Developing Technology-Integrated Field Experience Sites in Urban Schools: Approaches, Assumptions, and Lessons Learned

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Abstract

The Teachers Infusing Technology in Urban Schools project (TITUS) at the University of Illinois at Chicago is developing an approach for addressing the shortage of opportunities for teacher candidates to experience technology being used effectively in high-need urban schools in the course of their field experiences. Beyond recruiting mentor teachers who are already adept at teaching with technology, our work has involved developing communities of experienced teachers within urban schools – prospective mentors for preservice candidates – whom we support in learning to teach with technology. In our first year of intensive work with these groups of potential mentors, we have found a number of assumptions and patterns of interaction that can present problems for infusing technology, and we have explored a number of strategies for addressing them. These challenges often involve a tradeoff between different approaches to professional development. Some of these challenges are presented in the paper, followed by examples of how we have addressed them in our project.

Colleges of education in urban centers are challenged to prepare preservice teacher candidates to become effective teachers in high-need, underresourced urban schools. One of the many sets of skills these teacher candidates must learn is using computer technologies as tools to enhance instruction. However, many of these high-need urban schools are precisely those schools least likely to have adequate technology infrastructure and teachers adept at integrating technology instruction. This results in a shortage of opportunities for teacher candidates to experience technology being used effectively in high-need urban schools in the course of their field experiences, which limits their ability

to attain high levels of computer integration skills as teachers (Moursund & Bielefeldt, 1999).

The Teachers Infusing Technology in Urban Schools project (TITUS) at the University of Illinois at Chicago (UIC) is developing an approach for addressing this problem. Supported by a U.S. Department of Education PT3 Grant and the Steans Family Foundation, TITUS has worked to develop relationships with prospective mentor teachers in public schools in a low-income urban neighborhood. One objective is to build these schools' capacity to model effective technology integration for preservice teacher candidates. In the process, the project has attempted to build a bridge between the university and the school communities, enhancing the work of both.

Recent research has indicated that when technology is used as a tool within instruction to support learning objectives in the instructional areas student learning is enhanced (Sivin-Kachala & Bialo, 1994; Valdez et al., 1999; Wenglinski, 1998). Used in this way, technology facilitates students' abilities to retrieve, synthesize, and analyze information. Rather than creating learning environments in which students use technology to receive knowledge, or for technology's own sake, teachers must create environments in which students use technology to build their knowledge.

To facilitate this type of technology-integrated learning environment, it becomes necessary to not only prepare teacher candidates to create technology-rich curriculum, but also to implement it in the classroom – particularly in an everyday urban public school classroom. The strongest models for doing so advocate integrating technology within a teacher candidate's field placement. Moursund and Bielefeldt (1999) found that

> the use of technology in everyday classroom and practicum experiences seems to be more important than specific computer classes. The institutions that reported the highest levels of student technology skills and experience were not those with heavy computer course requirements, but those that made use of technology on a routine basis throughout the teacher training program (p. 26).

Students have greater opportunities to attain high levels of computer integration skills when technology becomes integrated within field placements because they *use* technologies *while* they are learning instructional methods and strategies.

However, finding such technology-infused field experience sites presents challenges. Although most institutions report that computers are present in K-12 classrooms where student teachers get their field experience, "most student teachers do not routinely use technology during field experience and do not work under master teachers and supervisors who can advise them on IT use" (Moursund & Bielefeldt, 1999, p. 28). Knowing that teachers teach as they were taught, it becomes clear that if technology is not infused in instruction during their practicum experiences, preservice teachers will not graduate with the ability to create technology-infused learning environments.

It is especially important to model strategies for teaching with technology that can be realized in underresourced urban schools. In working as partners, colleges of education and local schools can effectively prepare a pipeline of teachers equipped to integrate technology instruction to benefit student learning. Yet finding technology-rich field placements in low-income urban areas can be difficult. Although the gap between rich and poor schools may be closing in terms of computer-to-student ratios, a new digital divide separates white and minority students (Benton Foundation, 1998, 2003; Moersch,

1995; Piller, 1992; Technology Counts, 2 001), particularly in opportunities to use computers to engage higher order thinking skills (Wenglinski, 1998).

It seems that policies to promote computer access in school have succeeded in diminishing access inequities; yet inequities in teacher preparation, including how to integrate technology within instruction, remain. Prospective teachers must learn ways to integrate technology into meaningful and ambitious instruction – to avoid the "you can't do that kind of teaching with these kids" mentality. The relative lack of resources in many urban schools does not mean that ambitious instruction with technology cannot be realized there.

Challenges in Professional Development of Mentors

Beyond recruiting mentor teachers who are already adept at teaching with technology, our work has involved developing communities of experienced teachers within urban schools – prospective mentors for preservice candidates – whom we support in learning to teach with technology. In some cases these teachers are paired with university faculty who themselves are learning to teach with technology (Radinsky, Smolin, Lawless, & Newman, 2003), while in others they are brought together from neighboring schools to form collaborative technology -infusion communities (Smolin, Lawless, Newman, & Radinsky, 2003).

In our first year of intensive work with these groups of potential mentors, we have found a number of assumptions and patterns of interaction that can present problems to infusing technology, and we have explored a number of strategie s for addressing them. These challenges often involve a tradeoff between different approaches to professional development. Some of these tradeoffs are presented here, followed by examples of how we have addressed them in our project.

Challenge 1. Amount of Contact: Balancing Support and Independence

How much time should professional developers be spending onsite at schools, helping teachers work out the details of teaching with technology?

One strategy we pursued in Year 1 of the project was to bring professional development activities onsite at the schools, in the form of regular afterschool meetings. This approach has the advantage of engaging the teachers in using the actual computers they work with, in the same setting where instruction will take place. However, it has some drawbacks: Beyond the obvious labor -intensiveness of this model from our perspective (working with multiple schools), in many cases this approach can decrease teachers' sense of "buy in" to the learning process. It can lead to an attitude of, "Prove to me that this can work," rather than, "Help me figure out what will work best."

We have found that teachers are more likely to be late to a meeting at the school (where distractions, announcements, and other responsibilities are a constant pull) than to a meeting off site. This tardiness can frustrate attempts to focus on learning unfamiliar skills and activities with technology – the very familiarity of the school setting can undermine this focus.

But onsite support is crucial for teachers learning the complexities of facilitating classroom activity with technology, particularly in schools in which technology support may be less than optimal. Working out the details of computer access, software quirks, and unfamiliar classroom management issues will make or break student learning.

Challenge 1 Solution: Off-Site Group Meetings, Building In-School Support

One approach we are currently exploring is providing off-site professional development for these groups of prospective mentors, at the university and in community facilities, to provide an environment where teachers can focus on developing and practicing activities for their students. In these groups we work with multiple teachers from each school and attempt to build teacher-to-teacher support for trying new things and working out the bugs. Our own troubleshooting work with teachers at the schools is scheduled separately around these off-site meetings, focused on supporting particular activities that teachers are conducting – so that there is a real need for focus when we are there.

In Year 1, for example, most of our professional development meetings with project teachers were held onsite at the schools. Although there were many successes, there was also a high rate of tardiness and absenteeism at meetings, and we lacked an accountability mechanism to really push teachers to take on responsibility for designing and implementing their own activities in their classrooms.

This year we have adopted a continuing education course model, in which teachers come to regular meetings of a supportive group, either at the university or in a community facility, requiring them to detach from their instructional day before beginning. Course credit is contingent on designing and implementing activities with technology and assessing student learning from each activity. In addition, the course format promotes the expectation of reading and discussing research and other publications that provide valuable grounding for teachers.

In-school support is offered on an as-needed and as-available basis by appointment, requiring teachers to schedule and plan for the assistance they will receive at school. Technology coordinators have been brought in as members of teams, so that they are on the same page as teachers instructionally. We have also tried to cultivate in-school and cross-school teacher collaboration, so they provide each other with support as they are learning to teach with technology.

Challenge 2. Learning Objectives: Balancing the New With the Familiar

How do we help teachers stay grounded in instructional priorities, and also challenge their own practices as they learn new teaching tools?

When first exposed to an unfamiliar teaching tool, teachers often grapple with what it can help students learn. There are two common reactions:

1. "New container for the old stuff" – This reaction is seeing the new technology simply as a new means of conducting the exact same activities one already uses, with identical learning objectives.
2. "Now for something completely different" – This reaction is seeing completely new and unrelated kinds of learning that will be afforded for students, such as technology-specific learning objectives that do not connect with curriculum standards or the existing strengths of the teacher's instruction.

Both of these reactions make it unlikely that the technology will be used to its potential in instruction. In the first case, teachers may decide that the technology is not worth the trouble, since they can do the same thing in the old way with paper and pencil. They can miss opportunities to change their practice to take advantage of what technology offers. In the second case, teachers may get excited about a new technology and describe its

potential benefit to students as, "It will teach them to use technology," or, "It will prepare them for the future." By seeing technology as something completely new, they may miss ways to use it to teach core skills and concepts. Making connections between new technology and existing instructional objectives in the subject areas is crucial.

Challenge 2 Solution: Focus on Student Outcomes From the Beginning

Whereas many professional development workshops focus primarily on learning to use a particular tool, we have moved toward a focus on what it means to learn a particular subject. What are historical thinking skills? And then, how do you know them when you see them in your students' work? We begin with discussions of assessment strategies, rubrics, and curriculum standards.

Technology tools are then discussed in the context of helping students achieve those learning outcomes. This discussion includes describing what a satisfactory performance looks like and working backwards from what students will turn in to how we will help them succeed. Then we ask what technology tools can we give them at the beginning and how should we support their work at the computers so they can try to do this work.

For example, one group of teachers wanted to learn how to use technology to help them integrate data into their science instruction. Their initial ideas about what their students might learn from using AppleWorks database software (which they had experienced in a summer workshop) mainly were about technology skills – preparing students for the workplace of the future, getting comfortable with the keyboard, etc.

This group began by looking at their plan for science instruction in the school and discussed inquiry skills they wanted students to learn. They knew they wanted students to use data from their everyday lives and see how their firsthand observations connected with science. These skills could be assessed by determining whether students could translate real-world categories of things into variables for a database. One teacher then decided to have students create (with guidance) the actual input form they used for gathering their garden data. This step of the computer activity mapped specifically to the goal of having students learn to conceive of categories of things in the world (e.g., types of plants in the garden) as data variables.

Challenge 3. First Steps: Balancing Simple Technology With Ambitious Instruction

How do we keep "baby steps" with technology from becoming "baby steps" for learning?

In underresourced schools it is essential to develop meaningful instructional uses for relatively simple, accessible, and low-maintenance technologies. High-tech or expensive interventions have obvious drawbacks in environments where resources and technology support may be lacking. Also, relatively simple and straightforward activities often provide a better introduction to teaching with technology than complicated projects that can fail in a thousand ways.

Challenge 3 Solution: Focus on Teaching Affordances of Widely Available Software

For the reasons just listed we often focus on beginning with free or widely available software tools, including general-purpose software that can be reused for other activities and on relatively simple uses of the software (e.g., starting with creating HTML links between documents in Netscape Communicator or a word processor).

However, one risk of striving for simplicity of tools is that, as teachers grapple with incorporating new things into their teaching, activities may become oversimplified, to a point where they simply replicate noncomputer activities or become trivial. As we strive for relatively simple first-step uses of technology, we need to be sure that simple tools are not equated with simple instruction or simple objectives.

We encourage teachers to start with domain-specific standards and map them to properties of technology tools. This takes time, as teachers need to become familiar with tools before they can sense what they could help students learn. But we promote a "shopping" mentality for technology infusion – assume that there is a simple solution for structuring a student activity around a particular learning objective and search for the easiest way to do it with technology. Once a technology tool has been chosen, we focus on finding the most direct way to achieve an instructional objective with the tool, maximizing the benefit of the tool for that particular objective.

For example, one group of high school English teachers worked on an activity for teaching reading skills related to inferential reasoning from text. They began with the idea of having students use electronic texts, make inferences from the text, write down their inferences, and copy and paste the supporting text next to each inference – a simple and straightforward use of a web browser and a word processor. These notes could be used as the basis for a writing assignment.

As they struggled to get comfortable with this activity, they simplified and simplified what students would be asked to do, until they began to get the sense that there was no need for computers any more – one of the teachers had a worksheet for writing down inferences, and they wondered why they should replicate it. The writing assignment idea fell by the wayside.

The group was encouraged to revisit the learning objectives it started with – teaching inferential reasoning from text. It also revisited shortcomings of the existing tools for teaching it – for example, students might write down their inferences on the worksheet, but not ever be able to go back and justify them from specific examples in the text. In fact, lower achieving students needed a way to engage more closely with the text the first time through. They then went back to the computer activity and repurposed it to focus on supporting inferences with evidence from the text and helping students identify the precise meaning of particular passages. The electronic-text activity managed to engage a more meaningful set of skills than did the paper worksheet built on the simple activity of selecting, copying, and pasting.

Conclusions

This work is ongoing, and we continue to identify new challenges and new strategies for addressing them. The test of how well we prepare mentors in high-need schools will be the effectiveness of the new teachers coming through our programs and those mentor teachers' classrooms. We hope that the combination of technology-infused modules in UIC methods courses and an increasingly expert cadre of mentor teachers using technology in high-need schools will provide the foundations our graduates will need to create meaningful learning with technology in Chicago public schools.

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