

## **Building Assessment Mechanism into Educational Technology and Curriculum Integration**

By Robert Zheng and Barbara Wilmes\*

The increase of routine access to modern learning technologies by teachers and students has made it possible to integrate various technologies such as hypermedia and multimedia into classroom teaching. Modern learning technology has become part of the U.S. instructional landscape in formal educational settings from kindergarten through graduate school. In the meanwhile, concern regarding how to effectively integrate technology into curriculum becomes one of the primary issues in education which has caught the attention of the educational administrators, teachers, students, parents, and community. A recent study shows that while the majority teachers can use computer applications and run some educational software, their computer-based applications have little or no relevance to the curriculum objectives and instructional programs (Lohr, 2000).

Studies also indicate that what teachers are concerned most is not what particular piece of technology they learn, but rather how the technology can be effectively integrated into classroom teaching. Oftentimes efforts to integrate educational technology into curriculum fail to yield desired results. This is because such efforts are not garnered by a sound system of quality assessment. This paper will therefore address the issue of assessment in educational technology by (1) studying the pros and cons of various approaches in educational technology assessment and (2) proposing a new assessment model that focuses on various stages of designing, developing, and implementing technology and curriculum integration.

### **The Status Quo of Educational Technology Assessment**

The educational technology assessment can be, in general, subsumed into three categories: (1) Assessment in specific content area, (2) Enhanced assessment, and (3) Assessment in authentic learning with technology. The content specific approach focuses on the assessment of the effectiveness of using technology in a specific subject area such as math, reading, ESL education, etc. Such an approach limits itself to a specific learning situation within a single subject and fails to address the issue of overall technology integration with curriculum (Dugdale, et al., 1998; Lindsay, 1999). The enhanced assessment approach zeros in on the use of technology in assessment itself, such as online testing and computer-assisted assessment. The authentic learning approach tries to study the role of technology in an authentic, constructive learning situation. For example, how can technology be used to assist problem-based learning, and how can technology be used as a tool to enhance creative, constructive learning in students? The above three approaches have contributed to the understanding of

---

\* Robert Zheng, Ed.D. is an assistant professor of educational technology in Educational Studies Division, Marian College, Wisconsin. Barbara Wilmes, Ph.D. is the Director of the Department of Education at Seminole Tribe, Florida.

the relationship between assessment and technology. They, nonetheless, fail to address the fundamental question of assessment in technology integration: what are the common variables that are essential to technology and curriculum integration regardless of the subjects, methods, and strategies in learning?

Bowens (2000) tried to answer this question by providing a technology integration model known as The RAC Model which consists of three phases in technology integration: Research, Analysis, and Communication. Bowens' model seems to step beyond the specific content areas to provide a more general guidance to technology integration. Yet the model has an inherent flaw that hinders it from being fully implemented in teaching and learning. It fails to provide the logical connection between the use of technology and the implementation of instructional objectives. In other words, it doesn't answer why a certain piece of technology is being used in that particular learning situation. It does not examine the functions of technology to justify its use in a particular learning situation. Morrison et al. (1999) developed a model called Integrating Technology for Inquiry (NTeQ) which examines the various stages in technology integration, including the functions and use of technology in learning. However, this model regards assessment as a separate entity. We believe that the assessment should be an ongoing process and that it must be built into every stage of technology and curriculum integration.

### **EEAER Assessment Model**

Being aware that teachers face challenges in their use of technology and curriculum integration, and realizing that technology and curriculum integration depends on a sound system of quality assessment, we propose a model which contains five stages: (1) *E*valuate objectives, (2) *E*xamine technology functions, (3) *A*ssess technology-rich activities, (4) *E*valuate learning outcomes, and (5) *R*eflect on learning experience. We named the assessment model as EEAER Model and it is implemented as follows:

**Stage One: Evaluate objectives.** The first stage focuses on setting up learning objectives and using technology to achieve the objectives. The assessment is to ensure that curriculum objectives meet the standards.

**Stage Two: Examine Technology Functions.** In second stage, the focus is on assessing the functions and roles of various technologies in teaching and learning. The teacher needs to assess whether the technology has met the learning needs of the students and how it can be used to fulfil the curriculum objectives.

**Stage Three: Assess Technology-rich Activities.** The technology-rich activities stage consists of three sub-stages: (1) *Pre-tech-rich activities*. Students identify problems, plan how to collect, analyze, and categorize data; (2) *Tech-rich activities*. Students learn to use technologies and engage in higher level thinking activities via technology; (3) *Post tech-rich activities*. This is the enrichment stage where students engage in peer review, exploring other forms of content delivery, and examine how knowledge can be transferred to another learning situation. The assessment is on how to improve students' creative and critical thinking skills, and how technology can be used as a cognitive tool to improve those skills.

**Stage Four: Evaluate Learning Outcomes.** The assessment will focus on four learning outcomes which we believe are critical in technology integrated teaching and learning. The four learning outcomes are: (1) Core technology skills (Coughlin & Lemke, 2000); (2) Cognitive and metacognitive skills; (3) Social skills; and (4) Attitude.

**Stage Five: Reflect on Learning Experiences.** Traditional classroom assessment is a one-way process in which the teacher controls the assessment. What we advocate is that the students should be involved in the assessment. In this last stage the students reflect on the use of technology in content learning, examine whether technology has helped improve their cognitive skills, and how technology can help them further to transfer the knowledge gained in this learning situation to other similar learning situations. This creates in students a sense of ownership that consequently motivates them to pursue learning at a higher level.

The EEAER model has been used in two undergraduate courses at Marian College in two semesters (Fall 2000 and Spring 2001), respectively. A course survey was conducted to students in both sessions. There was a wide range of student responses. The analysis of the data indicates that the application of EEAER model in technology integration enables students to: (1) better understand the relationship between technology and curriculum; (2) use technology more effectively to achieve their learning objectives; (3) become more goal oriented and know how to use technology as a cognitive tool to enhance their learning; (4) go beyond what technology shows to become more cognitively and meta-cognitively aware of the potential of the role of technology in teaching and learning.

Realizing that the EEAER Model has a potential for helping teachers to improve their use of technology in classrooms, we also report that the study is still in its fluid stage. It needs to be implemented in a more diverse population and learning setting so that the model can reach beyond its present study scope to generate findings that are significant at a more general level.

## References

- Bowens, E.M. (2000). Research, analysis, communication: meeting standards with technology. Learning & Leading with Technology, 27(8), 6-17.
- Coughlin, E.C., & Lemke, C. (1999). Professional competency continuum: professional skills for the digital age classroom. Santa Monica, CA: Milken Family Foundation.
- Dugdale, S., LeGare, O., Matthews, J.I., & Ju, Mi-Kyung (1998). Mathematical problem solving and computers: a study of learner-initiated application of technology in a general problem-solving context. Journal of Research on Computing in Education, 30(3), 239-253.
- Lohr, N. (2000). LoTI results will help maximize technology use in schools. Channel, September-October.
- Morrison, G., Lowther, D.L., & DeMeulle, L. (1999). Integrating Computer Technology into the Classroom. Upper Saddle River, NJ: Prentice Hall-Merrill.