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Emerging technologies for quality education

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ABSTRACT

Computer and network based technologies now hold great potential for increasing the access to information as well as a means of promoting learning and that shape the process of education. Schools and classrooms never before had such universal access to information. Technologies are transforming classrooms into more engaging, collaborative and productive learning environments in which instructions can be customized to student's specific needs, interests and learning styles. It is also redefining the way educators teach as well as the role they serve – from being the sole source of information to being a guide, facilitator and coach in the learning process.

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Introduction

There are clear opportunities to infuse technology and educational practice. Whether you are involved in higher education, secondary education, elementary education, or special education, all of us find it difficult to catch up, keep up, and put up with fast-moving computer-based technology. This demand the new ways of teaching and learning that are more aligned with a sense of expression, reflection, exploration and above all, creating rather than only consuming content. If we support learning through collaboration, publication, multiple literacies and inquiry, the way that learners learn and are taught will change. The content and assessment of their learning will change as well. We can consider these problems and opportunities in terms of the teacher, the educational institution, modes of assessment and curriculum content and above all with the technologies available in the field of education.

Before the introduction of the blackboard have we seen a piece of equipment make such a difference in how we teach. Today, not only do we use computers, but we also have laptops, wireless laptops, and tablet PCs. In addition, we have the World Wide Web, scanners, CD burners, USB drives, digital cameras and digital video cameras, PDAs, as well as video and DVD players. And most educators use a variety of tools-including video, e-mail, desktop conferencing, online programs such as WebCT and Blackboard, as well as video conferencing-to teach. Thus, it is no longer acceptable for educators to be technology illiterate & require educators and educational institutions to confront the hidden challenges of children.

Impact of technology on education

"Technology is making a significant, positive impact on education. Important findings of the studies done by the Institute for the Transfer of Technology to Education, Alexandria are

- Educational technology as demonstrated a significant positive effect on achievement. Positive effects have been found for all major subject areas, in preschool through higher education, and for both regular education and special needs students. Evidence suggests that interactive video is especially effective when the skills and concepts to be learned have a visual component and when the software incorporates a research-based instructional

design. Use of online telecommunications for collaboration across classrooms in different geographic locations has also been show to improve academic skills.

- Education technology has been found to have positive effects on student attitudes toward learning and on student self-concept. Students felt more successful in school, were more motivated to learn and have increased self-confidence and self-esteem when using computer-based instruction. This was particularly true when the technology allowed learners to control their own learning.
- The level of effectiveness of educational technology is influenced by the specific student population, the software design, the teacher's role, how the students are grouped, and the level of student access to the technology.
- Students trained in collaborative learning, had higher self esteem and student achievement.
- Introducing technology into the learning environment has been shown to make learning more student-centered, to encourage cooperative learning, and to stimulate increased teacher/student interaction.
- Positive changes in the learning environment brought about by technology are more evolutionary than revolutionary. These changes occur over a period of years, as teachers become more experienced with technology.
- Courses for which computer-based networks were use increased student-student and student-teacher interaction, increased student-teacher interaction with lower-performing students, and did not decrease the traditional forms of communication used. Many student who seldom participate in face-to-face class discussion become more active participants online.
- Greater student cooperation and sharing and helping behaviors occurred when students used computer-based learning that had students compete against the computer rather than against each other.
- Small group collaboration on computer is especially effective when student have received training in the collaborative process.

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Infusion New Technologies and Skills in the Field of Education

The new Technologies include Blogs, RSS, Podcasts, Handhelds, Robotics, Digital Video, Social Bookmarking, Internet Telephony, One to One Social Networking Sites, Tablet Computers, Virtual Worlds, Interactive Whiteboard Technologies & Learner Response Systems.

The Technology skills include the following: collaboration and teamwork; strong written and oral communication skills; creativity and critical thinking skills; mathematical problem solving; cultural/global/diversity studies; information management; learning skills; personal responsibility and management skills; and technological literacy.

What is now known about learning provides important guidelines for uses of technology that can help students and teachers develop the competencies needed for the 21st century. It is important to understand that technologies do not guarantee effective learning; in fact, inappropriate uses of technology can actually hinder learning. Educators of the twenty-first century must become better at understanding when and under what conditions, technology can best be used to leverage student learning.

Technology Skills for Teachers

The, National Educational Technology Standards (NET standards) outlines the standards necessary for technology skills, both in teachers and in students. The suggested minimum standards outlined here are meant to assist buildings in outlining their specific technology plans in the buildings. Standards within each category are to be introduced, reinforced, and mastered by them. Teachers can use these standards and profiles as guidelines for planning technology-based activities in which students achieve success in learning, communication and life skills.

Here is a comprehensive listing of the technology skills that every educator should have. Because of computers and associated technologies continue to change and evolve, educators must continue to strive for excellence in their work. Today that includes continued time and effort to maintain and improve their technology skills.

Here are 20 basic technology skills that all educators should now have:

1. Word Processing Skills
2. Spreadsheets Skills
3. Database Skills
4. Electronic Presentation Skills
5. Web Navigation Skills
6. Web Site Design Skills
7. E-Mail Management Skills
8. Digital Cameras
9. Computer Network Knowledge Applicable to your School System
10. File Management & Windows Explorer Skills
11. Downloading Software From the Web (Knowledge including eBooks)
12. Installing Computer Software into a Computer System
13. WebCT or Blackboard Teaching Skills
14. Videoconferencing skills
15. Computer-Related Storage Devices (Knowledge: disks, CDs, USB drives, zip disks, DVDs, etc.)
16. Scanner Knowledge
17. Knowledge of PDAs
18. Deep Web Knowledge

19. Educational Copyright Knowledge

20. Computer Security Knowledge

The competent teacher will have, and continually develop, the knowledge and skills in learning technologies to be able to appropriately and responsibly use tools, resources, processes, and systems to retrieve, assess and evaluate information from various media. The competent teacher will use that knowledge, along with the necessary skills and information, to assist learners in solving problems, communicating clearly, making informed decisions, and in constructing new knowledge, products, or systems in diverse, engaged learning environments

Technology Skills for Pre-service Teachers

Although pre-service teachers do have a degree of knowledge with regard to information and communication technologies (ICT), "they have little know-how or technopedagogical ability with which to integrate those technologies into their teaching practice" (Karsenti 2001, 35)

Each student entering the Faculty of Education is required to learn Communications Technology and methodology of teaching .The primary focus of the course should be to provide experiences for the students that will help them effectively infuse technology into their future classrooms. This objective can accomplished by providing students with the opportunity to use a variety of technologies to accomplish tasks and by explicitly exposing them to the process of learning new technologies. This process includes exploring features of various technologies, identifying the appropriateness of using various technologies in teaching and learning, and devising methods to infuse these technologies into their teaching and learning. Students learn to be cognizant of the fact that we live in a culture of constant change—a technology may be appropriate today but not tomorrow. This philosophy underpins the programme, and encourages students to be reflective in their teaching and learning. As Riel and Becker (2000) state, "the rapid speed often technological development brings new computer mediated tools to the classroom door each year. Teachers have to make continual decisions about how to best utilize these tools in teaching, learning, and assessment." This course attempts to develop the skills as well as the critical and reflective thinking necessary to engage in that process.

Preparing teachers to use technology effectively is a major area of concern for teacher education. Effective technology use includes such activities as linking curriculum outcomes with various technologies, establishing a learning context of discovery and process in the use of technology, collaborating with others both face-to-face and virtually to achieve learning outcomes, simulating real-world environments, and assessing outcomes. In turn, faculty modeling of effective technology use has often been emphasized as a key means of illustrating such activities in teacher education programmes."If pre-service teacher education is to make a difference in how teachers use technology, then teacher educators must model effective technology use" (Milligan and Robinson 2000), Bruder 1989; Fulton 1989; Handler and Marshall 1992; Beisser, Kurth, and Reinhart 1997; Kent and McNergney 1999; Beisser 2000; Topp and Mortenson 2000). While we agree that faculty modeling is a necessary, though often absent, component of preservice teacher preparation, it is only one part of developing technopedagogically skilled teachers. We must show pre-service teachers how to learn by outlining what process works for combining technology and pedagogy; they need to be exposed to theory and research on technology in order to develop evidence-

based instructional strategies and a conceptual framework for integrating and evaluating technology applications. Successful programmes must also engage in technology skill and process-oriented instruction to foster effective technology use in their students.

One important and significant shortcoming of faculty modeling is that the methods of integrating technology at the university level—the methods most familiar to the majority of pre-service teachers—are quite different than the methods for teaching in a school system. For example, the appropriate and effective use of discussion boards and course management software in the university classroom will be different from that in the school classroom. University students can be expected to contribute to class through a variety of asynchronous learning tools outside the classroom while in a school setting, it would be necessary to reserve class time for such activities. The university instructor can more readily assume computer access for students outside the classroom whereas the school teacher may still need to provide computer access for school-based work. A necessary component of teacher education, therefore, would be the act of explaining what we are doing when we integrate technology and a discussion of how to adopt different methods of integration given different educational contexts (Beaudin and Hadden 2004). Faculty modeling must be complemented by technology skill in order to prepare pre-service teachers for the distinctive settings they will face in their future professions.

Application of Technology Skills in School System

While complex factors have influenced the decisions for where, what, and how technology is introduced into our nation's school systems, ultimately, the schools will be held accountable for these investments. How can schools ensure that the promise that technology holds for student achievement is realized? What factors need to be in place to support the effective use of technology? What resources can school districts use to help them plan for technology that will have a positive impact on student achievement, and how can they justify that investment?

To answer these questions, educators need to look at the research on technology and student achievement and the contextual factors that affect learning goals. A decade ago, access to technology was limited and wiring schools was one of the nation's highest education priorities. Ten years of substantial investments have vastly improved this picture. Along with expanded access has come a growing pervasiveness of technology in society. For a generation of young people, technology, particularly the Internet, has assumed a substantial stake in their social and educational lives.

There may be expectations that technology skills will solve all the school's problems with student learning and achievement. To be effective, however, technology skills must be used to promote new learning goals and teaching strategies that are student-centered, collaborative, engaging, authentic, self-directed, and based on development of higher-order thinking skills.

Evaluation of Technology Skills

Evaluating the implementation of a technology skill can be conducted by various means. Simple observations, both negative and positive, that have been made by students and teachers using the technology are the most helpful. Interviews and informal meetings with both teachers and students can draw out the lessons that both groups have learned from using the technology. A simple written survey can assist in measuring the extent to which the plan has met its original objectives and

expected outcomes. The following questions should be addressed when planning the evaluation of the implementation of your technology skill:

- How and when will you evaluate the impact your technology skill implementation has on student performance?
- Who will be responsible for collecting ongoing data to assess the effectiveness of the plan and its implementation?
- What windows of opportunity exist for reviewing the technology skill? (For example, the plan might be reviewed during curriculum review cycles.)
- How will accountability for implementation be assessed?
- How will you assess the level of technological proficiency gained by students, teachers, and staff?
- How will you use technology to evaluate teaching and learning?
- What is the key indicator of success for each component of the plan?
- How will you analyze the effectiveness of disbursement decisions in light of implementation priorities?
- How will you analyze implementation decisions to accommodate for changes as a result of new information and technologies?
- What organizational mechanism will you create that allows changes in the implementation of the technology skill and in the plan itself?

As technology-related learning ventures represent growing opportunities for applying instructional theories, advancements in technology could make constructivist approaches to learning more possible. Hypermedia environments that allow for non-linear learning and increased learner control are frequently mentioned in the literature, as particularly useful for the constructivist designer (Mergel, 1998). Multimedia and the Internet are also alternatives to the linear structure and facilitate data gathering techniques, supportive of constructivist learning principles. As an experiential learning tool, virtual reality is also considered an inactive knowledge-creation environment. In general, the emergence of environments - such as toolkits and phenomenaria, multimedia, Socratic dialogues, coaching and scaffolding, role-playing games, simulations, storytelling structures, case studies, holistic psychotechnologies - could promote instructional strategies that facilitate more active construction of meaning (Wilson, 1997). Moreover, microworlds and virtual reality simulations could stimulate authentic learning while the World Wide Web in general and Web Quests as innovative teaching strategies in particular could offer multiple representations of reality (Cey, 2001).

Conclusion

It is approximately 100 years since John Dewey began arguing for the kind of change that would move schools away from authoritarian classrooms with abstract notions to environments in which learning is achieved through experimentation, practice and exposure to the real world. Today, learning is approached as a constructive, self-regulated, cooperative, individually different, technology oriented process. In a world of instant information, technology skill can become a guiding practical foundation for the in-service teachers, pre-service teachers and students provide a technological proficiency that can be applied to several learning goals.

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