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ABSTRACT

This paper examines the integration of technology into teaching and learning, focusing on Idaho State University College of Education's experiences with developing and administering a statewide assessment for certifying teacher technology competency and documenting the effects of technology integration on P-12 student learning. The paper examines mandates for technology integration nationally and in Idaho, describing the Idaho Technology Portfolio Assessment process that was developed in response to national and state mandates for technology integration. The assessment ensures that Idaho teacher candidates are competent in technology integration, assesses technology competencies of certified school personnel, and links teacher technology use into P-12 student learning. The assessment is based on International Society for Technology in Education standards. The paper discusses technology integration into teacher education at the university, presenting evidence of technology integration and student learning. Having the portfolio assessment embedded in teacher education coursework and field experiences leads to candidates actually using technology tools while teaching and learning. The portfolio assessment gives Idaho teachers a jumpstart in shaping a career based on continual improvement. Teachers gain a sense of ownership in the assessment process and the development of technology knowledge and skills being assessed. (Contains 19 references.) (SM)

Meeting the Accountability Mandate: Linking Teacher Technology Competency to Student Learning

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The last decade has seen an increased emphasis on the technology knowledge and skills of teachers. Moreover, as evidenced by reports from the International Society for Technology in Education (1998) and the Milken Exchange on Education Technology (1999), the thinking of policymakers and educators has moved from concern with the foundational knowledge of technology tools toward a focus on the effective integration of technology into teaching and learning.

The effective integration of technology into teaching and learning is dependent on assessments that gauge not only the skills of teachers, but more importantly assess P-12 student learning. How should these expectations for assessment be realized in teacher education programs? What is involved in the process of helping teacher educators take on the challenges of this expanded focus of assessment? And what are the contextual issues surrounding efforts by teacher education institutions to meet the state and national mandates for accountability? This paper explores these questions by sharing our experience with developing and administering a statewide assessment for certifying teacher technology competency and for documenting the effects of technology integration on P-12 student learning.

Mandates for Technology Integration

There is a large and compelling knowledge base gained from research and best practice confirming the ways technology aids teaching and learning in P-12 schools (President's Committee of Advisors on Science and Technology, 1997; Sandholtz, Ringstaff, & Dwyer, 1997; Wenglinsky, 1998). Yet, recent national reports document the fact that modern technology in schools is used less than in the world beyond the school walls. In particular, teachers report a need for more time and training in both technology skills and technology-based pedagogy (Morsund & Bielefeldt, 1999; National Council for Accreditation of Teacher Education, 1997; Office of Technology Assessment, 1995).

Moreover, as noted by the National Council for Accreditation of Teacher Education (NCATE), "today's teacher candidates will tomorrow teach as they are taught today" (Piper & Eskridge, 1999). Therefore, teacher education institutions are being pressured to provide programs that (1) model effective integration of technology into teaching and learning and (2) graduate candidates who are technologically prepared for the 21st century. As a result, NCATE with the support of the International Society for Technology in Education (ISTE) has developed standards that call for a deeper commitment toward the early infusion of technology by schools, colleges, and departments of education.

Coupled with this mandate to provide school systems with prospective teachers who can help all students function in a technology-oriented society, NCATE has developed new standards calling for documentation of the impacts of teacher preparation programs on P-12 student learning. New accreditation standards and professional association standards call for teacher education institutions to shift to performance assessment systems that link teacher technology competency to student performance (Association for Educational Communication and Technology, 1994; International Society for Technology in Education, 1998; National Council for Accreditation of Teacher Education, 1999).

Consistent with these national mandates for the integration of technology into teaching and learning, the Idaho State Legislature appropriated $10 million per year for five years to infuse technology into the state's P-12 schools. As part of this appropriation, the Idaho legislature mandated the assessment of the technology competency of all new and practicing teachers in the state by the year 2001. The state's teacher education institutions were charged with delivering technology training for practicing teachers, infusing technology integration into teacher education programs, and developing and administering an assessment to certify the technology competency of all practicing teachers and new certification/licensure candidates. Soon after this legislation, a private education foundation in the state created an $84 million initiative to

fund hardware, software, and teacher training for school districts. To qualify for these funds, school districts must have an evaluation plan that provides evidence of the integration of technology into teaching and learning and the impacts of this integration on P-12 student academic performance in mathematics, science, and English-language arts.

Idaho Technology Portfolio Assessment -- http://www.isu.edu/itpac/

In response to the national and state mandates for technology integration, faculty in the Idaho State University College of Education collaborated with practicing teachers and administrators to develop the Idaho Technology Portfolio Assessment. The purposes of the assessment are (1) to ensure that all teacher candidates graduating from our teacher education program are competent in technology integration; (2) to assess the technology competency of certificated school personnel; and (3) to link teacher use of technology to P-12 student learning. The assessment is based on the International Society for Technology in Education (ISTE) standards that all teacher education candidates should fulfill as foundational to their preparation (ISTE, 1992; Taylor & Wiebe, 1994). These guidelines have been incorporated into the National Council for Accreditation of Teacher Education Unit Accreditation Guidelines (NCATE, 1994) requiring that teacher education programs thoroughly integrate technology into their programs.

Our discussions regarding the assessment of technology competency and input from our constituents including teachers, principals, and district technology coordinators led us to the conclusion that we must employ a portfolio assessment approach that both infuses and assesses the ISTE standards. This conclusion is supported by the assessment reform movement advocating assessments that are based on a generative view of knowledge; require an active production of work (not a passive selection from prefabricated choices); and consist of meaningful tasks, rather than only those that can be easily tested and easily scored (Pikulski & Cooper, 1997). Moreover, like Boody and Montecinso (1997), we believe the portfolio offers more direct evidence of actual classroom performance and is a perfect way to say, "I can talk about it, but I can also show you evidence that I have done it" (Jacobson, 1997, p. 22).

In response to the mandate for linking teacher performance to P-12 student learning, we incorporated Teacher Work Sample Methodology (Schalock et al., 1997) into the Idaho Technology Portfolio Assessment. The teacher work sample, based on an instructional sequence designed and delivered by the preservice or practicing teacher, provides evidence of the impacts of instruction on student learning and documents the teacher's performance relative to the ISTE standards addressing integration of technology into teaching and learning. The teacher work sample consists of the following components:

- A description of the achievement targets (instructional goals and objectives) to be accomplished;
- An analysis of the teaching-learning context;
- An instructional plan that incorporates technology for teaching and learning, includes adaptations for exceptional learners, and is based on pre-assessment data;
- Assessments used to measure student progress;
- Evidence of student learning including examples of student work;
- Interpretation and reflection on the success of the instructional sequence, oriented toward what this means for future practice and professional development.

Consistent with the concept of *assessment-as-learning* (Alverno College Faculty, 1995), the Idaho Technology Portfolio Assessment provides opportunities for educators to document their integration of technology into teaching and learning. As educators complete the portfolio assessment and the teacher work sample, they apply the ISTE standards to their own professional contexts. Through the development of the portfolio, educators refine their technology knowledge and skills and apply the standards to their own teaching and learning. Moreover, through the teacher work sample, teachers link their practice to the learning of their students.

Building on the work of Richard Stiggens (1997) and others, we defined the technology portfolio as a purposeful collection of work that demonstrates the educator's abilities to use and integrate technology into teaching and learning and to assess the impacts of their practice on student achievement. Specifically, the portfolio acts as a showcase of best work with clear criteria for selection of contents and rigorous standards for evaluating merit.

The Idaho Technology Portfolio Assessment consists of eight required entries, each of which asks for direct evidence of the educator's accomplishments relative to the ISTE standards. Documentation of the use of technology in teaching and learning serves as the focus of the portfolio and the source of required entries. Specific products in the areas of word processing, spreadsheet, database, presentation and communication tools; a teacher work sample with exhibits of student work; evaluation of software; and documentation of troubleshooting strategies comprise the entries of the portfolio.

Integration into the Teacher Education Program

In response to accreditation requirements for technology integration into teacher education and consistent with the state mandates for the assessment of candidates for teaching certification, the Idaho State University College of Education requires all teacher education students to take EDUC 311 Instructional Technology. The course specifically addresses the need for qualified integrators of technology within P-12 classroom who actively engage in the infusion of technology into teaching and learning. The course is taken in conjunction with a pedagogy course focusing on planning and delivery of instruction and a pre-internship through which candidates spend approximately 300 hours of field experience in a P-12 classroom.

The blocking of the instructional technology course with a pedagogy course and pre-internship meshes technology and pedagogy through theory and practice. Candidates are placed in P-12 classrooms where they not only engage in planning, teaching, and assessing instruction but also integrating technology into learning activities. In addition, as a requirement of the instructional technology course, candidates complete the Idaho Technology Portfolio Assessment. Through the assessment, candidates document their integration of technology into teaching and learning and profile student achievement.

As mandated by the Idaho State Board of Education, portfolios of candidates are evaluated by the Idaho Technology Assessment Panel, rather than course instructors in the teacher education program. As such, candidate portfolios are evaluated using the same rigorous criteria as those used for evaluating the portfolios of practicing educators. Candidates must pass all 25 ISTE standards prior to institutional recommendation for state teaching certification.

The knowledge, dispositions, and skills developed in the 300-level instructional technology course and pre-internship are further practiced and refined in the culminating integrative field experience component of the teacher education program consisting of a semester-long full-time internship in a P-12 classroom. As with the pre-internship, candidates document their integration of technology into teaching and learning and profile student achievement.

The integration of course work in instructional technology and pedagogy with field experiences demands a new level of collaboration between the College of Education and the schools in which we place candidates for the pre-internship and internship. Because our candidates are expected to integrate technology into teaching and learning, they must be placed in classrooms where technology resources support technology integration. In addition, our candidates must be placed with cooperating teachers who model the integration of technology into teaching and learning. To meet these challenges, we have instituted a series of professional development activities for cooperating teachers. These professional development activities focus on both technology integration and documenting P-12 student performance through the Teacher Work Sample methodology.

Evidence of Technology Integration and Student Learning

In the two years since institutionalization of the Idaho Technology Portfolio Assessment, 320 undergraduate students and 1,200 practicing educators have completed and submitted a portfolio for evaluation. Analysis of the scores on the assessment and P-12 student performance documented through the teacher work samples yield valuable evidence of the technology competency of teachers,the learning of their students, and the extent to which our teacher education program is responding to the national and state mandates for technology integration.

Of the 320 undergraduate teacher education students completing the Idaho Technology Portfolio Assessment, 283 (88%) met all 25 ISTE standards and passed the assessment. Of the 37 students not passing the assessment, 35 have banked scores, resubmitted entries to meet the unmet standards, and passed the assessment. The most frequently unmet standards of the students failing the assessment were the ISTE standards related to integration of technology into teaching and learning, specifically the standards dealing with using technology to assess learner performance and using technology to adapt instruction for learners with special needs. Evaluations of teaching performance completed during the field experience component of EDUC 311 Instructional Technology show that undergraduate students are indeed integrating technology into their instructional planning, delivery, and assessment. Analysis of the teacher work sample component of the Idaho Technology Portfolio Assessment yields strong evidence that P-12 students in the classrooms of our pre-interns are using technology for learning.

Through the course work focusing on the integration of technology into teaching and learning and through the guided practice provided in the pre-internship field experience, teacher education students gain knowledge about authentic classroom contexts and the use of technology within those contexts. Teacher education students learn about management within the classroom and the complexities of teaching. They are able to see possibilities for technology as an "electronic teacher's aide" for whole class instruction, individualized learning, tracking of student progress, communication with families and the community, and reflection on their own practice. Our teacher education students gain a high degree of self-confidence by actually performing the work they will do in a regular classroom setting as an educator through the process of infusing technology and the development of an electronic portfolio. As a result, teacher education students develop a fuller understanding of their abilities as teachers and a greater appreciation of themselves, as well as a strong commitment to integrating technology into teaching and learning.

Of the 1,200 practicing educators completing the Idaho Technology Portfolio Assessment, a total of 1,053 (88%) met all 25 ISTE standards and passed the assessment. Of the 147 educators not passing the assessment, 123 have banked scores, resubmitted entries to meet the unmet standards, and passed the assessment. The most frequently unmet standards of the practicing educators failing the assessment were the ISTE standard related to database tools and the standards related to using technology to adapt instruction for learners with special needs. Data from our first year of validity studies indicate that teachers successfully completing the Idaho Technology Portfolio Assessment more consistently use technology to support teaching and learning than teachers who have not developed a technology portfolio (Morgan, 2000). Analysis of the teacher work sample component of the Idaho Technology Portfolio Assessment yields evidence of P-12 student learning in the classrooms of teachers completing the assessment.

Conclusions and Implications for Teacher Education

Through use of the Idaho Technology Portfolio Assessment embedded in teacher education program course work and field experiences, candidates actually use technology tools while teaching and learning. In this way, candidates entering the profession gain direct experiences that generate personally relevant conceptions of technology integration (Marshal-Bradley & Bradley, 1998). Additionally, the process by which this direct experience is gained provides an authentic presentation and assessment of individual candidate performance relative to the ISTE standards and our Core Standards for Beginning Teachers. Because the Idaho Technology Portfolio Assessment is integrated with teacher education program course work and completed in authentic teaching contexts during field experiences, the assessment answers national and state accountability mandates while making the connection between teaching theory and practice and P-12 student learning.

The Idaho Technology Portfolio Assessment also provides our teacher candidates a jumpstart in shaping a career based on continual improvement. Because the portfolio assessment requires candidates to provide documentation of their application of the ISTE standards to their own professional practice, the assessment accommodates a range of teacher characteristics, roles and responsibilities, and work contexts. Moreover, the portfolio/teacher work sample assessment approach is reality-based and authentic because candidates apply the standards to actual practice in schools and classrooms. As such, the assessment allows flexibility in how and to what extent candidates document their performance relative to the ISTE

standards. Finally, because candidates are required to determine their best examples of the integration of technology into their teaching and the learning of their students, the Idaho Technology Portfolio Assessment creates a sense of ownership in the assessment process and the development of the technology knowledge and skills being assessed.

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