Integrating Technology into Teacher Candidates' Field Experiences

A Two-Pronged Approach

Neal Strudler and Karen J. Grove

Abstract

This paper reports on a "two-pronged" approach to restructuring teacher candidates' field experiences to support the integration of technology. It describes challenges in bringing about change to the entire field placement system, while also focusing on concentrated efforts to work with a subset of student teachers placed with technology-using cooperating teachers at designated partner schools. Several ongoing initiatives are described that address systemic changes in the process. Included is information on efforts to create request options for teacher candidates, revise student handbooks, address the development of field supervisors, and provide alternative models for students' field experiences. The article concludes with a discussion of outcomes obtained thus far and future directions that we envision for our program.

Project THREAD (Technology Helping Restructure Educational Access and Delivery) is a U.S. Department of Education PT^3 grant awarded to the University of Nevada, Las Vegas (UNLV) in collaboration with the Clark County School District (CCSD), one of the nation's fastest growing urban school districts. The project's overarching goal is to weave together a mixture of learning opportunities to prepare preservice teachers for tomorrow's technology-rich classrooms (Strudler, Archambault, Bendixen, Anderson, & Weiss, in press; Strudler & Heflich, 2000). A critical component of meeting this goal has involved revising expectations and procedures for students' field experiences. This article documents our efforts in this area. It begins with a review of related literature, followed by a description of specific initiatives, and closes with a discussion of our outcomes and conclusions thus far.

Review of Related Literature

A study of first-year teachers in CCSD confirmed gaps in their preparation to use technology. In a recent survey, only 25% of beginning teachers reported that they were required to teach a minimum of one lesson using computers in their field experiences (Strudler, McKinney, Jones, & Quinn, 1999). This finding is consistent with the survey reported by Willis & Mehlinger (1996), which concluded that technology was minimally considered in student teaching placements, and only a minority of student teachers were required to teach with computers during their field experiences. As the literature attests, although this component of technology integration is critical, it is clearly lacking in teacher preparation (Moursund & Bielefeldt, 1999; U.S. Congress, Office of Technology Assessment (OTA), 1995). Because technology has been implemented unevenly across K–12 schools and classrooms, it is difficult to place education students with teachers who are both accomplished in technology integration and have adequate access to appropriate computer resources (Bielefeldt, 2001; Dawson & Nonis, 2000; Moursund & Bielefeldt, 1999; Wetzel, Zambo, & Padgett, 2001). Researchers commissioned by the U.S. Office of Technology Assessment (OTA) concluded that this would likely remain a problem for some time (Mergendoller, Johnston, Rockman, & Willis, 1994). But as the OTA report (1995) noted, if information technologies are to become an integral part of teacher education programs, "K–12 and university educators must work together to integrate technology into curriculum and classroom practice" (p. 165).

Technology Integration in Field Experiences

Although the technology integration literature is still dominated by "on-campus" efforts such as education methods classes, a growing number of studies are addressing collaborative initiatives in K–12 schools. A majority of those efforts have focused on integrating technology into clinical experiences prior to student teaching. For example, several studies have documented attempts by colleges of education to cultivate technology-rich classrooms for practica placements through identifying interested schools and providing professional development for those involved (Brush et al., 2001; Brush et al., 2002; Dawson & Nonis, 2000; Jayroe,

Ball, & Novinski, 2001; Pierson & McNeil, 2000; Thompson & Schmidt, 2002; Wetzel, Zambo, & Padgett, 2001). Evaluations of such initiatives thus far have been primarily formative in nature, with emphasis placed on refining implementation procedures. When outcomes have been reported for teacher education students, they tend to be anecdotal or based on self-report obtained through questionnaires.

Interestingly, one study (Glazewski, Berg, & Brush, 2002) found that teacher education students who participated in field-based, technology-enhanced practica rated their preparation to teach with technology as lower than their peers who completed traditional university-based methods instruction. The authors speculated that this outcome suggests that providing preservice teachers with more authentic experiences may result in a more realistic understanding of all that is involved in teaching with technology. Thus a lower rating for how well one is prepared is not necessarily an indication of lower knowledge or skills. Rather, this finding may illustrate the fragility of relying on teacher candidates' self-report. Bielefeldt (2001), in his follow-up to the International Society for Technology in Education-Milken national survey (Moursund & Bielefeldt, 1999) concluded that future studies need to go beyond correlations and self-report to evaluate program outcomes more systematically.

Project THREAD is addressing the need for technology-infused field experiences through various collaborative initiatives, focusing primarily on teacher candidates' student teaching experience. A description of these initiatives follows.

Field Experience Initiatives

The field experience component of our project involves a collaborative effort between UNLV and CCSD, and is clearly entrenched within each of the organization's policies, procedures, and cultures. Major changes, therefore, are not easily implemented, especially due to the large number of student teachers (approximately 540) and practica students (approximately 920) that need to be placed each year. In view of this, rather than attempting to revamp the entire placement system, we decided to initiate an opportunity for students to request a placement with a technology-using teacher. Although our goal, of course, is for all teacher candidates to be placed in technology-rich environments, we adopted the strategy of placing those who made special requests as we transition toward providing such experiences for all students. We also sought to affect the entire program by revising current expectations for technology use in field experiences. In addition, we addressed the need for professional development for field supervisors as well as experimented with alternative models for students' field experiences. Each of these initiatives is discussed below.

Creating Request Options

Based on promising practices identified in exemplary colleges of education (Strudler & Wetzel, 1999), students now have the option to request student teaching placements with a technology-using teacher. UNLV's field experience office collaboratively planned with CCSD to make this option available. The field experience applications were revised to accommodate this preference, and the office adjusted its database to include this information with the student names forwarded to the school district for placement. Of 524 student teaching applications in the general education program from Fall 2001 to Spring 2002, 258 students requested to be placed with technology-using cooperating teachers. This represents 49% of the total student teacher applications submitted during this academic year. In Spring 2002, 63% of student teacher applicants requested technology placements. We believe that this increase may signify a shift in students' comfort level with using technology, and we anticipate that this number will continue to increase.

After compiling those students who sought technology placements, school district officials began the process of trying to match interested students with mentor teachers who committed to infusing technology into students' field experiences. Although we initially attempted to do this for practica students as well as student teachers, CCSD decided to forego inclusion of practica students due to the difficulty of accommodating such placements for all who requested them.

To appreciate the level of collaboration needed to modify this process, it is helpful to review details of the sequence of placing a student teacher. On the university side, once the prospective student teachers have completed all requirements and forms, their names are entered into a database that includes their requests for grade levels, location, and a column indicating whether or not they request placement with a technology-using teacher. The database is then forwarded to the school district office and principals from around the district are contacted to see if they are interested in hosting student teachers. The principals consult with their teachers and decide what placements should be made based on the student teacher requests. Once the teacher has accepted the student teaching placement, the information is forwarded back to the university so that supervising teacher assignments can be compiled.

The selection process for the cooperating teachers has posed clear challenges to the goals of our project. Initially, criteria for technology-using cooperating teachers were not clearly defined. Though we had hoped that principals would select teachers who were accomplished in their use of technology tools in the curriculum, in some cases principals viewed this as an opportunity to provide technology training for teachers and selected those most in need. Furthermore, cooperating teachers voiced concern about their roles and whether or not their technology skills were adequate for the task.

Eventually, we fine-tuned our expectations to address this challenge. Although the building principal still interprets these criteria and ultimately selects the mentor teachers, articulating our expectations has proven to be helpful. In addition to distributing the Student Teaching/Internship Performance Profile derived from the National Educational Technology Standards for Teachers

(International Society for Technology in Education, 2000), we developed a simple handout that provides a description of possible technology experiences that would be appropriate for teacher candidates to pursue. The four general areas delineated are technology as: (a) a teacher presentation tool, (b) a teacher resource, (c) a tool for student skill development, and (d) a tool for student projects. Examples of each of these four general areas are provided in the handout (see Appendix A, page 39).

In addition, to communicate our expectations, more site visits were initiated, an online forum was established, and information booklets with frequently asked questions were developed to address the concerns of the teachers and support them in their role of mentoring student teachers. A sample booklet is available at the Project THREAD Web site, www.unlv.edu/projects/THREAD. Similarly, expectations for the project were more clearly articulated for teacher candidates, thus minimizing confusion and resulting in greater satisfaction with the program.

What is emerging from this process is a clearer picture of what is necessary for a good student teaching experience that integrates technology. This requires working closely with university and school-district placement services to increase their awareness of appropriate technology-using placements. Furthermore, communication with the school principals has proven to be quite beneficial in developing a positive presence for the grant. Communication with each school's technology coordinator (known as educational computing strategists within CCSD) has resulted in increased support for student teachers as they plan and implement technology-integrated lessons.

Revising Handbooks

Although the option for technology-based placements helps preservice teachers who are motivated to use computers, we are committed to making technology a required part of all students' field experiences. To accomplish this, key faculty members and field supervisors were selected to participate in a planning retreat in the summer of 2001, led by our Associate Dean and Director of Teacher Education. The purpose of this session was to revisit and revise expectations for field experiences. This effort, funded by Project THREAD, was designed to address current professional standards, including the integration of technology in various subject areas.

At this point, the committee has developed a revised draft of the handbook under the direction of the Associate Dean. The draft is currently under review by other education faculty members. After all of their recommendations are received, the committee will reconvene and finish revising the document. Once the practica revision is completed, a similar process is envisioned to revise our student teaching handbook.

Including Field Supervisors

At a project leadership committee meeting, the CCSD Director of Placement Services noted that field supervisors were a critical factor in promoting the use of technology during student teaching, and needed to be more active in the project. Although meetings for university supervisors included a component about the goals of Project THREAD and technology use in field experiences, field supervisors indicated a need for information on technology uses in the classroom. We administered a needs assessment and used the results of that survey to design a short series of workshops. A majority of the responding supervisors (75%) indicated that technology was very important in teacher education. We found, however, that many of the supervisors had minimal comfort with computer applications that enhance classroom instruction. The workshops, designed to address these needs, focused on presentation software, generic productivity applications, and an introduction to digital still and video cameras.

Altogether, 27 field supervisors participated in our first series of workshops. The hands-on practice time and one-on-one support helped develop their skills with technology. In addition, field-based videos were used to provide a framework for understanding and "seeing" what technology use looks like in K–12 classrooms. This combined approach of enhancing personal skills and providing a framework is a key piece in developing supervisors' capacity to support and assess teacher candidates' use of technology. The value of these workshops was best summed up in a comment from one of the participants: "Technology will have a major impact on education…I feel fortunate to be able to participate in this worthwhile project. As a supervisor of student teachers, I need to have as much knowledge as possible to be able to help them out in the field."

Providing Alternative Student Placement Models

In order to move toward a more systemic approach to integrating technology in field placements, one of the models we used involved the creation of a cluster of five professional practice schools in conjunction with CCSD. Two elementary schools, two middle schools, and a high school, all located within close proximity of each other, were identified to focus on creating positive field-placement opportunities for preservice teachers. The cluster schools all serve large populations of low-income, minority, and special-needs students. A second model, involving the Paradise Professional Development School (PPDS), worked to increase technology integration through a field-based cohort program.

The Cluster School Model. In planning for the implementation of our project with our school district partners, we did not explicitly address the levels of technology at the schools or the levels of use by the cooperating teachers. Selection of the schools was based on meeting demographic criteria and the recommendations of CCSD's administrators. We were not in a position to dictate the partner schools that were chosen and believed it was important to work with the schools that were selected. As was previously discussed, principals at the school sites selected the cooperating teachers for the project.

Typically, cooperating teachers from the school district attend four half-day inservice sessions designed to address their role as

mentors. For this project, the four inservice sessions were a full day in duration, with the additional time used to focus on supporting cooperating teachers in developing their skills with technology as well as introducing them to technology-infused constructivist learning activities. Project THREAD funded the additional time. CCSD and UNLV personnel jointly delivered the workshops. Over the past few semesters, an average of 26 cooperating teachers per semester have participated in these workshops.

During the Fall 2001 semester, Project THREAD expanded its professional development workshops for cluster teachers to include an online graduate course, Internet for Educators. The professional development activities in this course were designed so that participants could learn how to create Web-based curriculum materials and effectively model using technology in the classroom. The classes were ongoing, content-focused, and involved teachers as active learners, traits that make professional development more effective (Birman, Desimone, Porter, & Garet, 2000). Emphasis was placed on incorporating technology into the district's curricula, with much latitude provided to the participants to focus on learning activities that fit their instructional needs.

Paradise Professional Development School (PPDS) Model. A second model used to expand technology integration in field experiences was partnering with a Professional Development School (PDS). The PDS cohort model, planned collaboratively by UNLV and CCSD, was designed to prepare preservice teachers to be effective in urban settings with diverse student populations. This initiative offers expanded opportunities over the traditional field placement system to articulate expectations between the university and its K–12 partner school. Technology integration was identified as a major priority for the PDS program, so it was a good fit with Project THREAD goals.

It should be noted that as with the cluster schools' personnel, we consider the PDS' cooperating teachers and administrators to be our "clients" in the project. Although our ultimate goal is to better prepare preservice teachers, we seek to do this by restructuring the system and increasing the capacity of UNLV and CCSD personnel who work within it. To help accomplish this goal, a comprehensive series of monthly workshops (four per semester) were presented for PPDS cooperating teachers and university supervisors in the school. Workshop topics included Mentoring and Communication, Meeting the Standards: Technology and Others, Students and Teachers as Researchers, and A Constructivist Approach to Teaching and Assessment. Project THREAD personnel and the educational computing strategist worked collaboratively to provide these workshops.

Teacher Candidate Outcomes

Findings suggest that substantial progress is being made within the field component in terms of increased use of technology. A questionnaire, based on the work of Knesek, Christiansen, Miyashitak, & Ropp (2000) and adapted with their permission, was distributed in spring of years 1 and 2 of the project to teacher candidates at the conclusion of their student teaching experience (see www.unlv.edu/projects/THREAD/grant/articles/articles.html). In Spring 2001 (year 1), of the 153 who completed the student teaching exit survey (return rate = 83.2%), 73.2% reported that they taught at least one unit in their student teaching in which their students used technology. At the time of this survey, our teacher education program had no requirements for candidates to teach with technology in their student teaching. Student teachers in the cluster professional practice schools reported more positive perceptions of technology in terms of their proficiency and their use of technology within student teaching, though not at a level that was statistically significant when compared to other teacher candidates.

In Spring 2002, 133 of 200 teacher candidates completed the student teaching exit survey (return rate = 66.5%). Seventy-eight percent of the respondents (N=133) reported student use of technology in an instructional unit, while all of the teacher candidates at the cluster schools taught a unit in which students used technology. Furthermore, exit survey data indicate that not only did student teachers get to teach with technology, but that they had the opportunity to use a variety of technologies and software. Table 1 lists the technology applications that respondents reported using during their student teaching.

Observations of the student teachers in the cluster schools in Spring 2001 and 2002 (N=40) confirmed their use of computers in their teaching and reinforced data gathered through the questionnaire. However, the observations, which were conducted by the university supervisors in 2001 and project evaluators in 2002, did not yield significant insights beyond compiling a wide range of technology applications and teaching strategies that student teachers used within their lessons.

Interviews with teacher candidates in Spring 2002 (N=19) confirmed that the student teachers were getting ample opportunities to teach with technology in their field

Table 1: Student Teacher Exit Survey (Spring 2002): Technologies and Applications Experienced in Courses and Student Teaching

	Student Teaching	
Technology or Application	% Yes	% No
Internet or Web-Based Materials	91	9
Teaching Tools (grade book, etc.)	84	16
E-mail	84	16
Software Pkgs. for Word Processing, Spreadsheets, etc.	76	24
Educational Software	63	37
Multimedia	55	45
Additional Software Pkgs.	52	48
Portfolio Tools	34	66

experiences. All were enthusiastic about using computers for teaching and learning and felt supported by their cooperating teachers, but some were limited by access in their schools. Most preferred to use technology for teaching and learning in small-group settings, but infrastructures at their schools often supported whole-group instruction in labs rather than small-group configurations. Finally, interview data suggest that student teachers were more likely to teach with technology when they were afforded greater access, flexible scheduling, and support and encouragement from school staff. Ongoing evaluation efforts are currently seeking more in-depth data on student teachers' use of technology by means of systematic observations as well as exit questionnaires and interviews.

Conclusions and Future Directions

Our experience with reforming preservice field experiences provides further evidence of the importance of this work and the challenges that are involved. In retrospect, we believe our "two-pronged" approach for reform is a good one. That is, we have chosen to focus on selected alternative programs—a cluster of professional practice schools and a technology-rich professional development school—while also addressing the larger program and the need for implementing systemic change at that level. We have accelerated the change process by working with a subset of "volunteer" preservice teachers, schools, and cooperating teachers, while fully recognizing that our longer-term goal is to reform the entire program to ensure that technology integration is a required and supported component of all students' field experiences.

From the alternative programs, we have learned about the need to clarify our expectations and communicate them more clearly to preservice teachers and school district partners. We are finding that participants better understand our project goals and expectations and are more satisfied with the program if communication through brochures, handouts, and informative Web sites is readily disseminated and available. The need for clearer expectations and communication has been expressed in several field-based projects (e.g., Brush et al., 2002; Dawson & Nonis, 2000; Wetzel et al., 2001). One of the challenges is to clarify the costs and the benefits of participation for teacher candidates as well as cooperating teachers. Although program planners tend to focus on a project's overall goals (i.e., to prepare preservice teachers to teach with technology), teacher candidates are often consumed with logistical issues such as the location of the field placement (Wetzel et al., 2001). Similarly, while participating teachers are supportive of the need for mentoring preservice teachers and furthering their own skills, they tend to be overwhelmed with responsibilities and are often resistant to committing to the project's professional development requirements (Brush et al., 2002). Consistent with these projects, we have found it helpful to clarify the costs and benefits of participation at the outset and clearly communicate them to project participants. A benefit that we have stressed with cooperating teachers is the opportunity to contribute to the development of prospective teachers as well as to promote their own professional growth through workshops and increased collaboration with colleagues.

Schools with strong administrative support for the program from the principal and the on-site technology coordinator offer the greatest access and support for our student teachers.

We have also found that by being more proactive in selecting partners at the "front end" who support the goals of the program, we can minimize problems that will likely arise. With grant funds we have been able to "buy" time for technology development through our workshops. However, issues of support and access within the schools are also critical factors in the success of the placements and are items that cannot be bought. As the literature clearly attests, we have learned that schools with strong administrative support for the program from the principal and the on-site technology coordinator offer the greatest access and support for our student teachers (Anderson & Dexter, 2000; Ronnkvist, Dexter, & Anderson, 2000).

During the course of the project, participating schools have changed for various reasons (e.g., two partner schools became Edison schools and needed to withdraw from our program, and the high school underwent major renovation and was unable to take student teachers), and we have benefited from our experience in selecting new partners. For the final year of our grant (2002–03), we are working with four elementary schools and two middle schools. Although we have had to make a change or two to ensure that our collaboration with partner schools provided a "win-win" situation for all concerned, we see this as a positive "next step" to build upon the momentum that we have established thus far in accomplishing the goals of the project.

We will also seek to create more formal procedures for the placement of student teachers with technology-using cooperating teachers. Our goal is to institutionalize all changes so that program initiatives will continue beyond the life of the grant and the particular individuals currently involved. As with our current effort to revise the field experience handbook, we will continue to formalize expectations and procedures in writing and seek "buy in" from key UNLV and CCSD personnel. Although we are pleased thus far with our attempt to match teacher candidates and mentors who support technology use in their teaching, our long-term goal is to phase out such requests and make that expectation consistent throughout all placements.

As we continue this work, ongoing project evaluation efforts will address the effectiveness of students' field experiences. Surveys will be administered to preservice teachers at the end of their student

teaching experience, along with exit interviews, lesson plan analyses, and classroom observations. Overall, we hope to gather all-important evidence to document if our efforts to integrate technology into students' field experiences are indeed affecting the quality of their preparation for tomorrow's classrooms. For now, though, we view our initial efforts regarding field experiences as helping us get "unstuck" and are very pleased with the collaboration we have had with our K–12 partners. Through these initiatives, we believe Project THREAD is making significant progress toward achieving its goals of supporting preservice teachers in their preparation for teaching in 21st-century classrooms.

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Appendix A

Technology Expectations for Cooperating Teachers

Project THREAD supports cooperating teachers in their efforts to integrate technology in their daily teaching activities as well as provide models of instructional technology to their participating student teachers. Possible experiences with these preservice teachers may include using:

Technology as a Tool for Student **Skill Development**

- Practice content area skills
- Reinforce lesson concepts
- Extend subject area knowledge
- Explore enrichment activities
- Implement alternative learning strategies

Technology as a Teacher **Presentation Tool**

- Present lesson with visual images
- Record student ideas
- Gather data in activities
- Demonstrate procedures
- Create overheads

Technology as a Tool for **Student Projects**

- Create slide shows
- Develop multimedia reports
- Collaborate on small group projects
- Explore lab projects
- Engage in web research

Technology as a **Teacher Resource**

- Research current data on the web
- Explore lesson enrichment
- Locate learning resources
- Develop new ideas and lessons
- Manage student data and grades

To assist cooperating teachers in these placements, *Project THREAD* offers opportunities to expand their current technological skills while focusing on the goal of using these skills to become better teachers and mentors. Project THREAD provides:

- Joint workshops with CCSD with release time
- Optional credit for workshops as a graduate elective course
- Supplemental materials
- Hands-on technical support
- E-mail support
- Extensive Web resources at www.unlv.edu/projects/THREAD