Identifying influences on attitudes and self-efficacy beliefs towards technology integration among pre-service educators

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ABSTRACT

This pilot study investigated the influences on self-efficacy beliefs toward technology integration among pre-service teachers at two mid-sized public institutions in the Midwest region of the United States. Using pre/post measurements of perceived comfort with using computer technology, perceived usefulness of computer technology, and ratings of self-efficacy beliefs toward technology integration, this study identified possible influences on self-efficacy beliefs. Specifically, this study found that Perceived comfort with computer technology was found to be a significant predictor of self-efficacy beliefs towards technology integration, while perceived usefulness was not found to have a significant predictive relationship. This study also found that all of the groups demonstrated a significant increase in self-efficacy beliefs while enrolled in a course focusing on technology integration even though the courses varied in course design and weekly instructional time. The results suggest that a course design that focused more broadly on issues relating to the integration of technology into teaching was likely to have a larger positive impact on self-efficacy beliefs than a course focused primarily on developing proficiency skills with specific computer technology.

INTRODUCTION

In recent years, the integration of technology into K-12 classroom teaching has been a major focus of federal, state, and local public and private educational organizations. It has become the responsibility of teacher preparation programs at institutions of higher education to prepare teachers that are capable of using technology in effective and efficient ways to positively influence student achievement. However, there is notable variability in the courses designed to prepare pre-service teachers to effectively using technology in the practice of teaching. Some of these courses focus primarily on developing the technical skills of pre-service teachers needed to use specific technologies that they might encounter as a beginning teacher while other courses focus on broader concepts of teaching with technology. Bandura (1997) describes perceived self-efficacy as "beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments." As this applies to the integration of technology into education, self-efficacy beliefs toward technology integration have been theorized to be a determining factor in how well a teacher is able to effectively use technology to improve teaching and learning (Albion, 2001; Enochs, Riggs, & Ellis, 1993; Kellenberger, 1996; Riggs & Enochs, 1993; Wang, Ertmer, & Newby, 2004a). Simply stated, a teacher's perception that he or she can effectively use technology in the process of teaching and learning will impact that teacher's ability to do so. However, the factors that influence self-efficacy beliefs towards technology integration remain largely ambiguous, particularly when examining the possible influences of students' attitudes towards technology and also the influences of their coursework as a pre-service teacher.

The purpose of the pilot research study is to examine the relationship between self efficacy beliefs towards the integration of technology into teaching and the attitudes of pre-service teachers toward computer technology while enrolled in a course focusing on integrating technology into teaching practices. Recent research in this area has focused primarily on the relationship among attitudes toward computer technology and perceived self-efficacy relating only to computer usage behavior (Compeau & Higgins, 1995; Karsten & Roth, 1998; Torkzadeh, Koufteros, & Pflughoeft, 2003; Zhang & Espinoza, 1998). However, this recent research has not specifically investigated the possible relationship among these measures and the perceived ability to effectively integrate technology into K-12 classroom teaching practices. This pilot study will expand on this recent research to investigate this relationship among factors the influence both attitudes toward computer technology and self-efficacy beliefs of pre-service teachers toward integrating technology into the practice of teaching. Of particular interest to this study is the impact of the four courses designed to prepare teachers to effective integrate technology into teaching practices. Additionally, this pilot study provides insight into the use of two distinct survey instruments in better understanding the relationship of various models of preparing teachers to integrate technology into teaching.

Research Questions

This exploratory study focused on two primary research questions:

1. Do significant changes in attitudes toward computer technology or self-efficacy beliefs toward technology integration occur within any of the four course models?
2. For students enrolled a course on technology integration, to what extent do preexisting attitudes towards computer technology influence self-efficacy beliefs toward technology integration after the course?
3. Do differences in the structure and design of course focusing on technology integration result in differences in the self-efficacy beliefs toward technology integration?

REVIEW OF RELEVANT LITERATURE

While there has been a notable amount of research conducted that has examined the attitudes of teachers, both in-service and pre-service, toward computer technology (Karsten & Roth, 1998; Kinzie, Delcourt, & Powers, 1994; Milbrath & Kinzie, 2000; Torkzadeh & Koufteros, 1994; Torkzadeh & Van Dyke, 2002), this research has focused primarily on attitudes influencing basic usage of computer technology and has not examined teachers' attitudes toward using technology in the practice of teaching. Other studies have focused on the development of technical skills as a result of professional preparation or professional development programs (Albion, 2001; Kellenberger, 1996; Mourson & Bielefeldt, 1999; Wang et al., 2004a). However, few studies have been conducted that investigate the nature of self-efficacy in teaching with technology (Albion, 2001; Enochs et al., 1993; Riggs & Enochs, 1993; Wang, Ertmer, & Newby, 2004b), and little research that has attempted to identify the relationship between attitudes towards computer technology, teacher preparation, and the perceived ability of a teacher to effectively integrate technology into their teaching practice.

Among the earliest research on self-efficacy beliefs toward the use of technology in teaching and learning was conducted by Enoch et al. (1993). This study focused on the development and validation of a survey instrument that would provide insight into the self-

efficacy beliefs of in-service teachers toward the use of computer technology in classroom teaching practices. The Microcomputer Utilization in Teaching Efficacy Beliefs Instrument (MUTEBI) developed by the Enochs et al.(1993) included subscale measurements for Personal Self-Efficacy (SE) and Outcome Expectancy (OE). Personal Self Efficacy was defined as "teachers' beliefs in their own ability to utilize the microcomputer for effective instruction."(p. 2) Outcome Expectancy was described as teachers' beliefs regarding their responsibility for students' ability or inability to use computer technology in the classroom. While this study was able to establish the validity and reliability of the MUTEBI instrument and the distinct nature of the two subscale measures, there has been little published research beyond this 1993 study to further investigate relationship of these measures to other factors that either influence or are influenced by self-efficacy beliefs toward the use of technology in classroom teaching. Further, the relevance of this research to the current state of technology use in teaching and learning is limited by the significant changes in the technology available in K-12 classrooms since the time this research was conducted such as the availability of the Internet. It is for this reason that new research is necessary to advance the understanding of self-efficacy beliefs toward technology integration.

Since the Enochs et al study in 1993, more recent research has been conducted examining beliefs toward technology. However, much of this research has focused on factors that influence attitudes toward computer technology (Kellenberger, 1996; Torkzadeh & Koufteros, 1994; Torkzadeh et al., 2003; Torkzadeh & van Dyke, 2001). The research regarding beliefs toward technology has focused on a broader uses of technology and not on the integration of technology into teaching. These studies have, however, provided insight into the relationship between self-efficacy beliefs toward technology in predicting usage behavior and also in developing instrumentation that is capable of reliably measuring attitudes toward technology.

In a recent study conducted by Wang et al. (2004a), goal setting activities and vicarious learning experiences in which pre-service teachers reviewed video segments and other artifacts from K-12 classrooms were determined to have a significant influence on self-efficacy beliefs toward technology integration. This study is among the very small body of research that had attempted to identify specific activities of pre-service teachers that influence self-efficacy beliefs toward technology integration.

METHODS

Overview of Methodology

This study focused on three measurements before and after completing a course on the integration of technology into teaching practices at one of two institutions. The survey instrument used for the pre- and post-tests measured perceived comfort towards computer technology, perceived usefulness of computer technology, and self-efficacy beliefs toward integrating technology into teaching. Prior to data collection, approval was received from the Institutional Review Board at both participating institutions for data collection involving human subjects. Also, the courses in which the participants were enrolled was the only course focusing specifically on technology integration that was required as part of the teacher preparation program at each of the participating institutions. According to the course descriptions, the courses being evaluated had similar goals and had a primary focus of preparing pre-service teachers to meet the National Educational Technology Standards for Teachers (ISTE, 2005). The courses varied, however, in the weekly instructional time and overall course design. The following groups were used for comparison:

Table 1. Weekly instructional time for each course

	Instructor	Weekly instructional time
Group 1	Instructor A	50 minutes
Group 2	Instructor B	50 minutes
Group 3	Instructor C	1 hour, 50 minutes
Group 4	Instructor D	1 hour, 50 minutes

Course Descriptions

The four groups in this study were formed from in-tact groups of students enrolled in one of four courses focusing on technology integration into teaching. The courses were the only course focusing on technology integration into teaching that was required in the teacher preparation programs at each institution. A sample syllabus for each course is included in the appendix.

Course 1 was a 1-credit hour course that met for 50 minutes per week for 16 weeks. Activities in this course included reviews of teaching examples and video-based interviews with teachers, developing instructional videos, examining student assessment data with spreadsheets, and group presentations on various topics related to educational technology. The first major activity in this course included discussion and review of technology integration videos from the Integrating New Technologies into Methods of Education (INTIME, 2001) program available from the University of Northern Iowa. The second major activity in this course focused on developing an instructional video for use in class using Windows Movie Maker software. The third major activity focused on using spreadsheet software to examine student assessment data. Near the end of the course, students were required to conduct a presentation on one of several topics relating to educational technology including assistive technology, free online resources for educators, and issues such as copyright and fair use guidelines for teachers. The final project for the course required students to develop a framework for a professional portfolio using either Microsoft PowerPoint or word processing software. Enrollment in this course was open to all elementary, middle, and secondary education majors.

Course 2 was also a 1-credit hour course that met for 50 minutes per week for 16 weeks. Activities in this course focused primarily on the application of specific software in an educational setting. Course topics included (1) word processing software, (2) database software, (3) spreadsheet software, (4) presentation software, (5) WebQuests, (6) Website evaluation, and (7) developing an e-portfolio using the *BlackBoard*™ course management system. For each of these topics, students were required to complete an assignment demonstrating their proficiency with the technology within the context of their content area. Enrollment in this course was open to all elementary, middle, and secondary education majors.

Courses 3 and 4 were similar in structure, however each course was taught by a different instructor. Additionally, Course 3 was primarily taken by secondary education majors and Course 4 primarily served elementary education majors. These courses were 2-credit hour courses and met for 2 hours per week. Both of these courses used the text *Integrating Technology for Meaningful Learning* (Grabe & Grabe, 2004) and shared similar course activities. These courses began with a discussion of key themes and issues relating to the use of technology in education and also the relationship of teaching methods to teaching with technology. Later class sessions focused on technology proficiency skills and software applications as well as strategies for using the Internet in the classroom such as a web quest. All student work

throughout the semester was incorporated into the electronic portfolio. It is also notable that these two courses were part of a program which required laptops for all students.

Description of the Sample

Participants in the study were 108 undergraduate students enrolled in teacher preparation programs at one of the two institutions represented in the study. Of these 108 participants, 78.7% were female and 21.3% were male. All of the participants were in their junior year or higher of a teacher preparation program with 24.1% juniors, 72.2% seniors, and 3.7% being graduate students seeking teaching certification. The mean age of the participants was 22.7 years old.

Survey Instruments

The study used data collected via a survey instrument derived from two existing survey instruments. The Attitudes Toward Computer Technology (ACT) instrument (Kinzie et al., 1994; Milbrath & Kinzie, 2000) has been used to assess the perceived comfort and anxiety as well as the perceived usefulness of computer technologies. The ACT instrument includes 19 items using a 4 point Likert scale (4=Strongly Agree, 3=Agree, 2=Disagree, 1=Strongly Disagree). These 19 items form two subscale measurements for (1) comfort and anxiety with computer technology, and (2) perceived usefulness of computer technology. Some of the items from the ACT were negatively worded statements that required the survey data to be recoded. After being recoded, higher subscale total scores indicated more comfort (less anxiety) with computer technology and higher perceived usefulness of computer technology.

The Computer Technology Integration Survey (CTIS) instrument (Wang et al., 2004a) has been used to measure participant's confidence and self-efficacy in using computer technology in teaching. The CTIS instrument included 21 positively worded statements relating to perceived confidence in successfully integrating technology into teaching practices. Each item is rated on a 5-point Likert scale (5=Strongly Agree, 4=Agree, 3=neutral, 2=Disagree, 1=Strongly Disagree). Higher combined totals on the CTIS scale indicated higher perceived self-efficacy toward the integration of technology into teaching practices. Wang, et al (2004a) evaluated the internal consistency of the CTIS instrument and reported a Cronbach alpha coefficient of .94 and .96 for the pre-survey and post-survey respectively.

Internal consistency of the Survey Instrument. The internal consistency of the subscale measures on the survey was evaluated using a Cronbach alpha coefficient. The calculated coefficient alpha for comfort/anxiety and self-efficacy beliefs was comparable for both the pre-test and the post-test. The internal consistency of perceived usefulness decreased from the pre-test to the post-test.

Table 2. Reliability of survey instruments

		Coefficient alpha	
Subscale	# of Items	Pre-test	Post-test
Comfort/Anxiety toward computer technology	8	.877	.856
Perceived Usefulness of computer technology	11	.738	.671
Self efficacy beliefs toward technology integration	21	.940	.966

Procedures

The survey was administered during the first and last class sessions for each of the four groups. All of the participants were presented with a letter of informed consent and provided the URL to the online survey. No technical errors were encountered during the completion of the online survey. Data were analyzed using SPSS 13 statistical software.

RESULTS

Overview

In general, the mean ratings of all of the factors showed a change from the beginning of the course as compared to the end of the course. Ratings of perceived usefulness and comfort with computer technology, as well as ratings of self-efficacy with technology integration were higher at the end of the course.

Table 3. Mean ratings of perceived usefulness of computer technology

		Pre-Test		Post-Test	
Group	N	Mean	St. Dev.	Mean	St. Dev
Course 1	41	37.05	3.28	37.59	3.97
Course 2	29	37.41	4.15	37.66	3.50
Course 3	15	36.39	4.07	37.0	3.85
Course 4	23	37.39	3.46	37.39	4.02

Table 4. Mean ratings of perceived comfort with computer technology

		Pre-Test		Post-Test	
Group	N	Mean	St. Dev.	Mean	St. Dev
Course 1	41	24.00	4.00	26.41	3.80
Course 2	29	23.66	3.43	24.62	4.11
Course 3	15	25.47	4.22	26.53	3.36
Course 4	23	24.09	3.45	24.70	3.46

Table 5. Mean ratings of self-efficacy toward technology integration

		Pre-Test		Post-Test	
Group	N	Mean	St. Dev.	Mean	St. Dev
Course 1	41	73.71	12.62	89.63	12.54
Course 2	29	76.21	12.16	83.72	11.35
Course 3	15	80.13	8.40	88.73	9.22
Course 4	23	73.09	10.96	86.48	10.64

Evaluating Changes within each group

Comparisons of change in attitudes toward computer technology and self-efficacy beliefs towards technology integration were made using a paired-samples t-test for each group. The pre-test and post-test ratings of perceived usefulness and perceived comfort with computer technology as well as self-efficacy ratings were compared in order to identify any significant changes in these ratings over the course of the semester within each group.

The analysis indicated that significant changes in self-efficacy ratings occurred in all groups. Significant changes in comfort with computer technology occurred in both of the 1-credit hour courses, but no significant changes were detected in either of the 2-credit courses. No significant differences were detected on ratings of usefulness of computer technology in any of the groups.

Table 6. Changes by group in attitudes and self-efficacy ratings

	Mean Difference (pre vs. post)		
Group	Usefulness	Comfort	Self-efficacy
Group 1	.537	2.42*	15.93*
Group 2	.241	.966*	7.52*
Group 3	.867	1.07	8.60*
Group 4	.000	.609	13.39*

* indicates significant difference ($p<.05$)

Predicting self-efficacy beliefs

In order to evaluate the relationship between prior attitudes towards computer technology and self-efficacy beliefs toward technology integration following the course, a multiple regression analysis using a stepwise selection method was conducted using the survey data collected. The factors of perceived comfort and perceived usefulness of computer technology from the pre-test were regressed on the measurement of self-efficacy toward technology integration (CTIS) from the post-test. The data indicating which course the participant had taken also included as a possible predictor in the regression analysis. This data was dummy coded using the course with the lowest mean CTIS rating (course 2) as the reference group.

The multiple regression analysis indicated that perceived comfort with computer technology combined with participation in course 1 accounted for approximately 41% of the variance in self-efficacy beliefs toward technology integration ($R^2_{adj} = .413$), $F(1, 105) = 38.71$, $p < .001$. As ratings of self-efficacy beliefs increased by 1, perceived comfort with computer technology increased by 1.93 points. These ratings of perceived comfort uniquely accounted for 63% of the variance explained by the regression model. Further, participants in course 1 had ratings of self-efficacy beliefs approximately 4.2 points higher, on average, than the group with the lowest ratings (course 2).

Table 7. Multiple Regression Model Using Stepwise Selection Technique

						95% Confidence Interval	
Variable	B	SE	β	t	sr	Lower	Upper
Comfort with computer tech.	1.934	.227	.631	8.52	.631	1.48	2.38
Participation in Course 1	4.25	1.75	.180	2.43	.180	.775	7.719

R Square = .424. Adjusted R Square = .413
**p < .01

Examining Differences Among Groups

In evaluating the difference in self-efficacy beliefs toward technology integration among the four instructional groups, an analysis of covariance was conducted using the post-test CTIS measurement as the dependent variable and the pre-test CTIS as the covariate to control for possible differences in self-efficacy ratings prior to the beginning of the course. A reliability adjustment as described by Trochim and Donnely (2007) was made to the pre-test CTIS in order to minimize the possible effects of measurement error from the pre-test on the results of the ANCOVA.

The ANCOVA indicated that a significant difference existed among the post-course self-efficacy ratings of the groups, $F(3,104) = 4.033$, $p = .009$. The pairwise comparisons using a Bonferroni adjustment indicated that the only difference that was significant was between course

1 and course 2, both of which had the same weekly instructional time (50 minutes), but different course designs.

CONCLUSIONS

Because self-efficacy with technology integration has a direct impact on how technology is used in teaching and learning, it is necessary to move beyond examining usage patterns and general attitudes toward technology in education and toward a better understanding of how self-efficacy beliefs emerge and what factors will have influence these beliefs. While the courses examined in this study represent the only point in these teacher preparation programs where the focus is directly on the integration of technology, it is beneficial to address the question of what impact can be expected from these courses on pre-service teachers' ability to integrate technology into the classroom. However, because these students have limited experience in a classroom, we focus our attention on self-efficacy beliefs in order to assess the potential of these students to successfully integrate technology into teaching. The results of this pilot study suggest that some factors will have a more direct influence on self-efficacy beliefs than others. Based on this study, it is also possible to better focus future research on identifying specific practices that will have the highest impact on self-efficacy beliefs towards technology integration into teaching.

Limitations of this study

One primary limitation of this study is the result of a focus on the four courses. While many aspects of these courses are common to many courses at other institutions, these four courses are not necessarily representative of all of the various models of preparing teachers to integrate technology. While these results are informative to those involved specifically in the four courses included in the study, this focus also limits the ability to generalize these results to other course designs. Further, it is difficult to identify specific characteristics of these courses that may influence self-efficacy beliefs and attitudes toward technology due to the institutional barriers preventing random assignments of participants to a particular course.

An additional limitation to this study was the limited number of paired measurements that were available for data analysis. The number of participants was limited to the number of students who were present on the first and last day of class for each of the four courses.

A third limitation to this study is the ability of the survey instruments and research design to identify the pattern of emergence of self-efficacy beliefs toward technology integration. Because of the length of the survey instrument and the limited time available in two of the courses, it was not reasonable to administer the survey more than at the beginning and end of the course without threatening the validity of the instruments and sensitizing the participants to the measurement. Also, the survey instrument is limited by its nature as a self-reporting instrument that relies on the ability of respondents to reliably respond to the survey items.

Changes in Attitudes and Self-Efficacy Beliefs

Because a significant change in self-efficacy beliefs within groups was detected in all of the groups, the data suggests that all of the courses have a positive impact on a pre-service teacher's beliefs about their own ability to integrate technology into teaching. These results further suggests that it is possible for self-efficacy beliefs to change within a 1-semester time period. In terms of preparing pre-service teachers to effectively integrate technology in their

future classrooms, all of the courses are meeting this common goal. However, these results also indicate that the impact these courses have on self-efficacy beliefs is not equal.

The changes in attitudes toward computer technology differed among the four groups. Significant changes in perceived comfort with computer technology occurred in both of the 1-credit hour courses, but not in the 2-credit hour courses. No significant changes occurred in perceived usefulness in any of the groups.

Another result of interest is the lack of an identifiable relationship between perceived usefulness of computer technology and self-efficacy beliefs toward technology integration. Ratings of comfort with computer technology were a significant predictor of self-efficacy beliefs while perceived usefulness was not. Based on previous research (Kinzie et al., 1994; Milbrath & Kinzie, 2000), this result was unexpected. It is possible that perceived usefulness of computer technology is more directly related to beliefs about one's ability to use computer technology, but not necessarily related to their belief about their ability to integrate technology into teaching. This idea is also supported by the results of the group comparisons in which the participants in the Course 2 that focused on proficiency skills had the lowest ratings of self-efficacy in technology integration. However, the findings that indicate no significant changes in perceived usefulness of computer technology in any of the groups might also be an indication that these participants had already believed technology to be useful in the classroom and there was little movement in that opinion over the course of the semester.

Of particular note in this study were the results of the comparisons among the groups on self-efficacy beliefs toward technology integration. Based on this analysis, the amount of instructional time did not appear to be a major factor influencing self-efficacy beliefs. Because the only significant difference that was detected was between the two groups that were enrolled in 1-credit hour courses, it is necessary to consider what specific differences might have contributed to this difference. Students in both of these groups are similar in age and experience. However, the focus of these two courses was notably different. Course 1 had a broad focus with regard to educational technology and included only two assignments that focused on the integration of specific technology and software. Ratings of self-efficacy in technology integration by participants from Course 1 were the highest among the four groups. Course 2 focused more on specific technologies and the development of proficiency with specific software. Ratings of self-efficacy in technology integration by participants from Course 2 were the lowest among the four groups. These results suggest that proficiency with specific software and technologies does not result in higher self-efficacy beliefs toward technology integration and that a more general approach to issues relating to the use of technology in education may improve self-efficacy beliefs to a larger degree.

It is also possible that specific activities that were present in Course 1 and no in Course 2 contributed to the difference in self-efficacy beliefs. Bandura (1986) describes observation of the performances of others as one of the contributing factors to self-efficacy beliefs. Wang et al (2004a) supports this theory and found that "preservice teachers who were exposed to vicarious experiences that were related to successful technology integration (with and without goal setting) experienced significantly greater increases in judgments of self-efficacy for technology integration than those who were not." In this study, participants in Course 1 were exposed to similar vicarious learning experiences from the INTIME project in classroom activities and as a required assignment. Participants in Course 2 were not exposed to any comparable learning experience during the semester. It is possible that these types of activities contributed to the significant differences between participants in Course 1 and Course 2.

It was also found that the self-efficacy ratings from participants in the 2-credit courses were not significantly different that either the course with the highest or lowest ratings. As such, it is difficult to interpret the influence of these courses in comparison to the two 1-credit courses. These results do suggest, however, that differences in self-efficacy beliefs is related more directly to the course design and particular emphasis with regard to technology than it is influenced by the instructional time available. While the weekly instructional time undoubtedly influences the amount of content that can be covered in each course, it appears that it is more important how the time available is used. It should be noted, however, that further research will be required to clarify the impact of specific course activities and emphases.

Suggestions for Future Research

Based on this pilot study, it is possible to begin to better understand how some of the models of preparing teachers to integrate technology influence their self-efficacy beliefs toward technology integration. However, much remains unanswered about the emergence of self-efficacy beliefs toward technology integration. A further expansion of this pilot study will be necessary to identify how specific activities are able to improve self-efficacy beliefs. For example, Course 1 included a discussion and review of the technology integration practices of in-service master teachers, while the two 2-credit courses included the development of e-portfolios as a major activity. It will be necessary to identify how these and other various activities might contribute to self-efficacy beliefs in order to improve the preparation of teachers to effectively integrate technology into their own teaching practices. With further research, it will likely be possible to evaluate specific activities within the context of a teacher preparation program that are more likely to have a positive influence on self-efficacy beliefs as well as the effective integration of technology in education. Future research will benefit greatly from a more broad selection of sources for data including participant observation during teaching internship, interviews, and other measures to confirm attitudes and self-efficacy beliefs.

Contributors

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Author's note: This research was partially sponsored by a grant from the Committee for the Advancement of Teaching and Scholarship in the School of Education and Allied professions at Miami University.

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Appendix A

Course 1 objectives and schedule as described in course syllabus.

Course Objectives

The goal of this course is to help prepare students to integrate technology into their classroom teaching and curriculum as described by the National Educational Technology Standards for Teachers (NETS-T) at http://cnets.iste.org/teachers/t_stands.html.

General instructional objectives are to:

1. Develop competencies with basic productivity and internet software
2. Introduce and develop strategies for integrating educational technology into the teaching/learning process
3. Examine and determine the relevance of emerging and innovative technologies

Tentative Course Schedule

Week	In-Class Topic(s)
1	Course Intro/Survey
2	Examples of Technology Integration
3	
4	Working with student assessment data
5	
6	In-class work session with spreadsheets
7	Designing Instructional Multimedia
8	
9	Instructional Multimedia
10	No class –Break
11	Instructional multimedia
12	
13	Using the Internet in the classroom - WebQuests
14	Group Presentations
15	Group Presentations
16	Group Presentations
17	Final exam (See final exam schedule for date)

Appendix B

Course 2 objectives and schedule as described in course syllabus

Goal: The goal of this course is to help prepare students to integrate education design and technology into their classroom teaching and curriculum.

Competencies: Upon completion of this course students will be able to teach NETS technology standards for students at their grade level and/or content area.

Content: (http://cnets.iste.org/teachers/t_stands.html)

Course Activities:

Access database assignment(s)
Word processing assignment(s)
Excel assignment(s)
Web site evaluation(s)
WebQuest Lesson Plan
Power Point assignment
ePortfolio assignment

Appendix C

Course 3 and 4 objectives and schedule as described in course syllabus

Course Description: Educational Media & Technology focuses upon the education/instructional uses of audiovisual media including computers and related technologies. Emphasis will be upon each type of hardware and software and its use as well as the subject matter areas that most easily integrate the technology.

PROGRAM GOALS ADDRESSED IN THIS COURSE:

The purpose of this course is to teach preservice teachers to integrate technology for meaningful learning. Preservice teachers will learn to evaluate commercial products in terms of learning theories and goals. These products include audio, visual, and multimedia products as well as new products as they are made available. Teachers will learn to produce learning aids in several media forms. Ultimately, preservice teachers will research the various forms of educational technology, develop artifacts that define what they know and are able to do, and publish their works in an electronic portfolio based on INTASC standards.

Objectives of the Course

Two of the primary objectives of the course are to meet the Michigan Entry Level Standards for Michigan Teachers and the National Educational Technology Standards for Teachers as outlined below.

I. A Teaching and Learning Framework for Integrating Technology in Classrooms	
Week 1	1. Key Themes and Issues for Using Technology in Your Classroom
Week 2	2. Meaningful Learning in an Information Age
II. Learning How to Integrate Technology with Your Teaching	
Week 3, 4, 5	3. Using Tools: Word Processors, Databases, Spreadsheets, and Data Probes
Week 6, 7	4. Using Instructional Software and Multimedia for Content-Area Learning
Week 8	5. The Internet as a Tool for Communication
Week 9, 10	6. The Internet as a Tool for Inquiry
Week 11, 12	7. Using Multimedia Tools
Week 13	8. Learning to Work with Images, Sound, and Video
Week 14	9. Learning from Student Projects: Knowledge as Design and the Design of Hypermedia
III. Looking at Issues for the Present and Future	
Week 15, 16	10. Responsible Use of Technology