

Behind the Curve in Teacher Preparation: How Schools and Colleges of Education Should be Preparing their Preservice Teachers to Teach Using Instructional Technology

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Abstract

Many Colleges of Education (CEOs) are not properly preparing preservice teachers to use instructional technology. Most COEs that provide technology experiences for their students follow one of two models - the single class model or the infusion of technology into the curriculum. A third approach that combines both of the aforementioned models is discussed and examples of current deployment of the model are cited. Various teaching strategies for using instructional technology are also discussed.

Keywords: Instructional technology; preservice teachers; technology integration; teaching strategies; models for teacher education, technology infusion

Introduction

Although pre-kindergarten through twelfth grade (P-12) schools have made tremendous strides in enhancing and increasing their technology base in the past several years, many school districts still have teachers who are unable or unwilling to fully and properly use that technology in their classrooms. Unfortunately, that situation is not being improved by the hiring of new teachers from Schools and Colleges of Education. Many first year teachers are also ill-equipped to function at an acceptable level in their classrooms, in regards to the use of technology and innovative teaching styles. Many, if not most, Schools and Colleges of Education are not providing adequate exposure to, training with and use of instructional technology and its integration for preservice teachers. Preservice teachers not only need to know the so-called "computer literacy" skills, they need to know how to integrate those and other skills into the curriculum. In addition, they also need to know and use a variety of techniques and strategies for implementing that integration effectively.

First-Year Teachers are Not Prepared for Technology-enriched Classes

Preservice and first-year teachers simply are not properly prepared for the instructional settings they are going to find themselves in when they enter the classroom (U.S. Congress, 1995). While discussing the 1995 U.S. Congress' Office of Technology Assessment's survey, Northrup and Little (1996) note that "(r)esearchers conclude that teachers are being inadequately prepared to

use instructional technology and consequently are unable to effectively integrate technology into classroom teaching practices" (p. 213). Robinson (1995) states "(t)here is little evidence that students teachers are prepared to cope with the realities of school situations ..." (p. 112). Faison (1996) agrees, noting that teachers "... have not had adequate training to help them use technology effectively." (p. 57). She also notes that student teachers "...report that they have had no systematic exposure to or integration of technology in their teacher preparation programs" (p. 57).

Part of the problem, according to Faison (1996) is that technology is not central to most teacher preparation programs and the instruction merely focuses on the technology itself, "...rather than providing experiences in using and integrating technology into the curriculum." (p. 57). Bitter and Pryor argue that "(d)espite technology's potential for transforming education, it has yet to influence many classrooms, often because the teachers are untrained in its use." (p. 27) Queitzsch and Hahn (1995), discussing various research projects noted that "...60 percent of first-year teachers wished they had more practical training" (p. 2) in using instructional technology.

Robert McClintock, a co-director of the Institute for Learning Technologies at Columbia University's Teachers College, indicates there are a multitude of problems with teacher preparation programs. The programs, if they include instructional technology at all, are elementary. "Pressed for time, such programs tend to focus on computer and software basics, not classroom strategies" (Cwiklik, 1997, p. R8).

Why do First-Year Teachers Need to be Prepared for Technology-enriched Classrooms?

According to the studies and articles noted above, it appears that many teacher preparation programs are not preparing preservice teachers to integrate technology into their instructional settings, one might back up a step and ask why should they? Why do school districts need technologically prepared first-year teachers?

Funding Increases

One reason that first-year teachers need to be technology proficient is that funding for technology in schools is increasing dramatically, hence more technology is being placed into schools. Both federal and state governments, along with schools boards are putting more financial resources into school-technology. Quick (1997) notes that the average per student annual spending by school districts in the United States was \$96.98 for 1996-1997. The projected spending for the 1997-1998 on a per pupil per annum basis will be \$116.62. Page (1997) notes that in 1997-1998, the federal government alone will give the nation's school districts over \$423 million for technology for use in classrooms. That is an increase of 111.5% over the 1996-1997 school year. Government Technology (1997) reports that California has already given \$100 million to its high schools. Over the next four years, California will spend an additional \$400 million for technology in the public high schools alone.

Changes in Schools

In addition to direct funding, many states have enhanced or changed the infrastructure of their schools and have improved opportunities for their students via technology. Increasing those technology opportunities of P-12 students will also require that first-year teachers be technologically proficient. Dr. William M. (Mike) Shimeall, the Director of Secondary Instruction for the Lexington (NE,) Public schools noted that "Our teachers need to be very familiar and comfortable with using technology in their classrooms. We require teachers to use instructional technology regularly. We (public schools) cannot afford to have to spend our staff development funds training first-year teachers and getting them up-to-speed. They need to graduate from teacher preparation programs with a certain minimum level of technology competencies in order to properly function in their classes. Unfortunately, most first-year teachers don't have those competencies." (personal communication, October 19, 1997) Nebraska will have all of its urban and most of its rural schools directly connected to the Internet via Nebraska's Educational Service Units by the end of the 1997-1998 academic year, and the Texas Board of Education is considering supplying only laserdisc or CD-ROMs to schools in lieu of seventh grade science textbooks. Information and instructional technology are changing public P-12 schools and first-year teachers need to be prepared for those changes.

Improvement in the Learning Process

Why the big "push" to include technology in classes? Because it is, or can be, very effective and beneficial for the learning process, both in P-12 (Grabe and Grabe, 1996) and higher education Pedras and Horton (1996). According to Pedras and Horton, when used in teacher preparation programs, instructional technology can enhance the process of teaching and can allow preservice teachers a opportunity to learn the "... classroom material in a more meaningful way..." (p. 3). They further note that instructional technology can have an impact on student motivation and creativity, enhance the learning process and learning, improve classroom management and organization, and expand the use of other educational resources. While Barksdale (1996) notes "(t)he idea that teachers should make technology an integral part of their teaching is becoming as much a given as the need to teach writing across the curriculum or the importance of higher-order thinking skills" (p. 38).

If the federal and state governments, school districts, the general public and others believe that it is important to have instructional technology integrated and used in schools, why have Schools and Colleges of Education not done more towards preparing preservice teachers to walk into a technology-enriched classroom and begin teaching?

Current Models for Teacher Preparation Programs

Schools and Colleges of Education have tended to adopt one or the other of the following models for including technology in their preservice program: an isolated course or integrated in various courses (Fredrickson, 1998). According to that survey, both models have some strengths, but they also have several weaknesses.

Single-Course Model

The isolated course method, generally presents basic information to students in a one semester, three-credit hour course. Most single class approaches include working on productivity software such as word processing, spreadsheets and data bases -- applications which some might refer to as the "traditional computer literacy" courses -- in addition to software evaluation, some multimedia and electronic presentation programs and Internet/web uses. Occasionally, some of these single courses will also attempt to provide preservice teachers with experiences which focus on integrating technology into instructional settings. Generally, if they spend much of the instructional time examining and using various applications, they simply do not have much time to focus on integration. According to Fredrickson (1998), without spending time on integrating the use of technology, preservice teachers are not exposed to and do not develop the variety of techniques and strategies they will need in their teaching "bag of tricks." In a strongly worded statement, Pedras and Horton (1996) emphatically state that "(i)t would be difficult and deplorable to find a university engaged in the preparation of teachers without at least one formal computer-related course in the curriculum" (p. 1). They note that, unfortunately, there are many in that exact situation.

Integrated Model

If Schools and Colleges of Education do not use the isolated classroom model, but still expose their preservice teachers to the use of instructional technology, they generally have used the "integrated in various courses" model. Many instructional technology faculty feel that this is a preferred model to the isolated class. Barksdale (1996) states that "... technology is best learned when it is integrated across the curriculum rather than placed in a 'technology ghetto' " (p. 42). When preservice teachers see their professors modeling the appropriate use of technology, they gain an understanding of how they could use it themselves in their classrooms. When professors make assignments which require the use of instructional technology, preservice teachers learn different methods that they might use with their students.

Some professors are very adept at technology integration, but many are not. Some of the reasons teacher education faculty do not include technology integration in their classes include lack of equipment and/or software or not keeping pace with the technology available in the schools; many institutions do not count technology-based work towards promotion and tenure; the amount time required to learn new programs and create new instructional programs is extensive (Barksdale, 1996; Northrup and Little, 1996); technology makes education too impersonal (Davies, 1997); and, teacher preparation programs do not have delineated goals (Faison, 1996). In addition, it has been this author's observation, during the past ten years of working in teacher preparation, that many teacher education faculty are simply uncomfortable with using technology in their classrooms and will not include it regardless of the consequences for their preservice teachers upon graduation.

In addition to the professors not being comfortable with instructional technology, many do not like the time it takes, when using the "various courses" model, to teach the basic skills to their students. They feel they must give up some of their content, to teach computer skills. Some professors do drop some content and teach those skills, and some just make the assignments and

assume the students will "pick it up" on their own. This can cause frustrations for many preservice teachers and that frustration can, perhaps, lead to a disdain for using technology later in their careers. The problem, is essentially a balancing act. Do methods and teacher education faculty leave out content to address technology skill building or do they leave in the content and assume students will somehow pick up the required skills? Unfortunately, many do neither; choosing to merely ignore instructional technology and not address its use in any manner (Fredrickson, 1998).

A Combined Model

So what is the solution? A third model exists that more Schools and Colleges of Education should consider adopting. It is a two-pronged model. In this model, basic instructional technology skills and teaching strategies are taught, generally in one three-credit class, followed by technology integration and usage in other courses the preservice teachers take. This model combines the best of both of the other models, with only a few problems. With this model, teacher education faculty can assume that students entering their classes will have a certain base-level of knowledge and understanding. They can use it, or perhaps even build on it. Instead of having to teach a class how to use a multimedia authoring program, perhaps the professor can spend a few minutes and teach her class how to import digital video into it or perhaps show how to create a navigation button to access the web.

Western Illinois University

An exemplary program at Western Illinois University has been established that follows this approach. Students take two courses which focus on building technology-related skills and the knowledge of the specific strategies to use those technologies. Other courses, methods and professional sequence courses, have been redesigned to integrate technology and strategies throughout. Students examine distance education technologies, interactive multimedia, computer applications, instructional video and telecommunications and the strategies to properly implement those technologies into their classrooms. (Barker, Helm, & Taylor, 1995).

Teaching Strategies for Preservice Teachers

What types of strategies should be presented to the preservice teachers? According to Cwiklik (1997) and others, that is the problem. Teachers and hence, Schools and Colleges of Education are struggling at the application level - they may understand how a computer works or how to create an electronic presentation, but they do not have a grasp on how to integrate those skills into their classrooms.

Field-based Experiences

Faison (1996) suggests the strategies and processes should be from "real classrooms" (p. 58). She also recommends that "(t)heir field experiences should provide opportunities to observe and learn by doing. They must practice in technology-rich environments and have opportunities to reflect on appropriate technology use" (p. 58). Barksdale (1996) agrees, noting that since some

of the best practices are being conducted in schools, Schools and Colleges of Education should partner "...with public school districts, which are often comparatively rich in technology" (p. 42).

Sebastian (1995) indicates that "(a)dding a degree of reality to pedagogical instruction through computer-mediated learning activities provides teacher trainees with a window into the classroom" (p. 64). Kovalchick (1997) supports using student generated portfolios and peer tutoring as effective strategies for using technology at the University of Virginia. Kovalchick also teams "prepared" preservice teachers with classroom teachers to create instructional units which are technology-based

Nine Additional Teaching Strategies

Barker, et al (1995) list seven strategies that should be included when preparing teachers to use technology: Cooperative learning, electronic field trips, thematic teaching, guided inquiry, apprenticeship, group problem solving and critical thinking. Robinson (1995) would add an additional strategy for preservice teachers. He suggests that student-centered, rather than teacher-centered instruction should be one of the strategies considered and taught. Ritche and Baylor (1997) agree with Barker by citing thematic units as effective strategies for preservice teachers.

Sebastian (1995) would expand the use of Barker's electronic field trips to include electronic conferencing. He suggests having preservice teachers communicate among and between themselves and their professors by using electronic conferences. When using these electronic conferences, students can "... share content-specific ideas and strategies ..." (p. 65). Carlin, Ciaccio, Sanders and Kress (1997) suggest that using a discovery model, which emphasizes open-ended, student-centered, thematic hands-on activities which "... incorporate significant ideas of the academic discipline" are effective because they are "...innately interesting to adolescents" (p. 62).

Conclusion

In a search of the literature over the past several years it was found that instructional technologists in teacher preparation programs have noted that Schools and Colleges of Education are not preparing future teachers for the classrooms that they will find themselves in when they graduate. Many Schools and Colleges of Education have used outdated or insufficient models for including instructional technology preparation in there programs. To the detriment of preservice teachers and to the students they will teach, they are not being properly prepared for teaching in a technology-rich environment. Schools and Colleges of Education must consider using the combined model of having a basic instructional technology course followed by technology integration throughout the other method and teacher education courses. As a major component of this combined model and interwoven throughout all of the methods and teacher education courses, teaching strategies must also be presented to the preservice teachers.

If Schools and Colleges of Education continue to improperly prepare their students, new teachers will not be prepared for teaching in today's classrooms, much less for classrooms of the next century. P-12 students will work and live in a society that is predominately information-based and heavily technology dependent. Their teachers need to be equipped to successful guide

them into that environment, and, therefore, teacher education programs must assume the responsibility for providing the skills and experiences those teachers will need.

References

- Barker, B. O., Helm, V. & Taylor, D. R. (1995, February) Reforming teacher education through the integration of advanced technologies: Case study report of a college model. Paper presented at the *47th Annual Meeting of the American Association of Colleges for Teacher Education*, Washington, DC.
- Barksdale, J. M. (1996) New teachers: Why schools of education are still sending you staff you'll have to train in technology. *Electronic Learning*, 38-45.
- Bitter, G. G. & Pryor, B. W. (1994) Research on the IBM grant program's impact on teacher preparation. Recreating the Revolution. In *Proceedings of the Annual National Educational Computing Conference*, Boston, MA.
- Carlin, M. B., Ciaccio, L., Sanders, J. Kress, M. (1997) Improving high school students' performance via discovery learning, collaboration and technology. *Technological Horizons in Education*, 24, 62-65.
- Cwiklik, R. (1997, November 17). Those who can't: If technology is going to transform our schools, the place to start is with our teachers. *Technology: The Wall Street Journal Reports*, p. R8.
- Davies, T. G. (1997). Blending learning modalities: A return to the "high tech/high touch" concept. *Technological Horizons in Education*, 24, 66-68.
- Faison, C. (1996). Modeling instructional technology use in teacher preparation: Why we can't wait. *Educational Technology*, 36, 57-59.
- Fredrickson, S. (1998). Models of technology inclusion in teacher preparation programs: A survey. Unpublished manuscript, University of Nebraska at Kearney.
- Government Technology (1997, December). Schools get first part of digital high school money. *Government Technology*.
- Grabe, M. & Grabe, C. (1996) *Integrating Technology for Meaningful Learning*. Boston: Houghton Mifflin Company.
- Kovalchick, A. (1997). Technology portfolios as instructional strategy: Designing a reflexive approach to preservice technology training. *Tech Trends*, 42, 37-40.
- Northrup, P. T., & Little, W. (1996). Establishing instructional technology benchmarks for teacher preparation programs. *Journal of Teacher Education*, 47, 213-222.
- Page, S. (1997, December 10) Schools' link to Internet to get second installment. *USA Today*, p. 10A.

- Pedras, M.J. & Horton, J. (1996, April) Using technology to enhance teacher preparation. Paper presented at the Annual Meeting of the Northwest Association of Teacher Education, Coeur d'Alene, ID.
- Queitzsch, M. & Hahn, K. (1995) *Great expectations: Preparing rural teachers for educational reform*. Portland, OR: Northwest Regional Educational Lab.
- Quick, R. (1997, November 17). Paying the Price. *Technology: The Wall Street Journal Reports*, p. R4.
- Ritche, D. & Baylor, A. (1997) Teaching with technology: Finding a workable strategy. *Tech Trends*, 42, 27-30.
- Robinson, B. (1995). Teaching teachers to change: The place of change theory in the technology education of teachers. *Journal of Technology and Teacher Education*, 3, 107-118.
- Sebastian, J.P. (1995) Using technology to prepare teachers: Future possibilities. In Slick, G. A. (Ed.) *Emerging Trends in Teacher Preparation: The Future of Field Experiences* (pp. 60-69) Thousand Oaks, CA: Corwin Press, Inc.

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