Another Perspective on Technology in Teacher Education

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The computer is a tool. Its actual value does not depend on its quality of advances, but its users—teachers and students. The question we are facing today in teacher education is how to use this tool for effective teaching and learning. Reviewing what we have done and examining what we are doing will help us to find answers.

Computer Literacy Training

Computer-assisted instruction in education started in the early 60s and increased in the 70s. Since 1980s, more and more computers have entered schools and computer literacy is becoming a sensational buzzword in education. The assumption is that as far as teachers become computer literate, they will automatically use computers in the classroom and the potential of the computer technology in education will be unquestionably achieved. Therefore, computer literacy training for teachers is increasingly recognized with four approaches: programming centered, computing-curriculum focused, problem solving emphasized, and productivity tools anchored approaches. Each approach has had its proponents and defenders, and all have their critics. The common thread through the criticism has been that these approaches treat the computer as the subject matter, not the implementation.

Programming-centered approaches dominated in teachers' computer literacy training in the early and middle of 1980s when microcomputers entered the schools in the late 1970s. Teachers mostly attended training on BASIC (Beginners All-purpose Symbolic Instruction Code) language, and few on PASCAL or COBOL languages. Teachers learned to write programs to tell the computer what they wanted it to do. Computer literacy therefore became a synonym for programming. Computers were then used for programming instruction instead of curriculum-related instruction. This approach resulted in many educators developing technophobia (LoCkard & Abrams and Many, 1997). Programming-centered training seemed to turn more teachers away from using computer technology in the classroom, with few becoming computer literate enough to make actual innovations in their teaching.

Gradually, computer literacy training was shifted to a computing-curriculum-focused approach. The literacy definition was broadened to become units or classes at different levels. With this approach, teachers were required to master survival skills and become knowledgeable about uses or misuses of computers before moving to the next level. Teachers at all levels and in all different disciplines were supposed to become "computer teachers," teaching computing units for that grade. This approach is no doubt helpful for some teachers who work with computers; however, one study of 125 Stanford professors in the mid-1980s showed that 80% of them used computers to prepare lectures, handouts, and exams. About one quarter of them required students to write papers or analyze data. Examining the uses of computers in the classroom, it was found that only 13 out of 125 professors had actually blended the computer into their classroom instruction (Cuban, 2000).

By the end of 1980s, developing problem solving ability became a universally accepted objective. A problem solving approach was joined with the computing literacy training. It tended to seek a new way to stimulate the use of computers in classrooms. However, few software packages were designed specifically for problem solving in depth. Although LOGO was firmly dedicated to mathematics problem solving, it was frequently taught as a change of pace, as a way to create pretty patterns, and as something separated from problem solving. A survey conducted in 1989 among 660 faculty members in humanities and sciences found that 80% of the faculty members used computers to prepare handouts, 72% to design exams, and 62% to prepare lectures. In the classroom, only 10% actually used subject-related software (Cuban, 2000). The problem solving approach usually had a sensational start but often failed.

In the early 1990s, there was a trend of looking at the computer as a tool and believing its effectiveness depends on the person's skills in using this tool. This perspective lead to a teacher preparation program revolution, in which almost every teacher preparation

program in the United States included either required or elective education technology courses to satisfy NCATE review. Computer literacy training for teachers was therefore transited to a focus on productivity tools and applications. The common sequences of the training were basic operating skills, wordprocessing, spreadsheets, database management, e-mail, and finally multimedia and the Internet. The courses tended to provide teachers with the knowledge and skills to use these tools. Yet, a faculty survey in 1994 found even poor use of technology in the classroom. Of 750 professors who taught undergraduates, 59% said that they never used a computer in the classroom, 19% reported occasional use and only 8% said that they used computers often. Since 1994, limited evidence of frequent use of e-mail and the Internet among faculty and students exits, with less than 10% of the Stanford faculty reporting frequently using these new technologies. Low-tech teaching still exists in high-tech schools (Cuban, 2000).

Current Computing Education for Teachers

Computing education for teachers today is facing the challenge of how to integrate appropriate technologies with strategies for maximum learning. Since the 1980s, computers have flooded into schools. Compared with the academic year of 1983-1984, the ratio of students to computers in the school has changed from 125:1 to 12:1 in 1995. Never in the history of American education has so much money been spent with so little thought given to implementation and so little demanded in return (Lockard, Abrams, & Many, 1997). NCATE has set integrating computer technology in education as one of its criteria for the review of teacher education programs; however, what had been expected to happen did not occur. The implementation process is still struggling, somewhat like one jumping on a buse but having no clear destination.

The arguments concerning computing education for teachers are focused on the question whether it should be technology course(s) driven or technology/ curriculum combination driven focus in teacher education programs. The former approach favors keeping or creating computing technology courses. These technology classes provide pre-service or in-service teachers with different levels of computing skills and strategies. It is believed that as teachers master these skills and strategies, they will automatically implement technology in their classrooms. The latter approach prefers to embed computing skills and strategies into all courses in the teacher education program. It is believed that pre-service teachers or in-service teachers who have enrolled in teacher education programs will gain the computing skills and strategies bit by bit and eventually be able to use the technology in their classrooms. Should technology courses be considered as required components in a teacher education program or be eliminate? Should each curricular content course cover one or two technological skills? To be or not to be, that is still the question.

Rapid changes in technology pose another challenge for computing education for teachers. Oblinger (2000) believes that these changes will have an impact on global education in the 21st century. Because of these rapid changes, technology will become an accepted tool for almost everyone and everything. Ideally, the lower costs and improved ease-of-use will allow teachers to use computers more often and implement technology in instruction and learning more effectively. However, few of us need reminders of the rapid pace in the technology industry. It is often the case that a computer may become out-of-date almost as soon as it is purchased, and the technology training that a teacher receives is no longer applicable almost as soon as he or she goes back to teaching in the classroom. The continual need to upgrade software and hardware is costing schools and teachers enormous time, energy, and money to keep current. Should we or can we take a breath to think about how to make the implementation more meaningful or simply keep trying to catch up with increasingly advanced technology? This is the question looking for an answer.

Another Perspective of Implementation

Creative uses of computer technology can make the difference. Common software packages, such as Microsoft Office and ClarisWorks, have the potential to help teachers and students. Wordprocessing programs have more powerful uses than paper simply writing; spreadsheets are not limited to compiling grade sheets; databases can definitely go beyond student record keeping; and presentation software is not only a presentation tool. A teacher can use wordprocessing programs to create math problem with fractions, use spreadsheet programs to develop hands-

on activity for youngsters to learn vocabulary, phonics, and reading, use database programs for social studies and subject-related projects, and apply presentation software to simulate teaching. I believe that if teachers and students use the technology creatively, implementation can become meaningful.

In the face of rapid changes in computing technology, life long and self-paced learning is the key to effective implementation. Obtaining technology training once or twice or one or two technology classes is not enough. No single teacher education program will be able to provide schools with fully and permanently qualified professionals. Few of us can anticipate what technology will be available a few months or years from today. However, technology courses will help teachers to master the basic computing skills. The alignment of computer technology with curricular disciplines will enhance technology implementation in teacher education programs. Therefore, implementing technology in teacher education programs needs to emphasize the mastery of the basic technological skills, and more important, should encourage teachers be life long learners and to creatively use technology for effective teaching and learning. The creative uses of computer technology depend on one's curiosity and enthusiasm, basic technological skills, and the alignment of technology and curricular contents.

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