

CHALLENGES IN PREPARING TOMORROWS TEACHERS TO USE TECHNOLOGY: LESSONS TO BE LEARNED FROM RESEARCH

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ABSTRACT

Today one of the most challenging factors for teachers and schools of education around the world is technology. With the advent of new technological tools; educators, parents, politicians, and administrators are seeking alternative ways of successfully educating the new generations to use these new technologies in their daily lives and to develop new skills to better compete with others. This task, of course, requires teachers who have the knowledge and skills to integrate these technologies in their curricula. Research shows that colleges of education are not doing their jobs effectively in preparing such teachers. This article focuses on research findings that address this issue and attempts to extract lessons that could be useful for other teacher education programs all around the world. The article concludes that there is a growing need of research studies which reports the currently utilized technologies and their impacts on the education and training of teacher candidates.

KEYWORDS: Preservice teacher education, technology integration

INTRODUCTION

Not a single day goes by without a new advancement in technology. This dynamic nature of technology, in turn, affects the way teachers teach and learn as well as their responsibilities in schools. As these improvements are getting more prevalent in teachers' and educators' professional lives, concerns are already directed to the importance of colleges of education because these are the places where preservice teachers should learn about technology and the ways to appropriately integrate it into their curricula. As the Office of Technology Assessment (US Congress, 1995) report concludes, preservice teachers should be able to use a range of technological tools to provide effective instruction and help their students become comfortable with and knowledgeable about technology. The most direct and cost-effective way to educate teachers about technology is through the preservice education they receive in colleges of education or other institutions (p.166).

WHAT DOES RESEARCH SAY?

However, recent literature on technology and preservice teacher education indicates that teacher preparation programs are not adequately preparing their graduates to teach with technology (Strudler and Wetzel, 1999; Thurston et.al, 1997; NCATE, 1997) and they have not yet fully integrated technology into their programs for preparing teachers (NCATE, 1997). Consistent with these explanations, a 1995 report by the Office of Technology Assessment (OTA) points out that technology is not central to the teacher preparation experience in most colleges of education. Consequently, most new teachers graduate from teacher preparation institutions with limited knowledge of the ways technology can be used in their professional practice (US Congress, p.165).

Similarly, Willis and Mehlinger (1996) in an attempt to address the current situation of technology and teacher education summarize much of the literature in one sentence: most preservice teachers know very little about effective use of technology in education and leaders believe there is a pressing need to increase substantially the amount and quality of instruction teachers receive about technology.

Regarding the possible reasons for this situation most of the research studies focuses mainly on three factors: colleges of education related factors, faculty related factors, and preservice teachers related factor. Generally, it is evident in the literature that many preservice teachers find that experience with the practical application of computers is lacking. Schools of education often overlook the very basic technology needs of their preservice teachers. Many education faculties do not receive the training they themselves need to model the use of technology effectively. Other higher-education faculties have little understanding of the changes technology is bringing to the K-12 classrooms and have not adjusted their own teaching methodologies to reflect these changes. This lack of modeling to preservice teachers provides little support for the use of technology to enhance learning (Hornung and Bronack, 2000).

Moreover, the report by OTA (1995) reports that most technology instruction in colleges of education is teaching about technology as a separate subject, not teaching with technology across the curriculum. The majority of teacher education faculty do not model technology use to accomplish objectives in the courses they teach, nor do they teach students how to use information technologies for instruction (p.165). According to the report, seldom are students asked to create lessons using technologies or practice teaching with technological tools (p.165).

Consistent with these findings, a survey by the International Society for Technology in Education (ISTE) and the Milken Family Foundation (1999) reports that most student teachers do not routinely use technology during field experience and do not work under master teachers and supervisors who can advise them on the use of information technology.

As it can be seen from the literature, there is an agreement upon the deficiency of an effective infusion of technology into preservice teacher education. Lewallen (1998) states that instructionally, nearly 80% of faculty require students to use word processors all or most of the time. Approximately 60% use e-mail for instructional purposes some or most of the time. However, no more than 18% of the faculty regularly require students to use technology for any other purpose. Only 22% report modeling the use of technology in their classes frequently or always and 50% say rarely or never.

Based on a large scale survey conducted in 416 teacher preparation programs, Morsound and Bielefeldt (1999) report that more than 70% of respondents required students to take three or more credit hours of technology instruction, with an equivalent amount built into their traditional classes. Yet most faculty did not feel that instructional technology training was adequate or effectively modeled for these future teachers. Moreover, many of the faculty members know quite a lot about using the technologies for their own professional work, but they are uncertain how to integrate it into their classes.

All of those findings portray a much more different picture than what is expected of colleges of education in terms of preparing tomorrow's teachers all equipped with the required technology skills. However, there seems to be a second factor that let researchers question these institutions. Schrum (1999) argues that colleges of education have typically lagged behind the public sector and K-12 schools when it comes to technology implementation. Brooks and Kopp (1990), on the other hand, point out that the best and most consistent exposure for teachers to classroom relevant technologies is often at the inservice or private sector level.

At this point of our discussion, it is important to focus on the types of and differences in what technologies are currently being used by teachers working in schools and in preservice teacher education in the U.S.A.

The Office of Technology Assessment (1995) reports the types of technologies being used by teachers regularly for instruction as follows:

- 64 percent using VCR
- 52 percent using TV monitor
- 42 percent using personal computer
- 32 percent using instructional software
- 25 percent using tool software such as word processing, database management, spreadsheet
- 16 percent using multimedia software
- 5 percent using videodisc
- 3 percent using online database (p.92).

Regarding the technology used in colleges of education, on the other hand, it is difficult to find extensive summaries or survey results. As Betrus and Molenda (2002) state we do not have good information about what media are being used and how they are used by teachers and students in teacher education programs. In another way of saying that, there is no universal agreement on what teachers should be taught or how they should be prepared. (Willis and Mehlinger, 1996, p.979). Willis and Mehlinger also state that a rare type of survey research in this field is a study that looks at what is currently happening in the teacher education programs across the country relative to technology (p.996). In order to portray the technology used in teacher education programs one has to dig into literature and find out specific examples reported by various studies conducted at different colleges of education.

Whetstone and Carr-Chellman (2001) sum up from their survey results that 94% of preservice teachers use word processing primarily for typing papers, 65% use e-mail to correspond with friends, family, or faculty; and 53% use the university's library information access system to do research. Among these students, the next most

commonly used applications are: 31% Internet, 29% graphics, 24% spreadsheet, 22% content area software, 16% database, and 62% statistics. Lewallen (1998), on the other hand, based on a survey result conducted among college of education faculty portrays the situation from a different perspective. Lewallen states that 47% of the faculty do not use any presentation software, 50% do not use spreadsheet, and 80% do not use database programs. Fifty percent do not use laser/videodiscs, 57% do not use digital cameras, 57% do not use scanners, and 89% do not use CD-ROM burners. Lewallen also notes that instructional use of these applications and hardware is correspondingly low. However, 21% of the faculty uses presentation software frequently or always to create class materials.

Besides, Rizza (2000) argues that teacher education programs have found the integration of computer technology and constructivist strategies, particularly with respect to the use of interactivity, real-world problems, context, and purposeful engagement, to be successful. Rizza notes that interactive techniques like e-mail, discussion groups, and listservs, which have been paired with delivery systems like web pages, Internet searching, and distance learning to implement successfully both theory and methods courses.

Some of the exemplary uses of technology in preservice teacher education in various institutions are as follows:

- Probeware, online computer simulations, an online communication tool, Courseinfo, PIViT: a concept mapping, project planning tool. (Friedrichsen et.al., 2001).
- Power Point, the Internet, (searching for information), scanners and cameras, CD-ROM and software, video editing (Myers et.al, 1997)
- Creating multimedia lessons (Smithey and Hough, 1999)
- Portfolios, HyperStudio, Claris Works (Doty and Hillman, 2000)
- Multimedia presentations, Internet investigations, spreadsheets, desktop publishing, Power Point, WebQuest, word processing (Willis and Raines, 2001)
- Database search, e-mail, Internet, statistical software, WordPerfect, software, spreadsheet (Fox et.al, 1996).
- Word processing, database management, spreadsheet, presentation software, web browsing, telecommunications, educational software, desktop publishing (Yildirim, 2000).
- Software evaluation (Clark et.al, 2000).
- Power Point, HyperStudio, curriculum web pages, software, multimedia development (Krueger et.al, 2000).
- E-mail and word processing documents, databases, digital cameras, web-based journal, HyperStudio, Internet, software (Hornung and Bronack, 2000).
- Multimedia video materials and other digital resources, an interactive multimedia program called ChemWorld (Pellegrino and Altman, 1997).
- Use of e-mail and Eudora, Internet, integration of multimedia into the curriculum, use of such teaching tools as a database and a spreadsheet, use of “wizards” to create presentations and newsletters, use of digitization tools such as scanners and digital cameras, use of hardware such as an LCD panel and presenter box, creation of personal homepages on the Web (Thurston et.al, 1997).
- TeacherLink, a regional telecommunications network; Public Education Network (PEN), one of the nations first statewide K-12 systems; CaseNET, a series of case-based courses on the Internet using the WWW, videoconferencing, electronic discussion groups, and e-mail; the Technology Infusion Project (TIP), pairing preservice teachers with local classroom teachers; and the Collaborative E-Learning Laboratory to be used on a pilot basis to conduct collaborative courses with faculty at other teacher education programs (Beck, 1998).
- Projection device, video player, videodisc player, and network connection (Strudler and Wetzel, 1999).

CONCLUSION

It can be easily seen that colleges of education have some reported problems in terms of effective technology integration into their curricula and in preparing the teachers of the future. Even though there are already some established standards and benchmarks (a good summary of such standards was provided by Mehlinger and Powers, 2002) so as to achieve a promising technology teaching in teacher education programs, there is a growing need of research studies which reports the currently utilized technologies and their impacts on the education and training of teacher candidates. There are lessons to be learned from the literature in preparing tomorrow's teachers in colleges of education. Full integration of technology across the curriculum of schools of education looks much more promising than the efforts of individual professors and/or departments. This may require the implementation of institution wide technology change initiatives that involve restructuring of the program, developing a new vision, inservice training for professors, and establishing support structures within the institution. Introducing professors to exemplary uses of technology in other institutions, as addressed in this

article, is also critical in helping them create vision to use technology in their own preservice teacher education programs.

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