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ABSTRACT
        This study examined the impact of a technology course on
in-service teachers. Teachers' comfort level, beliefs, confidence, and
attitude toward the use of technology were investigated. The impact of the
course with different degrees of technology integration was also researched.
The results indicate that the course increased students' comfort level,
confidence, and attitude toward the use of technology. The findings also
indicate that no significant difference was found on comfort level,
confidence, and attitude between the two groups who had different degrees of
emphasis on technology integration. (Author/MES)

Teachers' Comfort Level, Confidence, and Attitude toward Technology at a Technology Course

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Abstract: Currently many universities are offering a technology course. The study is intended to examine the impact of the technology course on in-service teachers. Teachers' comfort level, belief, confidence, and attitude toward the use of technology are investigated. The impact of the course with different degree of technology integration is also researched. The results indicate that the course increased students' comfort level, confidence, and attitude toward the use of technology. The findings also indicate that no significant difference was found on their comfort level, confidence, and attitude between the two groups who had different degree of emphasis on technology integration.

Introduction

In September of 1997, the National Council for Accreditation of Teacher Education (NCATE) released a report addressing the importance of teachers integrating technology into instruction. The new technology standards clearly state that teachers must be competent of using technology in their teaching. At present training teachers the use of technology has become a strong nation-wide movement.

Many universities are currently offering a technology course, often called "the technology course". Content of the course and attitude of teachers toward the use of technology have been studied. Research revealed that the course content is mostly skill-based and that technology integration should be emphasized in the course. Professionals also promoted technology infusion. In addition, research noted that teachers need technology training and that many of the teachers are anxious of the use of technology in the classroom.

Does the technology course reduce teachers' anxiety? Do teachers feel more comfortable and confident in the use of technology after they take the technology course? Does the course change their attitude toward technology? Do they believe that technology is useful for improving their teaching? Is the course content useful to teachers and applicable to their current and future teaching? Does the technology course with different emphasis on technology integration or technology infusion have different impact on teachers?

The present study is intended to examine the impact of the technology course on in-service teachers. Teachers' comfort level, belief, confidence, and attitude toward the use of technology are investigated. The impact of the course with different emphasis on technology integration or technology infusion is also researched.

Research Procedures and Methodology

Four classes, a total of 68 teachers who were taking the technology course in 1999 at a public university, were selected for the study. At this university, students who want to clear their teaching credential are required to take two educational technology courses, level I and level II. The level I course covers computer productivity tools such as word processing, spreadsheet, and database. The level II course involves multimedia, Internet, and technology integration. The course of this research study was a technology level II course. The majority of the students were full-time in-service teachers. The technology course lasted for ten weeks

Two professors taught this course to two classes each. Based on the professor's emphasis on the integration, two classes were categorized into "Integration A" classes while the other two classes fell into the " Integration B" category. The content, emphasis, and course projects will be introduced in the section "The two categories of the courses".

At the end of the quarter, the researcher went to the four classes and asked the students to fill in a survey. The survey contained ten Liker-scale questions related to the participants' perceptions of their comfort level, confidence, belief, and attitude toward the use of technology in classroom before and after the course. The internal reliability of the survey was checked by SAS computer program. The Cronbach Coefficient alpha value of the survey was 0.85. The value was high, and the items of the survey were reliable.

The means of the ten question items were used to determine how strong the students agreed with statements that the course was useful and applicable and that technology can improve teaching. Three question items were used to examine via t-test possible differences of the two categories of the courses.

The Two Categories of the Courses

The professor of the "Integration A" classes believed that students in the course needed to learn computer applications that were commonly used in schools and should practically explore how these applications could benefit and be integrated into their teaching. She taught students how to use a multimedia program (HyperStudio) and a webpage editor (Netscape Communicator). Students used these two applications to develop two course projects—a HyperStudio project and a webpage project. Examples of the HyperStudio project are: using the software to (1) create an instruction on a subject area like mathematics, (2) develop practice items, or (3) produce a test. Learners, especially remedial students, could review what they had learned by going through the instructional HyperStudio Stack. Students could also conduct self-examination using the practice items. Teachers could use the test to evaluate students. For the webpage project, students created a webpage with many links to websites pertaining to their teaching areas, such as science, language art, mathematics, or social studies. On their webpages, they also created questions that encouraged their students to search for the answers on the Internet. The other two course projects were a research paper and a lesson plan integrating technology into instruction.

The professor of the "Integration B" classes believed that students of the course needed to learn infusing technology into subject areas and hoped that after the infusion one could not distinguish technology components from subject components. The course projects involved writing a lesson plan, evaluating four pieces of educational software, using KidPix to create a slide show illustrating the use of subject areas, as well as writing a paper reviewing articles on technology integration. For the lesson plan project, students were encouraged to integrate technology like spreadsheet, videodisc, database, or CD-ROM into their content areas and grade levels. For the slide show project, students were required to include pictures, text, and sound in the project. For the paper, students should list three implications of technology integration.

Both professors required students to write lesson plans integrating technology into instruction. Both professors also required students to conduct research. The research of students in the professor A's classes was to investigate the availability of hardware and software of their schools and teachers' use of technology at the schools. The students needed to collect, analyze, and report data. The students in the professor B's classes conducted library research—reviewing literature related to technology integration. Professor A emphasized skills of using computer applications while professor B focused on technology infusion. The students of professor A's classes spent more time than the students of professor B's classes on learning computer applications, like HyperStudio and webpage development. The students of professor B's classes practiced much on technology infusion by writing lesson plans and evaluating software.

Results and Discussion

The results showed that the participants thought that the course was useful (M=4.2) and that they could apply what they learned from the course in their current instruction (M=3.7) as well as future classrooms (M=4.2). The results indicated that the course content was appropriate, and that the teacher training was on the right track. Some teachers expressed that they could not apply what they learned in their current teaching because computers at their schools were inadequate or not available in their classrooms.

The participants also believed that technology was useful for improving instruction (M=4.4). Since computers entered our classrooms, educators have been engaging in a constant debate whether technology or computers are useful in instruction. Educational technologists often advocate benefits of using technology in education. Some professionals voice their doubts because research indicates that technology does not have impact on students' learning. They argue that instructors do not need to use technology because it does not enhance students' learning. The results of the study revealed that field teachers and educational technologists are heading toward the same direction. Both of them considered technology to be useful for improving teaching.

Items	Means of A	Means of B	Means of A&B
What I learned from this class is useful to me.	4.2	4.2	4.2

I can apply what I learned from this class in my Current classroom.	3.7	3.7	3.7
I can apply what I learn from this class in my future classroom.	4.1	4.2	4.2
Before I took this class, I felt comfortable of using technology in my classroom.	3.4	2.9	3.2
This class increased my comfort level of using technology in my classroom.	3.8	3.9	3.9
Before I took this class, I felt confident of using technology in my classroom.	3.4	2.9	3.2
This class increased my confidence of using technology in my classroom.	3.8	3.7	3.8
Before I took this class, I had positive attitude toward using technology in education.	4.1	3.4	3.8
This class increased my positive attitude toward using technology in education.	4.1	4	4.1
I believe that technology is useful for improving my teaching.	4.4	4.4	4.4

Table 1. Means on the survey. Means of A = Means of the 34 participants of the professor A's classes. Means of B = Means of the 34 participants of the professor B's classes. Means of A & B = Means of all the 68 participants.

The results showed that the students were moderately comfortable (M=3.2) and confident (M=3.2) of using technology but had a comparatively positive attitude (M=3.8) before they took the course. This indicated that the teachers were willing to use technology although they were not proficient in using it. The course increased their comfort level (from 3.2 to 3.9), confidence (from 3.2 to 3.8), and positive attitude (from 3.8 to 4.1). As we know, technology is constantly changing, and the content of the technology course is being continually adjusted. Therefore, in the technology course helping teachers feel comfortable, confident, and positive is as important as teaching them specific technology content. If our teachers are comfortable and confident in using technology, they will be more likely to succeed in overcoming obstacles and using technology in their classrooms.

Professor A's class responses on comfort level, confidence, and attitude after the course were compared with those of professor B's classes. The obtained t-values were 0.12, 0.08, and 0.24. The values did not exceed the critical value 1.98 for p=0.05. The results indicated that there was no significant difference between the two groups of

different emphasis in the course. Due to the survey questions of the study being limited in scope, we need to conduct more studies to make conclusions on this issue.

Educators have been debating on what the course should emphasize: technology skills, technology integration, or technology infusion. Some educators think that the course should emphasize skills because one cannot integrate technology without having the skills. Some educators think that the course should focus on technology infusion because teachers must be able to use technology within their content areas and grade levels. Probably all instructors of the technology course have currently included technology skills and integration in their courses. Degrees of technology integration and ways of integrating technology into instruction might vary from one instructor to another. The findings of the study indicate that the difference is not significant on students' comfort level, confidence, and attitude toward using technology.

Conclusion

Studies on the technology course at Colleges of Education has been conducted by many researchers with the attempt to find the best way to train our teachers to be technology literate in order to enhance quality of education. The results showed that the course increased students' comfort level, confidence, and attitude toward the use of technology. No significant difference was found on students' comfort level, confidence, and attitude between the two groups who had different ways if integrating technology into instruction. More studies need to be conducted to evaluate the impact of the course on teachers. Well-trained teachers will help the coming generation to be successful learners in the Information Age.

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