A RESEARCH PROPOSAL TO COMPARE A COMPUTER-BASED AND A LECTURE-BASED COMPUTER LITERACY COURSE

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INTRODUCTION

Advances in computer technology have caught the attention of many educators and researchers. Computer-based multimedia applications, because of their flexible and varied presentation capabilities, are considered as an effective alternative to traditional training methods. Today in many educational and training settings interactive computer programs are used to teach young students and adults computer literacy skills. However, as indicated in the study by Merchant, Kreie and Cronan (2001), little research has been found in the literature investigating the effectiveness of computer-based computer literacy teaching programs.

Bertz and Johnson (2000) conducted a research study to determine the effectiveness of an innovative approach for teaching basic computer literacy. The innovative approach was web-based, which was administered over the internet, self-paced that required students learn on their own without attending a regular classroom instruction and competency-based that compared students' technical skills against national norms. Based on data gathered from 314 collage students who attended the computer literacy course it was found that the new approach for teaching computer literacy was the preferred approach and had advantages over traditional teaching methods.

In a different study by Desai, Richards and Eddy (2000) the importance of training methods and tasks in computer literacy training programs was investigated. A self-selecting and convenience sample of novice users, who were employees of a high tech company, attended to two different training programs, instructor-based training (IBT) and computer-based training (CBT), to learn Word for Windows and Excel 5.0. IBT used a combined traditional training, stand-up lecture and the hands-on exploratory method. CBT was similar to the IBT approach except for that there was not an instructor, and that subjects directly interacted with the computer. Employees learning performance was measured at the end of the training and a month after the training, and it was found that "the CBT group's overall end-of-training and one-month-after-training performances were significantly better than IBT subject's performances." (p.242)

Merchant, Kreie and Cronan (2001) measured and compared three groups of a total of 54 undergraduate level volunteer sujects' performance ratings for computer skills and their evaluation of the training method they received after they participated in three different training programs, which are lecture, handout, and multimedia CBT, to learn spreadsheet software. In the lecture method, information on spreadsheet software was given verbal and graphical format in a classroom. In the handout method booklet of information explaining the subject matter is given to trainees to study alone. Graphics examples and text-based explanations were included in the handout. Multimedia CBT included text, and still and animated examples with an option of sound. Similar to the handout method, Subjects executed the CBT program individually.

Based on an analysis of variance, subjects' performance scores in multimedia CBT group were significantly less than those in lecture and handout groups, and the multimedia CBT group was less satisfied with their instructional method.

Gurbuz, Yildirim and Ozden (2001) studied Turkish collage students' attitudes toward two computer literacy courses (one is offered as on-line and the other is by traditional methods). Sixty nine students attended to the on-line computer literacy course, and 140 students attended to the traditional computer literacy course. Based on a pre-post test within group comparison analysis, it was found that neither the on-line nor the traditional computer literacy course had significant effect on student-teachers' attitudes toward computers.

An intensive literature review did not yield much research that investigated and compared subjects' both performances and attitudes who participated in computer-based and lecture-based computer literacy course. Moreover, no study has been found that investigated the same issue in Turkey. Thus, the purpose of this study is to compare the learning performance and attitudes of students who attended to a web-based in-class computer literacy lessons with the learning performance and attitudes of those who participated in classical, lecture-based in-class computer literacy course.

There were three central research questions for this study:

1. To what extent will the computer attitudes of subjects, who participated in a web-based computer literacy course, be improved, as compared to the attitudes of those who attended to a lecture-based computer literacy course?
2. To what extent will the learning motivations of subjects, who participated in a web-based computer literacy course, be improved, as compared to the motivations of those who attended to a lecture-based computer literacy course?
3. To what extent will the learning performance of subjects, who participated in a web-based computer literacy course, be improved, as compared to the performance of those who attended to a lecture-based computer literacy course?

METHOD

Participants

Participants of this study will be 4 classes of approximately 200 (120 females and 80 males) sophomore students, majoring in social science education and elementary education, enrolled in four sections of a computer literacy course at a university in mid-west Turkey. Ages of students are between 19 and 21 with an average of 19.8. Each section will be randomly assigned to either experimental group or control group.

Two classes of a total of 100 social science education students attended to 2 sections (50 students in one section and 50 students in another section). Similarly, two classes of a total of 100 elementary education students attended to 2 sections (50 students in one section and 50 students in another section). One class (50 students) of social science education students and one class of elementary education students will be randomly assigned to treatment group as part of course requirement.

Independent Variables

The independent variable of this study is instructional mode of the computer literacy course. There will be two categories of the instructional mode: Classical lecture-based instruction and in-class web-based instruction.

The computer literacy course, regardless of the instructional mode, will cover ECDL curriculum (European Computer Drivers' License). The ECDL includes seven major computer skills, which are concepts of information technology, using the computer and managing files, word processing, spreadsheets, database, presentation, and information and communication. Each major skill has several specific sub-skills. For instance, the concept of information technology has following sub-skills: General concepts, hardware, software, health and safety, environment, security, copyright and so forth. Word processing has following sub-skills: Main operations, formatting, objects, prepare outputs and so forth.

The classical lecture-based instruction will be given by two instructors in a computer lab five hours a week for 14 weeks. Turkish version of ECDL curriculum will be given to the instructors and they will be asked to strictly follow goals and objectives of the curriculum. Similarly, the in-class web-based instruction will be given in a computer lab. Students will attend the class five times a week for 14 days. Instead of classical instruction, they will log in to a training web site which is commercially prepared and teaches ECDL skills. There will be an instructor in the classroom who won't teach directly but answer students' questions regarding the web-site and computer knowledge and skills taught in the web-site.

Dependent Measures

There will be three dependent measures of the study

1. Students' attitudes toward computers as measured by the Computer Attitude Scale.
2. Students' motivation toward the computer literacy course as measured by the Course Interest Survey.
3. Students' learning performance as measured by a standard ECDL test.

Dusick (1998) defined attitude as "an evaluative disposition based upon cognition, effective reactions, behavior intentions, and past behaviors which can influence future cognitions, effective responses, intentions, and behaviors" (p. 127). In this study, the Computer Attitude Scale (CAS) (Loyd & Loyd, 1985) was used to measure changes in teacher attitudes toward computers manifest after the intervention.

The CAS has 40 Likert-type items involving statements of attitudes towards computers and the use of computers. The items are divided into four categories, each of which represents one subscale of the CAS: (a) anxiety or fear of computers, represented by the Computer Anxiety (CA) subscale, (b) confidence in or ability to use or learn about computers, represented by the Computer Confidence (CC) subscale, (c) liking computers or enjoying

working with computers, represented by the Computer Liking (CL) subscale, and (d) perceived usefulness of computers for present or future work, represented by the Computer Usefulness (CU) subscale. Each subscale has ten items and respondents rate items by indicating to what extent they agree or disagree with the expressions in each item (from strongly disagree to strongly agree with four choices).

The estimated total alpha reliability coefficient of the CAS is .95 with the following coefficients for the subscales: .90 for Computer Anxiety, .89 for Computer Confidence, .89 for Computer Liking, and .82 for Computer Usefulness. The CAS is seen as a reliable and valid instrument for assessing teacher attitudes toward computers (Loyd & Loyd, 1985).

Here, we follow Driscoll's (1993) construct of learning motivation as "deciding to engage in a learning task and persisting in that task" (p. 295). For our purposes, Keller's (1995) Course Interest Survey (CIS) was used to measure student motivation towards computer-supported and non-computer-supported lessons. The CIS measures student motivation to learn in a particular course. The CIS has 34 items divided into four categories: (A) attention, (R) relevance, (C) confidence, and (S) satisfaction. Survey items in the attention category measure the extent to which the interest of learners is captured and their curiosity to learn is stimulated by the lesson. Items in the relevance category serve to measure the extent to which the personal needs and goals of the learner are met in such a way as to affect a positive attitude. Items related to confidence evaluate the perception of learners about whether they will be able to succeed and control their success. Finally, the items in the category of satisfaction measure the extent to which student accomplishments are reinforced.

Cronbach's alpha coefficient for the CIS is .95. Alpha coefficient values for the subscales are: .84 for attention, .84 for relevance, .81 for confidence, and .88 for satisfaction. The CIS is seen as a reliable and valid tool for measuring student motivation in a specific classroom setting.

Both instruments, the CAS and CIS, were originally written in English and the English versions were validated. Because the native language of both teachers and students participating in this study was Turkish the researcher translated the English versions of the surveys into Turkish. The translated surveys were subsequently checked and corrected by two language experts, both of whom are studying Turkish linguistics and literature in the United States and are fluent in both American English and Turkish. No data was available concerning the reliability of the Turkish versions of the surveys prior to the study. The reliability coefficients of the Turkish surveys were calculated, however, after the surveys were administered.

Procedure

Using a random sampling method, One class of social science education students and one class of elementary education students will be randomly assigned to experimental group, and the other two classes will be assigned to control group. All 200 students will complete the Student Consent Form and the CAS in the first class period as the pre-survey. Both classical instruction students and web-based instruction students will attend the computer literacy course five times a week for 14 weeks in a computer lab on campus. After students complete the course, they will complete the Student Consent Form, the CAS and the CIS as the post survey. Then, they will take a standard ECDL exam as their computer literacy course performance indicator.

No pretest, as an indicator of students' computer literacy knowledge, will be administered at the beginning of the study. It was the researcher's observation that students came to the university without computer skills, and they take their first computer literacy course in their sophomore year. Before than, students are not exposed to any formal computer education and they are not engaged in any school activity in which they use computer.

Hypotheses

Three hypotheses are developed based on three research questions

Hypothesis 1: Effect on Students Attitudes Toward Computers.

It is hypothesized that the students who participate in a web-based computer literacy course will record higher scores on the attitude questionnaire than those student who attends to a lecture-based computer literacy course

Hypothesis 2: Effects on Student Motivation Toward Class

It is hypothesized that the students who participate in a web-based computer literacy course will record higher scores on the motivation questionnaire than those students who attend to a lecture-based computer literacy course

Hypothesis 3: Effects on Student Learning Performance
It is hypothesized that the students who participate in a web-based computer literacy course will record higher scores on the performance test than those students who attend to a lecture-based computer literacy course

Research Design and Data Analysis
A pre-survey/post-survey control group design will used for first and second hypotheses. For the third hypothesis, assuming that students' computer skills are not significantly different based on the researcher's observation on students, post test control group design will be used. To see whether there are significant attitudinal, motivational and performance differences between control and experimental group students after the intervention, t-test will be employed.

REFERENCES

Bertz, R. & Johnson, L. (2000). An innovative pedagogy for teaching and evaluating computer literacy. *Information Technology and Management*, 4(1), 283-292.

Desai, M. S., Richards, T. & Eddy, J. P. (2000). A field experiment: instructor-based training vs. computer-based training. *Journal of Instructional Psychology*, 27(4), 239-243.

Driscoll, M. P. (1993). *Psychology of earning for instruction*. Needham Height, MA: Ally&Bacon.

Dusick, D. M. (1998). What social cognitive factors influence faculty members' use of computers for teaching? A literature review. *Journal of Research on Computing in Education*, 31(2), 123-137.

Gurbuz, T., Yildirim, S. I. & Ozden, M. Y. (2001). A comparison of student teachers' attitudes toward computers in on-line and traditional computer literacy courses: a case study. *Journal of Educational Technology Systems*, 29(3), 259-269.

Loyd, B. H., & Loyd, D. E. (1985). The reliability and validity of an instrument for the assessment of computer attitudes. *Educational and Psychological Measurement*, 45, 903-908.

Merchant, S., Kreie, J. & Cronan, T. P. (2001). Training End Users: Assessing the Effectiveness of Multimedia CBT. *The Journal of Computer Information Systems* 41(3), pp. 20-25.