

A SNAPSHOT OF TECHNOLOGY INTEGRATION TRAINING IN TEACHER EDUCATION PROGRAMS

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Abstract. Background and purpose. There is not a consensus on how teacher candidates in teacher training programs are prepared to teach with technology. While the National Association of State Boards of Education (2012) held that the training of teachers “too often has not kept pace with advances in technology or new ways of learning” and that educators were not being prepared to use technology effectively in classroom, the American Association of Colleges for Teacher Education (2013) indicated that almost all of the teacher candidates are well prepared to integrate technology into their instruction. **Aim and method.** This study took a snapshot of 83 teacher training programs in two states: Illinois and Nebraska to identify how their teacher training programs prepared their candidates to teach with technology.

Keywords: technology integration, pre-service teacher training, teacher education programs.

INTRODUCTION

It has been generally accepted that technology integration in K-12 education is a necessity in the digital age (Ertmer, 2005; Hew & Brush, 2007). Therefore, teacher education programs must decide if and how to offer technology integration training. However, there is not a consensus on how teacher candidates in teacher education programs are prepared to teach with technology. While the National Association of State Boards of Education (2012) held that the training of teachers “too often has not kept pace with advances in technology or new ways of learning” and

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that educators were not being prepared to use technology effectively in classroom, the American Association of Colleges for Teacher Education (2013) indicated that almost all of the teacher candidates are well prepared to integrate technology into their instruction. In addition, as the second author's home department initiated a restructuring of the teacher education program (TEP), the question emerged of how other teacher education programs really address technology integration training, given the disagreement between the two reports by very prestigious professional associations. To that end, this study examined whether and how certified TEPs in two Midwestern states, Illinois and Nebraska, include a technology integration course into their program by examining their 2013 teacher education program curricula.

BACKGROUND

The value of technology integration in public education

Cradler, McNabb, Freeman, and Burchett (2002) note that the Center for Applied Research in Educational Technology (CARET) collected evaluation and research findings about how technology integration in classrooms significantly affected learners' academic performance in relation to three main curricular goals: 1) higher-order thinking and problem solving skills; 2) high achievement in learning content areas, and 3) workforce preparation. Other research has echoed what Cradler et al. found. For instance, Goldberg, Russell, and Cook (2003) reported that students who used computers when learning to write were not only more engaged and motivated in their writing, but also produced work that was of greater length and higher quality. This finding was especially significant at the secondary level. Similarly, O'Dwyer, Russell, Bebell, and Tucker-Seeley (2005) found positive impact of technology on students' performances in English language. In their study, in which both prior achievement and socioeconomic status of 986 fourth graders were controlled, students who used technology at school more frequently to edit their papers were likely to have higher total English language test scores and higher writing scores on fourth grade test scores on the Massachusetts Comprehensive Assessment System (MCAS) English/Language Arts test.

The role of technology integration training for teachers' technology competences

Among the most decisive factors contributing to the success of technology integration in classrooms are the teachers (O'Bannon &

Judge, 2004; Sandholtz, 2001; Sheingold, 1991; Siegel, 1995; Silverstein, Frechtling, & Miyoaka, 2000; Sivin-Kachala & Bialo, 2000). However, the technology integration training of teachers has long been an issue. For example, a survey commissioned by the Office of Technology Assessment revealed that more than half of teacher education graduates who participated in the survey indicated they were not prepared or poorly prepared to teach with technology (Willis, Austin, & Willis, 1994). Approximately 25% of teachers said that they were minimally prepared and the remainder rated themselves as prepared to a certain degrees. A more recent study by McCannon and Crews (2000) revealed that technology integration training was often insufficient or nonexistent for in-service teachers. In addition, the technology training that was offered focused on showing pre-service teachers how to operate audio-visual equipment but not how to integrate technology into their teaching.

The CEO Forum on Education (2001) reported a rise in teacher use of computers between 1998 and 2000, but only 33% of teachers surveyed felt they were either well or very well prepared to use technology within their classrooms. The majority of teachers (53%) felt somewhat prepared and 10% felt not at all prepared to use technology in their classrooms. In 2001, the National Center for Education Statistics (NCES) revealed that only 33% of teachers felt ready to use computer-related devices in their teaching, while even fewer (20%) felt well prepared to infuse technology into their instruction. Although many of these studies are up to 25 years old, little seems to have changed as the latest findings from Project Tomorrow's report in 2013 indicates that many pre-service teachers felt they were not well prepared to teach with technologies in classroom and that their technology training mainly focused on simple management tools. The question, then, is how teachers can be better prepared, as pre-service teachers, to integrate technology into their teaching.

A large body of literature confirms that technology integration training is a fundamental factor in teachers' positive attitudes toward technology integration in their teaching and the desire to use technology in their classroom (Becker, 2001; Christensen, 2002; McCannon & Crews, 2000; Reynolds & Morgan, 2001; U.S. Department of Education, 2005; Yildirim, 2000). In her study, Christensen (2002) concluded that technology integration training seems to strongly influence teachers' attitudes toward technology use in the classroom and that training appears to promote meaningful use by teachers. In line with Christensen's conclusion, Becker (2001) identified teachers' own technical expertise

and professional experience in technology integration as being among the most influencing factors that determine whether teachers will effectively integrate technology into their teaching.

Approaches to technology integration training for in-service teachers

According to Zhao and Bryant (2006), offering technology training for teachers was important, but selecting training types were even more important. Zhao and Bryant asserted that technology training that simply emphasized teaching basic computer skills was unlikely to result in the successful integration of technology in the curriculum. To successfully incorporate technology into the classroom, teachers needed to take intensive curriculum-based technology training that could get them beyond the attainment of basic computer skills to activities that instruct them how to seamlessly infuse technology into their teaching.

Carlson (2002) confirmed that providing teachers with technology integration training is the decisive factor for infusing technology into classrooms. However, according to Carlson, the training should include the following three components: (1) initial training that prepares teachers to effectively make use of a variety of educational resources, (2) seminars, and short course in-service trainings that develop technology competences and how to integrate technologies into the classroom, and (3) ongoing pedagogical and technical support and assistance for in-service teachers in order to address their daily teaching responsibilities. Teacher education programs' primary role would seem to be delivering initial training on effective uses of technologies and resources.

Approaches to technology integration training for pre-service teachers

Teacher education programs are employing a variety of approaches to technology preparation for pre-service teachers. These approaches can be presented in different formats such as a stand-alone course, workshops, modeling, field-based, integration into teacher education coursework, collaborations among pre-service and in-service teachers, and a combination of all these strategies. According to Kay (2006), research on the effectiveness of these approaches has not resulted in any convincing evidence, and there remains no accepted "best practice" for preparing teachers to use technology among educators and researchers.

Among those approaches, technology integration across teacher education coursework and a standalone course are two common

approaches in teacher education programs. In the approach of technology integration across the curriculum, technology training is included or embedded into content area teaching of specific coursework. For instance, a mathematics instructor may integrate technologies into his or her mathematics lesson and model how to use those technologies so that pre-service teachers will learn not only about mathematics concepts but also how to use technologies to teach mathematics.

Many researchers have concluded that modeling the use of technologies as teaching and learning devices in colleges' courses was among effective ways to help pre-service teachers understand the potential of technology in education and learn how to integrate technology into their classroom (Howland & Wedman, 2004; Rosaen, Hobson, & Khan, 2003). However, one of the challenges to this approach, according to Hall (2006), is that teacher education programs heavily rely on teacher educators' technology readiness and their attitude toward the use of technology in education. To make this approach successful, faculty members in teacher education programs need to be technology-competent and willing to integrate technology into their curriculum. However, the U. S. Faculty Survey (2012) revealed that, while professors are growing more comfortable using technology in their research and professional development, they are not as comfortable including technology in their teaching practices.

There are numerous reasons why professors do not integrate technology into their teaching as much as into their research and professional development. Wedman and Diggs (2001) explained that the current reward system in U.S. higher education does not commonly recognize innovation in classroom instruction. In most promotion and tenure-related decisions in the higher education system, changing instructional practices to model technology infusion in classroom only benefits faculty members if they have publications. To have an effective cross-curriculum approach teacher education programs need to 1) have technology-competent faculty members who are willing to incorporate technologies into their curriculum and model how to use technologies in classroom; and 2) have a reward mechanism that encourages faculty members to use technologies in their teaching.

Another rationale behind infusion of technology into teacher education coursework is that many educators made an assumption that pre-service teachers who were in teacher education programs after the year 2000 would be more likely to be familiar with technology, and

therefore more willing and able to use technology in their teaching (Hall, 2006). However, researchers showed that, although those pre-service teachers who were born and are living in the digital age are more comfortable with technologies, they are not necessarily more willing to integrate them into their teaching practices (Russell, Bebell, O'Dwyer, & O'Connor, 2003). Pre-service teachers need to learn how to use and integrate technologies into their teaching in a systematic way because they cannot automatically envision their everyday technology tools as necessary to their classroom instruction (Keren-Kolb & Fishman, 2006). There seem to be forces, both from the direction of teacher educators' limited incentives and from the direction of pre-service teachers' limited knowledge, that work against the effectiveness of cross-curriculum approaches to technology integration training.

The other major approach to technology integration training is through providing a standalone course. Betrus and Molenda (2002) remarked that this approach can be traced back to the 1920s. Their survey in 2000 indicated that 80% of 100 deans of teacher education programs reported that their programs included a standalone technology integration training course for pre-service teachers. Betrus (2012) conducted the same survey in 2010 with 35 deans and found that 64% of teacher education programs offered a standalone technology integration training course. In this study, instead of conducting surveys to collect data to examine whether and how teacher training programs prepare the teacher candidate for technology use in their future teaching, we closely examined teacher education program curricula.

METHOD

Both the websites of Illinois State Board of Education and Nebraska Department of Education list approved teacher education programs in their states. Based on the websites of Illinois State Board of Education (2013), Illinois has 77 higher education institutions offering TEPs. Based on websites of Nebraska Department of Education (2013), Nebraska has 16 higher education institutions offering TEPs. Accessing the web pages of each institution, we searched the course offerings of those teacher education programs to identify any technology integration training courses in the curricula.

Our first challenge in this research was that different teacher education programs have different course names related to technology integration training. For example, one teacher education program

names a technology course *EDU 310: Computers in Education*; another teacher education program lists *TEP 305: Technology for Teaching*. In cases, where we could not be sure from the course name, we examined the course description to decide whether the course is related to technology integration training. For instance, when we found a course named *ECE 330- Instructional Technology* in a teacher education program, we were not sure whether the course specifically addresses integrating technology in teaching. The course description reads: “This is an introductory survey course, with emphasis on appropriate ways to use technology across the early childhood curriculum. Students learn computer literacy and its use in Early Childhood Education through hands-on activities, such as word processing, databases, graphics and instructional software appropriate for young children, software evaluation, hardware selection, telecommunications, and integration of technology into Early Childhood Education classroom practice.” Based on this description, we counted this course as a technology integration training course.

FINDINGS AND DISCUSSION

Technology Integration Courses in TEPs in Illinois State

Out of 77 teacher education programs approved by the Illinois State Board of Education, we could not get access to the curricula of two teacher education programs to decide whether they have a course related to technology training for their pre-service teachers. Therefore, the actual total number of approved teacher education programs in this study is 75. Figure 1, below, shows the percentage of teacher education programs in the Illinois state we reviewed that have at least one course related to technology integration training

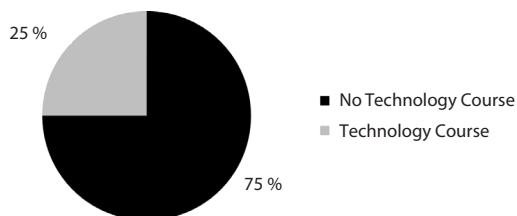


Figure 1. Percentage of Teacher Education Programs in Illinois offering a Standalone Technology Integration Training Course

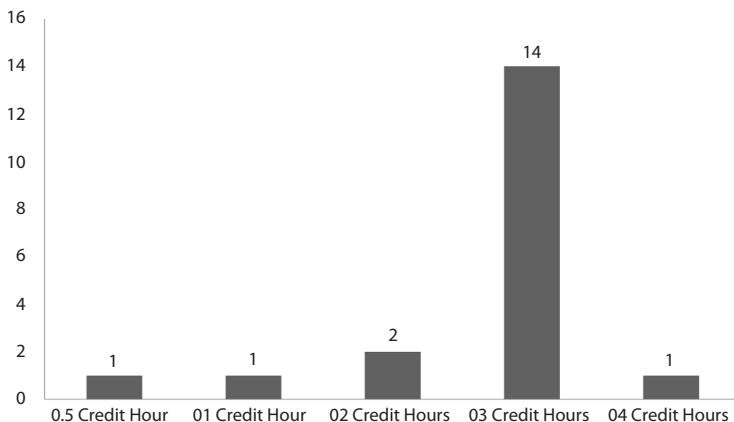


Figure 2. *Numbers of Credit Hours for Technology Training Courses in Teacher Education Programs in Illinois*

As shown in Figure 1, only 19 out of 75 teacher education programs (25%) in the Illinois state currently offer a stand-alone technology integration training course for their pre-service teachers. This number is far less than what Betrus (2012) reported about the prevalence of technology-training courses in teacher education programs, either in 2000 (80%) or in 2010 (64%). Among the 19 teacher education programs having a standalone technology integration training course, 14 out of 19 programs (74%) offer a three-credit hour course. The rest of teacher education programs with a technology integration training course offer courses of 0.5 credit hour, 1 credit hour, 2 credit hours, or 4 credit hours.

Technology Integration Courses in TEPs in Nebraska State

Out of 16 teacher education programs approved by the Nebraska Department of Education (2013), 14 TEPs (87.5%) have a technology training course in the curricula for their pre-service teachers. Two TEPs (12.5%) do not have a technology training course. Among 14 TEPs which are offering a technology training course, 13 TEPs offer a three-credit hour course while one TEP offers a one-credit hour course. Figure 3 and 4 below are the summary of the data.

In reporting that only 19 out of 75 teacher education programs (25%) in the Illinois state offer a standalone technology integration training course, we do not assume that the other teacher education programs in the Illinois state do not provide any technology training for their pre-service teachers. This also applies to TEPs in the Nebraska state.

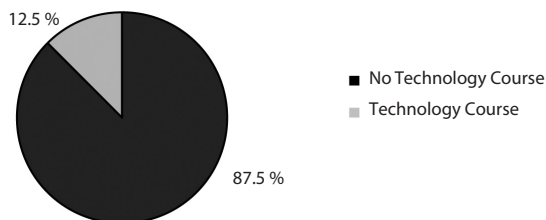


Figure 3. Percentage of Teacher Education Programs in Nebraska offering a Standalone Technology Integration Training Course

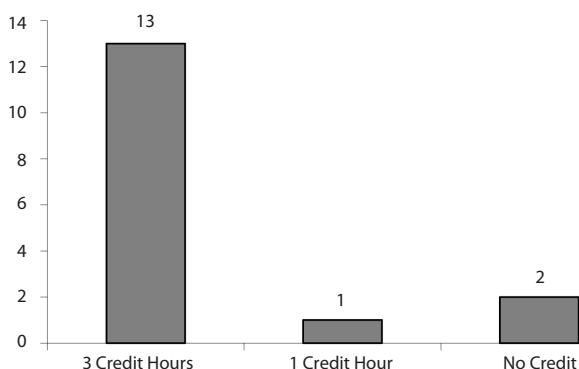


Figure 4. Numbers of Credit Hours for Technology Training Courses in Teacher Education Programs in Nebraska

Some TEPS may integrate technology training across their curriculum and those embedded trainings are not explicitly stated or included in the curriculum. However, it is also possible that some of the 75% of TEPs in the Illinois state and 12.5% of TEPs in the Nebraska state which do not offer a standalone course may not offer any specific technology integration training either.

This exploratory study addressed the question of whether what has been reported in the literature nationwide about technology integration courses is reflected in the teacher education programs in two states of Illinois and Nebraska. We observed a wide difference between the percentage of teacher education programs in Illinois offering a technology training course (25%) and that of teacher education programs in Nebraska offering a technology training course (87.5%). While the percentage of 87.5% in the Nebraska is above the national survey of teacher education programs offering a technology

training course (64%), the percentage of only 25% of teacher education programs in Illinois offering a technology training course is much lower than what was reported in the Betrus' study. We have several follow-up questions to pursue in future studies. One question is whether analysis of the curricula of teacher education programs nationally, as represented on program websites, would reveal a difference in results based on methodology or if, in fact, Illinois teacher education programs take a substantially different approach to technology integration training than Nebraska teacher education programs and nationwide.

Another question for further research is whether the large majority of Illinois teacher education programs that do not offer a standalone technology integration course instead have a demonstrable commitment to technology integration training within and across methods courses (cross-curriculum) or if technology integration is not explicitly included in their teacher education curricula. The ultimate question is how these different approaches to technology integration training within their teacher education programs (standalone, cross-curriculum, no designated coursework) effect how well teachers in Illinois and Nebraska are prepared to teach with technology. Future research may include a survey of in-service teachers in Illinois and Nebraska who graduated from one of the approved teacher education programs in the states to dig more deeply into the question of how the type of technology integration training of pre-service teachers relates to in-service teachers' reporting of their preparation for integrating technology into their teaching.

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ŽVILGSNIS Į TECHNOLOGIJŲ INTEGRACIJĄ MOKYTOJŲ RENGIMO PROGRAMOJE

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Santrauka. Mokslinė problema. Nėra galutinai aišku, kaip ketinantys tapti mokytojais formalaus mokymo metu turėtų būti ruošiami naudotis technologijomis. Nors Nacionalinė Valstijų Švietimo Tarybų Asociacija (2012) teigia, kad mokytojų rengimas „per dažnai nepataiko koja į koją su technologijų pažanga ar naujais mokymo metodais“ ir kad mokytojai nerengiami, kaip efektyviai galėtų panaudoti technologijas pamokose, tačiau Amerikos Mokytojų Švietimo Koledžų Asociacija (2013) deklaruoja, kad beveik visi būsimi mokytojai yra gerai pasirengę integruoti technologijas mokydami vaikus. **Tikslas ir metodas.** Šiame tyrime aptariamos 83 mokytojų rengimo programos dviejose JAV valstijose – Ilinojuje ir Nebraskoje, siekiant nustatyti, kaip mokytojų rengimo programose numatyta būsimus mokytojus mokyti integruoti technologijas į mokymo procesą.

Pagrindiniai žodžiai: technologijų integracija, mokytojo kvalifikacijos įgijimas, mokytojų rengimo programa.

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