Models for Integrating Technology into Teacher Training Programs

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This paper provides a synthesis of models proposed for integrating technology into teacher training programs. It discusses models that have been developed from research studies conducted in the field as well as the Integrating Technology into Teacher Training Programs (IT3P) model that has been extrapolated from a synthesis of the literature on technology and teacher training.

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Classrooms are becoming increasingly more technological with computers in many classrooms across the country. Teachers now have access to machines that some believe will revolutionize the way we teach and enhance the amount of learning that takes place in schools. The proliferation of these devices has complicated the teaching learning process and finding the best ways of integrating technology into classroom practices is one of the challenges the 21st Century teachers face; teachers now face the sometimes daunting task of preparing students to live in a world where technology plays a significant role in everything we do; the way we communicate, access information and life in general.

Technology is now used throughout the world for gathering information, keeping records … and global collaboration for lifelong learners. Its pervasive use across almost all aspects of modern life- including business, industry, communication and entertainment- warrants continued efforts on the part of educators to prepare students for participation in a technological world (Kimble, 1999, p. 1).
A report from the National Advisory Committee on Training and Employment (NACTE, 1997) corroborates this view. It states: “The business world demands that our schools prepare educated workers who can use technology effectively in the global marketplace… technology is a central element of educational reform and student learning” (p. 3). It is incumbent upon schools therefore to ensure students are equipped with knowledge and skills required to function effectively in the society in which they live.

Despite the proliferation of computers in schools however, and the obvious need to prepare a technologically literate populace, computers in schools are either underutilized or misused (Cuban, 1993, 1998). In instances where computers are used, they are being used in what Cuban (1993) describes as “unimaginative” ways: writing term papers, writing tests and for tutorials and drill and practice (Abdal-Haqq, 1995; Jost, 1995; Office of Technology Assessment (OTA), 1995). The full potentials of modern technological devices are not fully explored and utilized in ways that will be beneficial to students. Grabe and Grabe (2001) propose that technology, when used in the classroom, should facilitate meaningful learning in an environment that fosters the development of cognitive behaviors such as higher order thinking, creativity, problem solving and reasoning among students”; these are critical to learning in an Information Age.

Despite the need to use technology in schools, however, teachers, the catalyst for educational reform have received little training in their teacher education programs (Vrasidas and McIsaac, 2001). “If we believe teachers are the primary agents of change, then a good place to start is by reforming our teacher education programs to better prepare teachers to take advantage of the affordances of various technologies and
successfully integrate them in their practice” (Vrasidas and McIsaac, 2001, p. 11). Other scholars interested in integrating technology in teacher preparation programs share this view (e.g., Brownell, 1997; Fisher, 1997; Parker, 1997; Schmidt, 1998). Technology should be integrated in teacher preparation programs so that students can see technology in use; this will in turn influence the way they use technology when they become in-field teachers. The task of preparing teachers to use technology in their classroom practices should not be relegated to their post college experiences, it has to begin with training they receive during their college experience. “Better preparing teachers is not a challenge that begins with teachers already in the classroom; it begins earlier” (The CEO Forum-School Technology and Readiness Report, 1999).

Results of research on the effectiveness of teacher preparation programs in preparing future teachers to integrate technology in their classes paint a bleak picture. The findings indicate that in general, graduates of teacher preparation programs are not prepared to integrate technology in their classes (ISTE, 1999; National Center for Educational Statistics, 2000; NCATE, 1997; OTA, 1995).

A study conducted by the International Society for Technology in Education (ISTE) reveals that teacher training institutions are not effectively preparing their graduates to incorporate technology in their classrooms. In 1999, The Milken Exchange on Education Technology commissioned ISTE to survey teacher preparation institutions to ascertain the status of technology education in teacher training programs across the United States. The report entitled, Will New Teachers be Prepared to Teach in a Digital Age? illustrates responses from 416 teacher preparation institutions (representative of approximately 90,000 graduates per year) found that, “…in general, teacher-training
programs do not provide future teachers with the kinds of experiences necessary to prepare them to use technology effectively in their classrooms” (p.2). Other studies and reports (e.g., Barron and Goldman, 1994; Campoy, 1992; Fisher, 1997; Wetzel, 1994) corroborate the view that teachers are not being adequately prepared to use technology in the classroom.

Willis and Mehlinger (1996), cited in a report by ISTE (1999) synthesized the literature on technology in teacher education. From the studies reviewed, they concluded: “Most preservice teachers know very little about effective use of technology in education … teacher education, particularly preservice, is not preparing educators to work in a technology-enriched classroom” (p. 978). They also found that despite the fact that many preservice teachers were exposed to instructional technology (IT) coursework, it was not linked to pedagogy or their field experiences. As a result, teachers were unable to make the connection between what they had learned in theory and its practical applications in real classroom situations.

Teacher training is critical; teachers must feel prepared to use technology if they are to use it in their classes with their students since it is highly likely “… that new teachers, adequately prepared, can act as change agents and accelerate the process of meeting students’ needs for the Information Age” (Brownell and Brownell, 1991, p. 147). The report from the National Center for Education Statistics (2000) posits a correlation between level of preparedness and technology use. The survey indicates that teachers who feel prepared are more likely to integrate technology in the classroom than those who feel unprepared. Teachers play a significant role in determining whether technology is used and the extent to which technology will result in educational reform.
Therefore, it is imperative that teacher education programs adequately prepare new teachers with skills necessary to integrate technology in their classes. Preservice teachers must be taught with technology as well as exposed to ways in which technology can be used in their classes if technology is to reform the education process (Abdal-Haqq, 1995; Brownell, 1997; Fisher, 1997; Parker, 1997; Schmidt, 1998; Shenouda & Johnson, 1995).

The purpose of this paper is to synthesize the existing literature on models for integrating technology into teacher training programs as well as to discuss the Integrating Technology into Teacher Training Programs (IT3P) Model that has been synthesized from existing literature on integrating technology into teacher training programs. The paper is divided into three main sections and examines the following issues:

a. Firstly, models for integrating technology into teacher training programs.

b. The second section discusses various recommendations for integrating technology into teacher education.

c. The final section of the paper presents the Integrating Technology into Teacher Training Programs (IT3P) model that has been developed from a synthesis of the literature on models for preparing preservice teachers to incorporate technology in their teaching.

Models for integrating technology into teacher education programs

A number of models for integrating technology into preservice teacher education programs have been proposed. In this section of the paper, existing technology integration models are discussed.
Schmidt (1998) postulates that two approaches have been primarily used in preservice teacher education programs; offering an undergraduate instructional technology course or integrating technology throughout all courses. Each of these approaches has its share of pro and cons.

In the first approach, a complete instructional technology course is offered to preservice teachers as one of the courses in their program of study. However, this can be problematic and counter intuitive as Collis (1988) cited in Parker (1997) believes technology classes are usually focused on teaching students about using technology at the expense of exposing them to practical ways of applying it in their classroom practices. Preservice teachers need to understand what computers can do, what learners can do with computers and ways of using them in their classes (Brownell, 1997).

Findings from the ISTE survey commissioned by the Milken Exchange family Foundation (1999) show that simply implementing a single instructional technology course in teacher preparation programs is not usually very effective. Based on the findings of the study, researchers concluded, “…formal stand-alone IT course work does not correlate well with …technology skills and ability to integrate IT into teaching” (p.3). Talbot Bielefeldt, one of the researchers for the ISTE survey, cited in an article entitled Information Technology Underused in Teacher Education, (September, 2002) reiterates this sentiment. He states: “specific technology training has a role, but up to a point. The institutions that reported the highest levels of student technology skills and experience were not those with heavy computer course requirements, but those that made use of technology on a routine basis throughout the teacher training program” (p. 2).
Therefore, integrating technology across the entire teacher preparation programs seems a more viable option than requiring students to do a single instructional technology course. This approach seems the one more likely to result in increased technology use by new teachers. One of the recommendations of ISTE (1999) is that for technology to be incorporated in teacher education programs, preservice teachers should “complete a well-planned sequence of courses and/or experiences that will help them understand and apply technology in education” (p. 23). Technology should be integrated into methods courses and field experiences of all pre-service teachers (Brownell, 1997).

Kortecamp and Croninger (1996) propose a model that was successfully implemented in a teacher education program at New England University (UNE). The model, designed to improve faculty’s skills so they could model technology use in their classes consists of five components that the authors believe “overlap and are ongoing”.

- Familiarization with hardware and software
- Partnering with mentors
- Developing personal projects
- Becoming mentors
- Keeping current

The first phase of the model involves two steps; first faculty must become familiar with hardware and software that currently exist. When they are sufficiently familiar with current technology, this is followed by aggressive professional development to equip them with the knowledge and skills necessary to use the technology that exists.

The second phase, partnering with mentors, involves collaborating with other faculty members who are more experienced using technology. The main reason for doing
this is so faculty get exposed to ways of using technology in their professional activity as well as to provide ongoing support for faculty who are less familiar with technology.

In the third stage, faculty become involved in designing projects that get their students to use technology in meaningful ways. This stage also includes three basic activities: modeling technology use in their teaching activities, facilitating and placing students in technology-rich field practices where they provide skilled supervision.

Fourthly, faculty themselves become mentors and guides their students in using technology. The final stage is especially important as technologies are constantly in flux. Therefore, keeping abreast with new technologies is critical if technology is to be effectively used in teaching.

*A systematic design model*

The second model that will be examined in this paper was developed by McKenzie, Kirby and Mims (1996). They describe a model that used Gagne’s systematic design model as the basis for conceptualizing and developing a technology training program used at West George College to facilitate staff development. The model consists of three distinct stages:

Stage 1: Planning - This phase involves doing a needs assessment to identify areas where training is needed. The target audience is also analyzed to ascertain their skills and knowledge so that the training program can address deficiencies in their knowledge base.

Stage 2: Implementation phase - During this phase, the actual training takes place. Training is based on the needs identified in the previous stage.

Stage 3: Evaluation- This involves assessing the effectiveness of the training program.
Using the systematic design model to design the training program resulted in positive outcomes. The authors reported that the technology training program at West George College was quite effective. The evaluation revealed that “instructors knowledge of the technology” ranked highest after exposure to the training program. Results of the study also indicate that faculty became more confident in using technology after exposure to the training program.

*RIPPLES (Surry, 2001)*

Thirdly, Surry (2001), developed a model for “integrating instructional technology into college of education”. His model is the result of a systematic review of the existing literature as well as the results of responses to questionnaires that were sent to deans of colleges of education. The model consists of seven elements: Resources, Infrastructure, People, Polices, Learning, Evaluation and Support, hence the acronym RIPPLES. Each of these elements will be examined in the subsequent section of the discourse.

Resources- in this stage of the model, the primary concern is “fiscal” resources. Although not given extensive consideration in the existing literature on adoption and diffusion of technological innovations, the deans surveyed thought access to financial resources must be given consideration as this can determine whether technology becomes incorporated in the college curriculum.

Infrastructure refers to hardware, software, network connections and other physical amenities required for technology integration.

People- the third stage of the model emphasizes the important role that people in the organization play; their beliefs, values and attitudes determine the extent to which an
innovation becomes adopted and integrated in the activities of the organization. This stage of the model also emphasizes the importance of communication among stakeholders and involving all parties concerned in the decision making process. There is usually cooperative problem solving and decision making at this stage so that resistance will be minimized.

Policies- there should always be a plan that outlines steps required for adopting new technologies. The plan should also identify prospective sources of funding so that technological devices can be continuously upgraded and maintained.

Learning- “Technology should not be seen as an end in itself” but as a means by which learning goals will be accomplished.

Evaluation- involves an assessment of four main things; 1) the impact of technology on learning, 2) evaluating technology itself 3) developing an integration plan to identify factor that facilitate or hinder adoption and integration process 4) return on investment (ROI) to determine correlation between project costs and benefits to be gained from it.

Support- the final stage of the model reiterates the need for support as people use technology. There are four critical components of the support system:

- Training (formal and informal)
- Technical support
- Pedagogical support
- Administrative leadership

The author reiterates that support is critical for technology adoption. Education change is a complex process and the result of a number of factors. Having the necessary
prerequisite factors in place will not guarantee successful adoption and implementation of educational technology innovations, but can facilitate the process.

Common threads across models

A review of the models proposed for integrating technology in teacher preparation programs indicates some commonalities among them. Firstly, simply requiring students to enroll in a single IT course in their program of studies is not sufficient for effectively preparing them to use technology in their classroom practices. Preservice teachers need more prolonged exposure to technology; teaching them about it will not facilitate its use. Therefore, technology use should be incorporated in all aspects of the curriculum with faculty modeling its use so students will be exposed to ways in which technology can enhance their practice.

Secondly, a number of prerequisites must be in place if technology is to successfully integrated into teacher education programs. Faculty must have access to staff development facilities that will prepare them to use technology. This is especially important as they will in turn model technology use so that preservice teachers can learn observationally methods for using technological devices in their classes. Resources required should also be in place. Teachers need to have access to hardware and software required for technology use. Technical support is also critical as teachers need ongoing support to ensure continued use of technology. Finally, teachers need to feel like they are a part of the innovation decision process. Therefore, there should be constant collaboration between the leader and members of the organization. The leader who perceives technology literacy as relevant for effective functioning in an information age
is more likely to encourage preservice teachers to use it as well as put the necessary facilities in place to ensure they are trained.

Technology integration takes time, time to learn about the innovation, time to be adequately prepared to use it. The factors mentioned here are minimum requirements. Their presence will not guarantee that a technological innovation will become built-into the curriculum; there are other variables at play. However, their presence will play a more facilitative role on the road to successfully incorporating technology in the teacher education curriculum.

Recommendations for integrating technology in teacher education programs

A number of recommendations for integrating technology into teacher preparation programs have been proposed. The NCATE Report (1997) identifies “changes” that teacher education programs need to successfully prepare new teachers to use technology in their classes. The report states that simply adding a course will not ensure change; change requires a “transformation of the culture of teacher education” (p. 9). This can be achieved in a number of ways.

Firstly, teacher preparation institutions need to create a vision; a long-term view of how incorporating technology can enhance the program. This involves deciding what technology can do and how it will be used in the program. The vision should also include an examination of how technology can change the practices of future graduates of teacher training institutions.

Secondly, developing a plan; a physical document which details how the vision will become a reality. Findings from the ISTE survey (1999) indicate, “Most teacher-preparation programs do not have a written, funded, regularly updated technology plan.
The presence of a technology plan has a positive, but low, correlation with other measures of capacity” (p. 2). The plan should include steps that will be taken to procure and distribute hardware and software required for the program. It must also include ways in which technology can be incorporated into the curriculum as well as ways in which teachers will receive ongoing support when they decide to implement the innovation in their classes. The plan should also include facilities that should be in place for staff development, acquisition of hardware and software as well as networking of computers and changing the existing curriculum to facilitate new pedagogies associated with using new technologies (ISTE, 1999). They should also include a set of goals and objectives that can be achieved though incorporating technology into the program (Kimble, 1999).

Brownell and Brownell (1991) propose three things that are required if preservice teachers are to act as change agents:

- A required course on computer literacy for teachers
- Exposure in methods courses to the uses of technology to teach specific content and
- Field experiences where can apply what they have learned.

Field experiences are critical to efficient use of technology in classes as students should be provided with instances that “allow experimentation” in using technology in practical situations (NCATE Report, 1997). Practice using technology will increase preservice teachers’ confidence as they become more comfortable using technological devices. Teachers need field experiences using technology under the supervision of qualified instructors.
Integrating Technology into Teacher Training Programs (IT³P) Model

The following model has been extrapolated from a synthesis of research studies and papers on integrating technology into teacher education programs. The model depicts key features that should exist in teacher training programs to ensure preservice teachers are provided with experiences required to integrate technology in their teaching. While each variable can be viewed as an individual entity, to ensure teachers are prepared to teach with technological tools, the IT³P model proposes an interaction among all variables in the model. For teachers to be equipped with knowledge and skills required to integrate technology in their teaching, all variables must exist.

The diagram below depicts the IT³P model. Each variable in the model will be detailed in the subsequent sections of the paper.

![Integrating Technology into Teacher Training Programs (IT³P) Model Diagram]
The reader will recall that the IT3P model was synthesized from a review of the existing literature of integrating technology into teacher training programs. To develop the model, a thorough analysis of the literature on the following topics was done:

a) Barriers to integrating technology in teacher training programs (Barron and Goldman, 1994; Cuban, 1998; David, 1994; Parker, 1997; Sudzina, 1993 and Rosenthal, 1999).

b) Factors that will facilitate technology adoption in colleges of education (Dasher, 1997; Kimble, 1999; Mann and Shafer, 1997; Munday, 1991; Office of Technology Assessment (OTA) Report, 1995; RAND Report, 1995; Sprague, Kopfman, & de Levante Dorsey, 1998).

c) Effective teacher training programs (Bowman Alden, 1989)

d) Approaches to integrating technology into teacher training programs (Gillingham and Topper, 1999).

e) Finally, models for integrating technology into teacher training programs. The development of the IT3P model was influenced by the works of Kortecamp and Croninger (1996); McKenzie et al., (1996); Schmidt (1998); and most significantly, by Surry’s (2001) RIPPLES model.

The IT3P model is divided into two parts: prerequisite factors and college level factors. The first section, prerequisite factors describe features that should be in place in colleges of education to facilitate technology integration. These include the presence of a technology plan/policy, opportunities for staff development, access to resources required to facilitate technology integration, and support, both technical and administrative.
The second section of the model, college level factors, present factors that should occur while students and faculty interact in an effort at integrating technology in the teaching learning process. These factors are critical to ensure prospective teachers are provided with experiences required to equip them with knowledge and skills need to integrate technology in their teaching. These include modeling technology use, modeling a positive attitude towards technology, training, and providing preservice teachers with opportunities for practice through coursework activities as well as field experience. Each of these factors will be discussed in details in the subsequent sections of the discourse.

Prerequisite factors

Technology Plan/Policy

The variable defined as technology plan will be examined on two different levels; firstly in terms of a physical document or a policy that should exist in all colleges of education and the second, plan will be used in a similar way as is used by McKenzie et al., (1996); as synonymous with the planning stage of Gagne’s systematic design model (Gagne et al., 1992).

The technology plan should be the result of collaboration among all the primary stakeholders; curriculum policy makers, college administrators, faculty and members of the community. Faculty should be involved at this stage of the decision making process so that there will be a kind of shared vision which will in turn, reduce the amount of resistance that may occur if dissemination of the technology policy is predominantly top-down. The technology plan should include a detailed physical document that outlines the goals of teacher training programs and how technology will be used to achieve these
goals. The plan should also outline how technology will be procured, allocated and maintained (Kimble, 1999).

In the second instance, plan is used here in a similar way as is used by McKenzie et al., (1996). They propose that during the planning phase, a needs assessment is done to determine preservice teachers’ technology knowledge and skills to identify the gap between what exits currently and what is required. The needs analysis gives policy makers an indication of where training is required and what skills should be trained. Ideally, this step should be conducted prior to the development of the technology policy discussed previously.

Staff development

Key to successful integration of technology in teacher training programs is the availability of opportunities for staff development. However, while providing faculty with staff development opportunities is required, this feature is insufficient in and of itself. For staff development to be effective, faculty must participate in these activities. One way of doing this is through providing faculty with incentives that will encourage them to take part in staff development activities.

Staff development should not only provide faculty with technology skills and hands-on experiences using technology, but also expose them to ways in which technology can be used to facilitate practice (McKenzie, et al., 1996; Pettenati, Giuli, & Abou Kahled, 2001). It should also be ongoing to facilitate the ever-changing nature of emerging technologies (Kimble, 1999; RAND Report, 1995).

Sprague, et al., (1998) propose that staff development activities should not be conducted in “one-size-fits all workshops” but should be customized to suit
idiosyncrasies of different situations. Colleges of education faculty also “need individualized instruction to explore software appropriate to their content areas and need support as they begin to implement new teaching approaches” (ISTE 2000-2002, p.15).

One of the most effective ways of ensuring faculty are equipped with skills required to integrate technology in their teaching is “through working one-on-one (mentoring) where individual’s needs can be addressed” (Thompson, Hansen, and Reinhart, 1996) cited in Stewart (1999, p.15). Mentoring can be a means of professional development. The mentoring process can expose faculty to both technical skills as well as provide them with knowledge of ways in which technology can be incorporated into their teaching.

Therefore, faculty must be provided with staff development so they will be equipped with knowledge and skills to enable them to use technology in their teaching.

Access

If technology is to be integrated into the college of education curriculum, faculty and students must have adequate access to the latest technological devices and infrastructures required. This factor has been variously termed access, resources or infrastructure. While Surry (2001) makes a distinction between resources and infrastructure in his RIPPLES model, other scholars (e.g., David, 1994; Parker, 1997) do not. Access, used here, will refer to the availability of hardware, software, telecommunication networks and infrastructures. It is important that available technologies at colleges of education are on par with those available in the schools as well as the business community.
Access to resources is included as a prerequisite factor because if there are outdated hardware and software and if faculty and students do not have access to resources, integration will be hindered.

To ensure colleges have adequate access to technology, community support is critical. Colleges of education should develop partnerships with the community as they can be a potential source of funding to procure technological devices as well as to provide expertise. Access to current technologies should be provided to faculty and students both inside and outside the classroom.

Support

The final variable included as a prerequisite factor is support, defined both in terms of technical and administrative support. Technical support refers to having a skilled expert available to assist faculty with technical issues while administrative support is somewhat less tangible.

Administrative support can become manifest in the form of encouragement to use technology in teaching, release time to learn about technology and how to use it to augment instruction; regularly scheduled meetings so faculty can share experiences regarding success and difficulties using technology as well as to get assistance and encouragement from each. Support can also come in the form of training sessions to facilitate continued technology skills development and technology use (Kinslow, Newcombe, & Gross 2002).

Faculty should also be provided with technical support from an individual experienced in technology use as well as pedagogy. This person’s primary role is to
provide faculty with assistance when they have difficulties using technology and should be available at all times to provide help when it is required.

Support for technology use has to be ongoing even after faculty decide to use it in their classes. Support for technology use is critical to ensure continued use of technology tools in teaching.

College level factors

Included in this section of the IT3P model are factors that should occur as college of education faculty integrate technology in their teaching. Faculty should model technology use, model a positive attitude towards technology, provide students with knowledge and skills via training and ensure they get practice using technology as teaching tools through coursework activities as well as during their field experience. Each of these is detailed in the following section of the paper.

Modeling

Modeling technology use by faculty is critical to ensuring preservice teachers are exposed to ways in which technology can be incorporated into different content areas. Munday (1991) proposes, “The ideal way to incorporate technology into teacher education programs is to integrate it into the college curriculum with professors modeling its use” (p.29). When faculty model technology use, preservice teachers get an opportunity to see how technology can be used in the classroom (Stewart, 1999) as well as how it can be applied in content specific disciplines (Stuhlmann, 1998; Thomas et al., 1996). Therefore, faculty should know how to integrate technology in their classes so they can, in turn, show their students how to use it in their classes.
Positive attitude

Attitude towards technology can become manifest in two ways: (a) technology affinity which indicates a positive attitude towards technology or (b) technology aversion or a negative attitude towards technology. Faculty’s attitude towards technology can determine the extent to which they use technology in their teaching and have an indirect impact on preservice teachers’ attitude. Teachers who display an affinity towards technology are more likely to integrate it into their classes than those with an aversive attitude (Mann and Shafer, 1999). Faculty who believe integrating technology in their classroom will be beneficial and result in increased academic achievement are more likely to integrate it in their teaching (OTA Report, 1995). If technology is to be successfully incorporated into teacher training programs, faculty must display a positive attitude towards technology.

Training

One way of ensuring preservice teachers are provided with experiences necessary to integrate technology in their teaching is through training. The most common way that has been adopted by colleges of education is by including an instructional technology course in the college curriculum. However, results of research indicate that requiring students to complete a single instructional technology course is not effective in equipping them with knowledge and skills necessary to use technology in their teaching (OTA, 1995; Stuhlmann, 1998; Thomas, Larson, Clift, & Levin, 1996; Willis and Sujo de Montes, 2002). Training should not only focus on equipping preservice teachers with technology skills, but should also expose them to ways in which technology can be
incorporated into specific content areas to enhance learning (Bielefeldt, 2001; Thomas, et al., 1996).

Field Experience/Practice

In tandem with exposing preservice teachers to opportunities for training to equip them with knowledge and skills required to incorporate technology in their teaching, preservice teachers should be provided with opportunities to see technology in use in actual classroom settings, as well as practice what they have been taught. This practice can become manifest in the form of coursework, or by practicing with their peers in contrived classroom settings. The most ideal way of ensuring preservice teachers get practice using technology is through a combination of completing content-specific coursework as well as practice in actual classrooms. Faculty should ensure preservice teachers are provided with opportunities to prepare technology-based lessons which require them to practice using technology as teaching tools (Thomas, et al., 1996).

According to an ISTE document entitled “Essential Conditions for Teacher Preparation” (2000-2002), “Prospective teachers must experience and observe effective uses of technology in their general education and major coursework…coursework must consistently model exemplary pedagogy that integrate the use of technology for learning content with methods for working with PK-12 students”. During field experience, college of education candidates should be provided with opportunities to see technology in use preferably under the supervision of technology using supervisors. Field experience can also provide a means of instilling in preservice teachers that technology should be considered an integral part of their classroom environment (Stuhlmann, 1998).
Wetzel and Strudler, in their editorial report in the *Journal of Computing in Teacher Education* (Winter, 2002) postulate, “…field experience has a powerful effect on students’ perceptions of what it means to be a teacher and clearly shapes their beliefs and practices” (p.30). Therefore, providing students with opportunities to use technology as well see technology in use in actual classroom settings is a “critical step toward preparing technology using teachers for the future” (Wetzel and Strudler, 2002, p.30).

Conclusion

If technology is to be systematically integrated into classrooms across the country and result in increased learning, teachers, the primary agents of educational change must be adequately prepared to use technology in their classes. Training should not focus only on technology skills, but also on ways in which technology can be use to augment the instructional process. Finding the most effective ways of preparing teachers to teach with technology is a challenge that colleges of education face. The IT3P model is proposes factors that have been proposed as those relevant for effective technology integration.

If technology is to be integrated in teacher training programs, curriculum policy makers and administrators of colleges of education need to find the most effective and efficient ways of equipping preservice teachers with knowledge and skills required to teach in an increasingly technological society.
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