. In 2001 approximately

11% of all business related training was delivered via computer (Clark and Mayer

(2003).

An ongoing and important debate in the education community questions

whether online learning is as effective as traditional classroom learning. With the

amount of time, money and other resources dedicated to online learning, the

level of learning students reach is an important factor in judging online learning effectiveness. The purpose of my research proposal is to analyze the following thesis: Online learning is more effective, as judged by the students' level of understanding, than traditional classroom delivered instruction. The level of student understanding will be judged by posttest grades.

Review of Relevant Literature

In analyzing the relevant literature I looked for studies that showed how students performed based on online learning. If possible, I wanted studies that compared the results of online and traditional classroom learning, taught by the same instructor. I found four such studies.

Constantine, Lazaridou and Hellden (2006) compared online and traditional classroom delivered versions of an environmental education program. The purpose of their study was to compare knowledge and attitudes of junior high school students before and after their participation in an environmental education program delivered in the two different ways. Their study involved intact high school classes utilizing a quasi-experimental design. The classes were divided into two subgroups with group one receiving the class through traditional classroom methods and with group two receiving the class using online methods. The lesson content was identical, except in the method of delivery. The sample was comprised of 297 students aged 13 to 14 years old from four junior high schools throughout Greece. The first group was taught the

program in a traditional lecture-based way. The meetings were held weekly, in

normal 45 minute classes over a term of 10 weeks. The second group received

exactly the same amount and structure of training over the same period of time,

but the sessions were held in the school's computer laboratory instead of the

classroom. Both groups were tested simultaneously to exclude potential

influences independent of the study.

The assessment instrument was 40 knowledge questions from the course

of study. The questions were multiple-choice with five possible choices, with only

one correct answer. The assessment instruments were submitted to a panel of

experts, who established their content validity. Each group was given a pretest

and a posttest. The pretest was administered one week before the class started

and the posttest was administered one week after the class ended. The results

indicated that group two, receiving the online learning, raised their score higher

than group one, who received their learning through the traditional classroom

method. Group one scored an average of 69.07 on their pretest with a standard

deviation of 5.59 and scored an average of 70.78 on their posttest with a

standard deviation of 6.7. Group two scored an average of 69.35 on their pretest

with a standard deviation of 5.14 and on their posttest scored a 74.21 with a

standard deviation of 7.03. Aivazidid, Lazaridou and Hellden conclude that the

online class was more effective than the traditional classroom instruction based

on the 3.43 difference in posttest scores.

Tucker (2001) conducted a more in-depth study that examined pretests

and posttest scores, homework grades, research paper grades, final exam

scores, final course grades, learning styles, and ages of distance education and traditional students enrolled in a business communication class. The study was designed to determine if distance education is better, worse, or as good as traditional education. Research participants were 47 undergraduate students enrolled in the business communications class. The students were divided into two groups with each group receiving the same content, completed the same assignments and were allotted the same timeframe for completion of assignments. The same instructor taught both classes. Twenty three students were enrolled in the traditional face-to-face class and 24 were enrolled in the distance education class. A quasi experimental research design was used.

The online class scored significantly higher in posttest scores and final exam scores. Tucker found no significant difference between pretest scores, homework grades, research paper grades and final course grades. Tucker concludes that a lack of significant difference in the final course grade may indicate that one delivery method is not superior to the other. Tucker concludes online education is an acceptable alternative, because it is just as good as traditional education.

Thirunarayanan and Prado (2001) conducted a study for the purpose of comparing achievement between online and traditional classroom study in which the students did not know in which way the content would be delivered. The students were enrolled in a program to teach English to speakers of other languages. The classroom delivered content was composed of 31 students, while the online class was composed of 29 students. The students were assigned to

the online and classroom-based course after the course had begun. However, when students enrolled in the course they had no way of knowing whether they were registering for an online or traditional classroom course. A pretest was administered to both groups and the same test was administered as a posttest at the end of the course. The same instructor taught the same content to both classes. The same material was covered in both sections of the course with the off-line class receiving the content through lectures, activities, and cooperative exercises in the classroom. The online class received the same content through online modules, discussion forums, interactive chat sessions with the instructor and classmates, links to video clips and links to relevant web pages. Both groups had the same hours of access for individual time with the instructor through office hours. The results showed that online students improved their scores from the pretest to the posttest by an average of 15.21 points, while the average scores of students in the traditional class improved their scores by only 13.19 points. This indicates the students in the online group achieved numerically, but not significantly, higher scores than students in the classroom-based section of the course. Thirunarayanan and Prado concluded that students in the online class achieved more than their classroom-based counterparts, however the results do not support this conclusion. The difference in posttest scores between the two groups was only 1.31 points – not enough to draw a solid conclusion that one method is superior to the other.

Finally, O'Dwyer, Carey and Kleiman researched the effectiveness of online learning involving students participating in the Louisiana Algebra 1 Online

project during the 2004-2005 school year. The Algebra 1 online course was available to students in grades eight and nine in which no certified mathematics teacher was available in their schools. In total 463 online and traditional group students were taught within 33 classrooms. The classes met on a standard schedule, with the online students meeting together in a technology equipped classroom. The online class was composed of 231 students and the traditional class was composed of 232 students. The comparison group met in traditional classroom settings with certified mathematics teachers. The certified mathematics teachers also served as online teachers. There were no pre-requisites for the algebra 1 course, and all students were taking algebra 1 for the first time.

Three instruments were used to gather data; a pretest designed to assess general mathematics ability, a posttest based on Louisiana's Algebra 1 student requirements and a survey to gather data about students' online experiences. Results of the pretest showed no significant difference between the two groups. With a maximum score of 25 points, the traditional students scored 14.99 points and the online group scored 14.91 points. Pre- to posttest scores were not examined directly. Instead, a multi-level regression model in which students pretest scores were included as a covariate to examine the effect of the online experience on students' scores was examined. In this 25 item model, the online class scored higher in 18 items with significant difference in four of the items. Of the seven items in which the traditional classroom scored higher than the online class only three were statistically significant.

Both sets of students were also surveyed to analyze their online or classroom learning experience. 71% of the students who received online learning reported that they liked using the online technology as compared to classroom delivered instruction. However, a higher percentage of students in the traditional classroom felt more confident about their algebra skills. 67.6% of the students who received classroom delivered instruction felt very confident in their algebra skills, while only 49.8% of those students who received online instruction felt confident of their algebra skills. The researchers conclude that while this finding is interesting given that students in the online classrooms had a higher posttest score than those in the traditional classrooms, it is consistent with the findings of other studies suggesting that students in online learning courses may have poorer perceptions of their learning. Most importantly, however the study suggests that the Louisiana Algebra 1 online model is a viable approach in teaching students when a certified teacher is not available.

While the literature review begins to support my hypothesis that online learning is more effective, as judged by the students' level of understanding, than traditional classroom delivered instruction, it is far from conclusive. The research I propose below will assist in reaching a definitive conclusion.

Method

Participants

The sample will consist of college graduates attending the Military Intelligence Basic Officers Leadership Course (MIBOLC). MIBOLC is an entry

level course for officers entering the United States Army in the field of military

intelligence and provides the basics in the analysis of military intelligence. The

vast majority of MIBOLC students (79%) have no prior military experience and

are just entering military service. Approximately 20% of MIBOLC students are

prior service enlisted who are transitioning to officers. These students vary

widely in military background and experience. The final one percent of the

student population is made up of international officers. These officers vary

widely in military background and experience as well as English proficiency.

Ages of all students range from the early 20's to the early 30's. Students are

grouped into classes of approximately 40 per class and 18 classes are scheduled

to attend MIBOLC in 2008 for a total of 720 students.

Research Design

For the purpose of this research study, a MIBOLC block of instruction,

military symbology, has been turned into a multimedia, internet delivered class.

The internet delivered class mirrors the traditional classroom delivered class in

content, time allotted and posttest. Every effort has been made to make the two

military symbology classes as similar as possible.

A quasi experimental, posttest only design method will be used for this

research. Throughout 2008, classes of 40 students will be divided into two

groups, one receiving the internet delivered symbology class and one receiving

the classroom delivered symbology class. Computers are available for the

groups that received the internet delivered instruction. Following the block of

instruction, both groups will take the identical posttest in the same classroom, allotted the same amount of time, under the same test conditions. The posttest consists of a 20 question hands on type test during which the student must demonstrate an understanding of the material. It is impossible for students to guess the correct answer – the hands on posttest requires students to create military symbols using knowledge gained during the class with each symbol consisting of 7 parts. Scores can range from zero, with no right answers given, to 100 with all 20 questions answered correctly. All questions are equally weighted with each question worth five points.

Two potential confounding variables must be controlled. First, prior service students that may have had formal training in military symbology and international students that may have prior formal training on military symbology and second, international officers whose English comprehension may impact the outcome of the posttest. To control for these variables, each student will complete a pre-course survey. Students will be asked their prior experience and training with military symbology and the two groups will be balanced as equally as possible with students who have experience with military symbology with those who have no experience with symbology. Students will not know to which class they are assigned until after they complete the survey. International officers will be assigned using the same criteria however they will be tracked separately for further analysis.

Instruments

The pre-course survey will consist of five questions that address the following areas:

- Years of military experience

- On a scale from 1 to 5 students will be asked to provide their level of experience with US standard military symbology (some international officers may have experience with other forms of symbology such as Russian)

- On a scale from 1 to 5 all students will asked to provide their level of comprehension of English

- All students will be asked if English is their primary language or their second language

- All students will be asked what country they represent

The survey will be coded with a number that will identify each student, however that information will be safeguarded so only individuals with a need to know can link surveys with students.

While there is a lack of quantitative and validity data, the posttest has been validated through the use of local subject matter experts and by the Army's primary test and development experts, the Training and Doctrine Command (TRADOC). Following the completion of the posttest, the final grade will be included with information collected by the pre-course survey.

Proposed Analysis of the Data

The data will be analyzed using a t-test for independent samples. The two groups (those receiving the internet delivered instruction and those students receiving the classroom delivered instruction) posttest scores will be analyzed based on the following criteria; students with no prior formal training in military symbology, students with prior formal training in symbology, international officers with no prior formal training in symbology, and international officers with prior formal training in military symbology.

Results

If the hypothesis is supported, the group that received the internet based training will score higher on the posttest than the group that received classroom delivered training. However, the null hypothesis cannot be rejected if the group that received the classroom delivered scores either better than or as well as the treatment group.

Discussion

If the research hypothesis is supported, given the number of students involved, approximately 720 throughout 2008, the study will have a wide range of generalizability. During the literature review, I did not find any prior research that involved such a large number of students where two comparable classes were involved. However, one limitation of this research design is that all participants are college graduates and can be considered educationally motivated; future

research will be needed to determine if the hypothesis also pertains to non-college graduates. As discussed earlier, international students will be assigned to one of the two groups and their results will be tracked both as part of a group and under the variable of non-native English speaker. Results must be analyzed to determine if the hypothesis also applies to international students. However, if English as second language is not a confounding factor; if the international officers' posses a functional use of English, their results should also support the research hypothesis. The topic of the class, symbology, is heavily based on rote memorization of basic symbols. Future research will be needed to see if subject content also impacts on the effectiveness of online learning. A more technical subject may not fall under the generalizability of this research.

If, however, the null hypothesis cannot be rejected, this research will fuel those who do not support online learning. Given the similarity of the internet delivered and classroom delivered content, it would be hard to continue to support that online learning is superior to classroom learning. This is not to say that online learning does not have its advantages, for example those stated by Tucker in the introduction of this paper. Content again could be researched further to determine if a different topic would result in a different outcome. Additionally, the online learning method could be researched further. The online symbology class is designed to be as similar as possible to the classroom delivered instruction, to include an almost verbatim narration. Future research could focus on an improvement to the online delivery method.

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