

A Situative Perspective on a Collaborative Model for Integrating Technology into Teaching

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Abstract

This paper describes a collaborative professional development model in which faculty in a College of Education partnered with a local school district to design and implement a year-long project in an effort to increase effective integration of technology in instruction by K-8 classroom teachers, university teacher preparation faculty, pre-service teachers and novice teachers graduating from that teacher preparation program. A brief description of the project, its accomplishments and dilemmas, analysis of the project design and experiences of participants through the lens of situative professional development for teachers is presented. Lessons for structuring professional development such that subsequent improvements in technology use within partnership schools and teacher preparation programs can occur are discussed.

With the advent of the World Wide Web and the Internet, the possible educational uses of computer technology by K-12 students greatly expanded. National and state standards were adopted that covered technology integration in the classroom (California Commission on Teacher Credentialing, 2001; International Society for Technology in Education, 2000, 2002). Federal and state programs to support technology integration in classroom instruction were designed and funded (e.g. the federal Preparing Tomorrow's Teachers to Use Technology [PT3] grants, California Technology Assistance Program [CTAP]). Classroom teachers who believed there were unique educational opportunities presented by computer and Internet technology became *early adopters* of technology use in classrooms (Ringstaff, Yocam, & Marsh, 1996; Rogers, 1995). These early adopters joined national leaders as advocates for integration of technology as one approach to educational reform.

As in most educational reform movements, however, the challenge after initial excitement has been to engage those classroom teachers in the reform who have not eagerly adopted computer technology as a teaching tool; the early majority, late majority and laggards (Rogers, 1995). A modest research base now exists to describe the factors that affect the degree of success that classroom teachers experience as they attempt to include technology innovations in their regular teaching practice (Becker, 1986; National Center for Education Statistics, 2002; Zhao, Pugh, & Sheldon, 2002). However, that research base is still relatively small, and while there is ample research on effective models of staff development for teachers, the research on effective professional development models designed to change teacher practice with respect to *technology integration* is in its infancy. The research that does exist on effective staff development for teachers has not always filtered into the actual design of those activities. The

one shot approach, or even *one shot plus follow-up*, has not been shown to be effective (International Society for Technology in Education, 2000, 2002; Sandholtz, Ringstaff, & Dwyer, 1997; Schrum, 1999) and yet persists. In the case of technology, the all too common approach of providing "... motivational speeches by a forward-looking visionary plus sessions on how to use a piece of software" in the hopes that teachers will develop "... some technical skills and a good attitude" (Zhao et al., 2002, p. 511) is simply not enough.

A situated cognition view of knowledge and learning can provide direction when envisioning effective professional development for practicing teachers in the area of technology integration. The situated cognition view and its implications for professional development have been recently explored (Putnam & Borko, 2000). In this article, the authors take the three conceptual themes of the situative perspective: (a) that knowledge is situated in particular contexts, (b) that it is social in nature, and (c) that it is distributed across the individual, others and tools. They then explore how this view of knowledge points toward certain designs for teacher professional development, while calling into question other designs.

In this article, we describe a collaborative professional development effort in which faculty in a College of Education partnered with a local school district to design and implement a year-long project in an effort to increase effective integration of technology in instruction by K-8 classroom teachers, university teacher preparation faculty, pre-service teachers and novice teachers graduating from that teacher preparation program. A brief description of the project, its accomplishments and dilemmas, analysis of the project design and experiences of participants through the lens of situative professional development for teachers is presented. Additionally, lessons for structuring professional development such that subsequent improvements in

technology use within partnership schools and teacher preparation programs can occur are discussed

Project Overview

The College of Education at California State University, Sacramento (CSUS) in collaboration with the Roseville City School District (RCSD) developed and implemented a collaborative model for simultaneous integration of technology in K-8 field placement classrooms and curriculum and into preservice coursework. This year long project was funded by a Preparing Tomorrow's Teachers to Use Technology (PT3) grant and was aimed at accomplishing the following objectives: (a) implementing a model for generating technology-infused curricula that utilized technology leadership within partner school districts, (b) increasing the capacity of university faculty and partnership teachers to integrate technology into their respective classrooms, (c) ensuring that all student teachers experience effective technology integration in coursework and K-8 field placements.

Background

The collaborative credential program between CSUS and the Placer County area (the RCSD is the primary partner) was a three semester, fifth year post baccalaureate program at the time of the project. Student teachers' field placements were with Collaborative Teachers (CT) who, as exceptional classroom teachers, served in place of a traditional university supervisor and received a stipend from the university.

The RCSD has a strong commitment to the integration of technology and curriculum. Its technology plan, with its underlying philosophical commitment to collaboration, includes a robust technology integration model for classroom teachers. Much of the technology leader training was based upon Apple Classrooms of Tomorrow (ACOT) methodologies (Ringstaff et

al., 1996; Sandholtz et al., 1997). This training is designed around a Unit of Practice (UOP), a specific process for thinking about and developing a classroom activity/unit. Participants in ACOT training explored technology in the context of working through a sample UOP. Then using one of their own lessons, they developed an original UOP that incorporated technology in a fundamental way. In so doing, the curriculum remains rigorous and technology is not an end in and of itself. This model, of starting with the curriculum and infusing the technology, served as a springboard for this project.

The College of Education has a technology plan that puts much emphasis on the active learning of the student. Upon completion of the teacher preparation program, it is expected that all students meet exit criteria for technology based upon state standards. However, to do this in the isolation of a college classroom without coinciding practicum experience in a K-8 classroom results in little long-term capacity of new teachers to continue to use technology. This project, therefore, focused technology integration professional development on two levels: (a) in University methods and foundations courses and simultaneously (b) within the field placement classrooms of inservice Collaborative Teachers.

Methodology

Project Model

The project was designed and coordinated by two people; the district technology director who had been a successful bilingual classroom teacher for many years prior to moving to his administrative position and a long-time district elementary teacher who was on appointment as a *Teacher in Residence* in the College of Education.

Participants

At the core of the project was the development of design teams. Five design teams were assembled. Each team consisted of a minimum of one university faculty, one K-8 classroom technology mentor teacher, and K-8 Collaborative Teachers (CTs). The university faculty spread across the five design teams included one from each content methods area: mathematics, science, reading/language arts, social sciences, and educational foundations. The five classroom technology mentor teachers were selected from the district's teachers trained in technology integration. These reflected a balance of grade levels and content emphases. Ten CTs from throughout the district were recruited from the pool of experienced field mentors. In total, five university faculty, five technology mentor teachers, and ten CTs participated in the project.

The collaborative model was designed with the hope that each team member would bring different strengths and insight to the team, and that each would in turn learn from the others. For example, the teacher education faculty may have the content or pedagogical background while the CT may have the pragmatic know-how of what really works in a classroom, and the technology mentor teacher provided both technical expertise and a thorough understanding of the UOP development process, from having already used the ACOT process to develop curriculum for their respective classrooms.

Data Collection

The design teams were to develop two products over the course of the project. The first were K-8 lessons/units for use by current classroom teachers and university preservice methods faculty and students. Design teams used model UOPs and the ACOT methodologies as the basis of their initial work. They also learned how to use rubric criteria to evaluate their lessons. The second product was a redesign of preservice coursework integrating technology into each

methods and foundation course. Additional data was collected via an online tool that measured participant technology skills. Survey instruments were developed by the external evaluator to assess participants' demographics, teacher attitudes, student teacher attitudes, and elementary students' attitudes and technology skills.

Data Analysis

The redesigned units and lessons were analyzed according to the project rubric. Criteria included curriculum and standards, student-centeredness, collaboration, the role of the teacher, instructional design, assessment, use of the web medium, and ease of use. The online assessment data was used to measure increases in participants' technology skills. Data collected from the survey instruments were analyzed at the aggregate level and provided pre and post data.

Timeline

In early fall, design teams were formed around content areas. For example, the technology mentor teacher who previously had redesigned a portion of her curriculum by infusing technology into a social studies unit was teamed with the social studies methods faculty and two upper grade CTs. Therefore, this team was expected to develop a social studies UOP. By designing teams around content areas, each course in the preservice program would have a significant unit in which every student teacher would participate.

At the initial meeting, the technology trainers facilitated each of the teams working from their expertise in blending technology and curriculum. They shared the UOPs that they had previously developed and implemented in their K-8 classrooms. The lessons in the shared units served as the springboard to connect skills, assessment, content, problem solving, research and standards that needed to be components of the redesigned curriculum.

Throughout the fall semester, teams developed their first integrated lessons and communicated with one another in a variety of ways including listserv and email. As the semester progressed, teams continued to meet amongst themselves to develop their own lessons. The entire project group met for eight hours about every six weeks during which time each team shared its work in progress, and specific skills were taught to the participants per participant request. Additionally, rubric scoring of the units was done at these meetings. By the end of the fall semester, the first lessons were developed and implemented in the K-8 classrooms of the CTs and preservice courses. These completed lessons were implemented in a variety of ways during the spring semester university coursework and in the K-8 classrooms.

During the spring semester, every student teacher encountered technology-based lessons in their coursework, with limited integration into the literacy courses. This was due to the fact that the newly mandated credentialing tests impacted the preservice literacy coursework, and the literacy faculty member's involvement in the project was minimal. Built into the coursework was a component that had each of the student teachers planning, teaching, and/or observing and evaluating a technology infused lesson.

Integration

The preservice faculty integrated technology in a variety of ways. For example, the educational foundations professor had difficulty envisioning how technology integration could occur, and initially questioned whether it was an effective use of classroom time and focus. However, she had preservice teachers participate in webquests based upon the *multiple intelligences theory* (Gardner, 1993). She then designed an assignment in collaboration with her two design team teachers, one a kindergarten teacher and the other teaching third grade, both at low income, culturally and linguistically diverse Title 1 schools. For this assignment, all

preservice teachers enrolled in the foundations course observed either the kindergarten or third grade teacher for two days and evaluated whether or not the lessons being observed (which incorporated technology use) were effective examples of technology integration, and/or effectively incorporated children's multiple intelligences.

In science methods, the course now included a means by which students could do some of their course on-line and each preservice teacher developed a webquest for a specific science concept for use in their student teaching placement.

In mathematics methods, the student teachers learned how to develop algebraic thinking using spreadsheets with students in grades K-8. The student teachers also analyzed a variety of mathematics-related websites: some for teacher use and some for student use. The mathematics design team unit was *Creating a Playground*. The outcome of this unit was the development of a new playground for the school site. As the semester progressed, the unit was presented to the preservice students for participation, analysis and evaluation.

Outcomes

Data from the online assessment indicated that all participants increased technology skills used in their respective teaching. Also important was that the reported rationale for using technology changed amongst program participants. Rather than primarily viewing technology integration through a simple skill-based lens (e.g. teaching children how to write a paragraph using word processing rather than paper and pencil), program participants noted increased interest in technology integration into content and curriculum (e.g. having children engage in inquiry, take internet content and design a multi-media presentation summarizing their learning). One of the project objectives was to increase the capacity of participants to integrate technology

into teaching; this objective was met in a variety of ways including the development of UOPs, increased self-efficacy and in the work done by K-8 and university students.

Four of the five design teams developed UOPs (at least one per group) that were available for use by all university faculty and student teachers involved in the teacher preparation program; when appropriate, units were also shared with other grade level teachers at respective school sites. In this way, all 75 student teachers were exposed to technology in instruction through methods or foundations coursework and in most of their field placements. Thusly, the project objective of ensuring that preservice teachers experience technology integration in field placements and university coursework was met.

Participants explained increased use of technology in various ways when asked to reflect about the project. For example, the university social studies methods faculty member stated,

... (my) students have begun talking about how to integrate technology with instruction. I have made it a requirement for students to document at least one lesson that integrates technology and instruction. This was done in addition to going to the partner district's Technology Learning Center; so, in effect, the time allotted to technology integration was expanded this semester.

A Collaborative Teacher from the social studies design team described her increased use of technology in the following way,

The project has pushed me to explore how to use the Internet with my students. Previously the focus of my teaching revolved around teaching students how to acquire information from the Internet. This year, the focus has been more on teaching them how to transform that information or how to use the information to construct new

knowledge.... I also read more technology articles. I wanted to explore other people's philosophy about using technology to teach.

The reflective narratives from the social studies design team were representative of all project participants. All participants were asked to engage in self-assessment and reflection throughout the project.

Clearly one of the strongest outcomes of the design team model, however, was the development of relationships between university faculty and classroom teachers that led to broader thinking about curriculum and teaching practices, and deeper collaboration in preparing future teachers. Participants in this project from both the K-8 and university levels consistently noted its unique design. This was the first time most had participated in a truly collaborative project of this type, where University faculty were alongside K-8 faculty learning together, rather than leading the workshops. The design team model proved successful; the project objective of implementing a model for generating technology-infused curricula was achieved.

The collaborative partnerships between university faculty and K-8 teachers that were begun during this project have flourished over the four years since its inception. The various partner activities that have occurred during the four years include the development of two Professional Development Schools (PDS), an increase in the number of pre-service students placed in the district for student teaching, a mentoring and supervision Continuing Education course (co-developed and co-taught by university faculty and K-8 teachers) that was initially conceived of and presented in this district, a collaborative MA program cohort in Curriculum and Instruction with an emphasis on *teacher as leader*, and several collaborative presentations at state and/or national conferences where K-8 teachers from the RCSD presented with University faculty. Might the situative perspective on professional development help us to understand the

success of this project, both in increasing the uses of technology in K-8 and university classrooms, and increasing the depth and breadth of collaborations among all partners in the project?

A Situative Perspective on Project Design

Cognition as Situated

Putnam and Borko (2000) state that how a person learns, and the situation in which they learn, are a fundamental part of what is actually learned. Therefore, if a teacher is to learn a new set of skills related to teaching, it is important that the skills be learned through *authentic activities*; learning activities that are similar to the act of teaching in a K-8 classroom. In order to allow teachers to incorporate new ways of thinking about teaching and learning, however, the learning activities should not be so closely grounded in a teacher's current practice so as to disallow innovation. Putnam and Borko give examples of projects that achieved this balance through systematically incorporating multiple contexts of learning through combining, for example, a summer workshop with ongoing support during the regular school year.

When planning professional development in-service workshops for teachers, one must balance the desire to introduce new ways of conceptualizing the teaching and learning process with the realities of classroom teaching in an ever more standardized, accountable public school system. A potential danger of grounding teachers' professional development in regular classroom practice is reproducing the very approaches that professional development seeks to change. Therefore, Putnam and Borko (2000) indicate that it may be important to design professional development so that teachers experience learning in new and different settings. This project's design had teachers and faculty bringing to the table already finished, successful units and lessons, and examining them for effective ways to integrate technology. This allowed

participants the comfort of starting with current practice and expanding upon it in exciting new ways.

The CSUS-RCSD project design addressed multiple learning needs of teachers and university faculty through a variety of ways. All workshops were scheduled away from the normal workspace of participants; they were neither held at the University nor at school sites. Instead, all workshops were held at the District Technology Center that was designed for technology professional development. Meeting schedules and project deadlines were also designed to address the learning needs of adult teachers. Meetings were scheduled so that participants had time to try out new technologies that they planned to use in their final UOP. Participants were given time during meetings to discuss goals and challenges; compare progress on units; and ask questions of technology mentors based on current needs.

The fact that design teams consisted of both university and K-8 teachers also contributed to providing multiple learning contexts for project participants. Each time the teams met, participants wrestled with the differences between teaching and learning in a K-8 classroom and a university teacher preparation program. Because a stated goal for the project was to more closely link the two settings, fruitful partnerships arose amongst participants, expanding the conceptions of what good teaching using technology might look like. The design teams also made possible new kinds of discourse among the participants, an important aspect of taking into account the social nature of learning (Putnam & Borko, 2000).

Cognition as Social

Situated cognition theorists posit that all learning is social in nature (Resnick, 1991). What we know and how we think are influenced by whom we interact with over time. The various *discourse communities* in which we participate, whether cultural, social, professional or

familial in nature, affect how and what we learn. When designing professional development projects, what sort of discourse community is desired?

In the CSUS-RCSD project, the discourse community was designed to take advantage of the breadth of experience and knowledge represented by practicing K-8 teachers and university faculty. Within those two broad groups, some individuals were recruited due to their enhanced technology knowledge (e.g. K-8 technology mentor teachers), other teachers due to their interest and participation in teacher training (e.g. CTs who had hosted student teachers in the past), and university faculty were recruited to represent the range of methods and foundations coursework in which teacher candidates would enroll during a preparation program. Putnam and Borko (2000) note that, “Together, these two groups of participants (classroom teachers and university professors) can learn new ways of thinking about their practices and simultaneously create new forms of discourse about teaching” (p. 9).

While the CSUS-RCSD project was designed to pull teachers and faculty out of the everyday practice of teaching (the regular meetings were held during the school day while substitute teachers conducted that day’s lessons), additional components of the project were also designed to challenge their thinking as well. The co-facilitators of the project were avowed supporters of constructivist learning theory, so all activities and sample products were constructivist in nature, guiding participants towards this view of teaching and learning. While the completed UOPs did align with state content standards, an analysis of the units indicate that they also incorporated constructivist activities and were integrated and thematic in nature; a sharp departure from the prevailing standardized teacher-driven curriculum widely in use.

The foundations professor believed she was already doing an effective job aligning theory and practice in her foundations course. The project, and her interactions with the

elementary teachers in her design team, showed her that she could do much more to effectively link theory with practices in Title 1 classrooms where learning was dominated by scripted curricula. However, it also provided her with current examples of a constructivist, progressive Deweyan classroom, during teaching of the UOP that was designed by the kindergarten and third grade teachers on her foundations design team.

Ultimately, team members influenced each other; university faculty had influence as theorists that led the teachers to think more deeply about the design of their lessons; the K-8 teachers influenced university faculty as practitioners in ways that led faculty to think more clearly about the realities of Title 1 schools with scripted curricula and elementary classes with many children identified as English Language Learners.

A unique and crucial component of this project design was the change in leadership hierarchy. Project designers and leaders were not primarily university faculty. The projects described in Putnam and Borko (2000) as having drawn upon the "...unique sets of knowledge and skills offered by researchers and teachers" (p.12) in forming diverse discourse communities all focused on changing practice in the K-12 setting, but not in the University; university faculty remained in the role of staff developer. In the CSUS-RCSD project, the university faculty and K-8 teachers were in the same role; that of a learner working toward improving one's own teaching practice. What is not clear is whether the reversal of the usual hierarchy of leadership could have taken place without strong pre-existing partnerships that brought the two co-facilitators together. However, the success of this design supports the practical implementation of the situative theory that knowledge is distributed.

Cognition as Distributed

The third conceptual theme explored in Putnam and Borko (2000) has cognition residing in more than just the individual; it is distributed across the individual, other people, and tools or artifacts. As noted above, the design of the CSUS-RCS D project took into account the distribution of important knowledge and skills across the participants, and of course, the importance of technology as a tool in producing and presenting children's knowledge. An area not explored in Putnam and Borko is the importance of children's knowledge in the staff development process for teachers. By embracing a constructivist model of knowledge production, the facilitators of the CSUS-RCS D project reminded participants that children are not blank slates upon which experts write *the truth* (or the latest scripted curriculum). Rather, children bring with them important understandings of their world when they enter the classroom. If we are to believe that knowledge is distributed across individuals, we must include the individual at the center of our efforts, the K-12 student. In this project, the formal and informal data gathered from the K-8 students influenced the sequencing of lessons within the UOPs as well as the student learning activities. For example, one 6th grader indicated that since students *knew* playgrounds better than adults, they should be the ones researching playground designs.

This understanding, that knowledge is distributed across individuals, including the student, was evident in UOP products in a variety of ways. For example, in the *Creating a Playground* project; children brought their knowledge of play activities; the popularity of various climbing, swinging apparatus, etc., to the design of the playground. Ratio and proportion was a fundamental mathematics concept for this unit. Students used the internet to research a variety of playground models as well as to identify requirements for a school playground. Additionally, they gathered data from K-6 students at their school and spoke with planners and contractors.

Using drawing software, they eventually designed a playground and presented their plan to the district school board.

Lessons Learned

This project was intended to strengthen the preservice program, its school partners, and infuse technology into coursework and fieldwork. Our intent was that participation in the project would be beneficial and sustainable for all members. In looking back at the evaluative data and our collective experiences, we have learned the following lessons.

Lesson 1: It is possible to utilize an effective partnership model between K-8 and university faculty for technology infusion into teacher preparation and K-8 classrooms. Using the situative perspective, the partnership should be designed so that attention is paid to the contextual and social nature of learning.

Lesson 2: Leadership for collaborative projects such as this one can come from the classroom side as well as the university side. In fact, the situative approach to knowledge would suggest that leadership *should* come from both sides, so that both sides benefit equally from the knowledge of the other.

Recognizing the contextual, social and distributed nature of cognition requires that professional development activities be construed quite differently from current designs; in fact, researchers decry much professional development as ineffective at best; counter-productive at worst(Fullan, 1995; Killion, 1999).

Lesson 3: Strong collaborative and on-going school-university partnerships can be encouraged by projects such as this one.

Many national organizations and researchers focused on systemic school reform have supported deep school-university partnerships and collaborative models of teacher preparation,

such as that found in the Professional Development School (PDS) model, as one way to achieve lasting reforms (Holmes Group, 1995; National Council for Accreditation of Teacher Education, 2001). The PDS focus on improving student achievement and teacher preparation through effective professional development and reflective practices meshes well with the situative perspective on technology integration described herein. The fact that the school where many project participants taught ultimately became a PDS where 25-35 new teachers are trained each year as part of the CSUS teacher preparation program was a welcome result of this project. In a time of scarce dollars, strengthening school-university partnerships should be an explicit goal in the design of projects such as this one. Utilizing a situative approach to project design improves the odds that collaborative professional development activities will actually lead to lasting relationships among participants.

The lessons of previous reform efforts should make us wary of one-size fits all professional development designs. Clearly, the professional needs of the *early adopters* vary significantly from the *early majority*, *late majority* and *laggards* (Rogers, 1995). In addition, the needs of a University methods faculty member vary from those of a secondary chemistry teacher, which vary from those of a kindergarten teacher. The situative perspective provides a framework for all who endeavor to provide effective support to teachers as they attempt to integrate technology into their teaching. By designing projects that address how knowledge is situated in particular contexts, is social, and is distributed across people and tools, we have a much better chance of providing the support that individuals truly need as they embark on this potentially transformative reform.

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