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ABSTRACT

A network of electronic mail systems connects universities throughout the United States and several foreign countries. Colleges of education link with public schools to support the student teaching process. Telecommunication tools for collaboration promise benefits for university faculty, student teachers, and cooperating teachers. Appalachian State University (ASU) is one example of an electronic community for the teacher education program founded on the piloting results of earlier studies. This account chronicles the uses of technology in the field experiences of the teacher education program. Initially, e-mail discussions were unstructured and substantiated previous studies which had found that student teachers used technology more for exchange of social and emotional support than exchange of ideas. To encourage more focused discussions via telecommunications, use of listservs were guided by faculty in the following academic year. Critical teaching concepts were targeted for development. During the first two years, cooperating teachers' participation was extremely limited. Individual training and encouragement was given by faculty to increase participation. When surveyed, the majority of the graduates of this program have noted that e-mail and word processing are the two major technological skills they obtained. The cooperating teachers indicated many more areas of technology in which they were competent. Attitudes of these preservice teachers were positive toward technology; the hindrances were listed as (1) limited funds, (2) equipment, and (3) time. With easy access to a network and a true social and instructional community for support, an environment was created for teachers, students and university faculty to grow and explore. Contains 13 references.) (AEF)

A Five-Year Chronicle: Using Technology in a Teacher Education Program

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At the beginning of this decade a network of electronic mail systems connected most universities throughout the United States and several foreign countries. Colleges of education had begun linkages with public schools to support the student teaching process. Telecommunication tools for collaboration promised benefits for university faculty, student teachers, and cooperating teachers. The Curry School of Education at the University of Virginia was a premier example of an electronic academic village. Their first experimentation with electronic mail began in 1984 as a result of a joint study with IBM Academic Information Systems and the Curry School of Education. Implications and recommendations from this project have since impacted universities and public schools internationally (Bull, Harris, Lloyd, & Short, 1989).

Appalachian State University (ASU) is one example of an electronic community founded on the piloting results of studies similar to that conducted by Bull and his colleagues at the University of Virginia. In the past few years our research group has reported widely on building a technology-rich community of learners. We have found that our electronic community provides clear advantages for both public schools and our teacher education programs. For the first time we have linked preservice teachers with university faculty and cooperating teachers.

This historical account chronicles the uses of technology in the field experiences of our teacher education program. The purpose of this chronicle is twofold. First, the implementation of this program needed to be reviewed so that others may learn from the process of creating such an electronic community. Second, technology must be carefully integrated and used within teacher preparation programs.

Concurrent Impetus for Change

Throughout the last decade teacher preparation has undergone a "quiet revolution" in response to radical social and economic transformation (Darling-Hammond, 1996). Being apprised of this information, ASU reviewed practices and compared them with state and national licensing standards and ultimately with what students learned and what they could do as a result of their experiences in school. From this information, a university cohort of faculty began to grapple with field experiences as a logical place to begin major changes needed in the teacher education program. Central to the commitment was the desire to thoughtfully transform the teacher education program into a community of inquirers who come together to examine the aims of education and the nature of teaching and learning for achieving worthy educational goals. Technology surfaced as a natural tool for transformation.

Preservice teacher training programs have acknowledged the emerging contributions of educational psychology and technology. A combination of philosophy and technological innovations is critical information in understanding the potential to reinvent a teacher preparation program. Neither a community of learners nor technologies can effortlessly transform education. A combination of both is necessary to create a powerful opportunity to change the structure of public school education and teacher preparation.

Theoretical Framework

The Reich College of Education (RCOE) at ASU has become a participant in this "quiet revolution" with the goal of reinventing itself in terms of mission and work. Teaching is currently defined as a dynamic, goal-oriented social activity which reflects a commitment to both the value of cultural diversity and to the identification and solution of social problems. Learning is seen as an active process of acquiring, assessing, and producing knowledge in an environment of care and respect for others. New forms of learning and teaching can be acquired through experimentation and the exploration of new technologies.

The framework of social contructivism serves as the research base for college reform. Vygotsky's socio-cultural approach affords us the support to guide the process of transformation. Two key implications for ASU were drawn from the literature on social constructivism. First, it is

imperative that we assess the space and interactions where assistance from others occurs as preservice teachers enter the field. Second, hands-on experiences, which can only occur externally or socially, must be perceived as scaffolding in the gradual internalization and the ultimate development of an expert teacher. Both require social interactions or a community of practice (Lave & Wenger, 1990). The concept of interdependence of context, people, and process are integral to the development of teachers (Rogoff, 1994).

Model Clinical Teaching Program

The story of this technological force and the projects developed from it, which brought about change in the RCOE, began in 1992 with a small project called the Model Clinical Teaching Program. The goal of this program was to apply "several technological innovations and procedures that could revolutionize the way in which interaction took place between the university and the schools, professors and teachers, and professors and student teachers" (Blanton, 1992). To develop a basis for a new college model of teaching and teacher preparation, particularly for methods courses and field experiences, the RCOE surveyed and interviewed teachers in the region for guidance. The results of these surveys pointed out the need for increased communication between teachers in the school system, methods professors at the university, and preservice teachers attending college classes and field experiences.

A pilot section of one field experience served as a setting that encouraged preservice teachers to discuss, analyze, evaluate, and interpret their experiences in the schools with professors and teachers. A "Thoughtful Community of Teaching, Learning, and Technology" was created to build a partnership between the public schools and the university in the preparation of preservice teachers. E-mail was employed to link these three groups together for improved communication and increased understanding of expectations in the clinical setting. Funding was obtained from AT&T, Bell South, and the university to utilize an Integrated Systems Digital Network, permitting full video, audio, and data transmission over telephone lines. Public schools in this partnership were equipped with a technology room containing 8 to 20 microcomputers and a multimedia terminal. All participants were trained in the use of e-mail and videoconferencing. Participants were cohorts of preservice teachers in their senior elementary education field experience (Blanton, 1992).

Once the equipment was in the schools, another pilot project was initiated. These preservice teachers were "teaching fellows." This group of students was on full scholarship for high academic achievement and their commitment to the field of education. They were college sophomores and juniors and were mandated to complete one year of tutoring students in the public schools. These participants were required to write e-mail entries at least once a week to their professor who was supervising their experience. Entries were responded to on a daily basis by their professor and careful records of all e-mail transactions were kept for later analysis (Zimmerman & Blanton, 1993).

Year Long Block-Elementary Education

From the two pilot studies it was obvious that increased communication could occur with the use of e-mail and videoconferencing. After additional research and study of our own college practices, five concerns came to light in our field experiences. First, university supervisors, cooperating teachers, and interns were having difficulty communicating and understanding the expectations of clinical experiences. Second, the supervisory process did not seem to facilitate interns' application of formal concepts to the real world of teaching or the construction of meaning from the everyday practice of teaching. Third, interns seemed to reject formal knowledge acquired at the university early in their teaching experience. Fourth, university faculty and cooperating teachers did not share a common body of knowledge and language. And last, the structure of clinical teaching experiences prohibited the social construction of knowledge (Blanton, Thompson, & Zimmerman, 1993). Given these concerns, a cohort of faculty began to examine current practice and from this it became evident that our traditional field experiences needed restructuring.

In the fall semester of the 1993-94 academic year, 16 students and five faculty members launched an experimental year long training project. Each of the four participating schools had a computer lab and was connected to the university's local network. Students were required initially to send two messages per week via e-mail. Listservs were set up for all subject areas for preservice teachers, cooperating teachers and for university faculty to participate in topical discussions and information sharing. Data in the form of e-mail were collected over the course of the semester and archived for analysis. All participants received training in telecommunications. Faculty members taught courses in content methodology curriculum and media and learning. During the first semester students were engaged in these courses for ten weeks and then were assigned to five-week internships in nearby partnership schools. Preservice teachers intermittently returned to campus for seminars, which focused on issues such as classroom management, mainstreaming, strategies, and technology. During the second semester of student teaching students attended periodic seminars and workshops. Videoconferences were also held between and among faculty, preservice teachers, and cooperating teachers. University methods professors continued to communicate with students throughout the year primarily through telecommunications.

At this point, it was obvious that pilot projects using technology to increase communication were promising and that the concept of a year long experience in one setting with the same support personnel was advantageous. During the third year of this experimental project, faculty began an

in-depth look at the interactions within the partnership. Notes conferencing was utilized for specific topics in university methods classes. E-mail was designated for the discussion of concepts, issues, and reflections related to communication skills, social studies, math, and classroom management during the internship and student teaching. Listserv entries were analyzed for discussion of critical concepts taught in the methods courses. These discussions were also examined to determine declarative, procedural, and conditional levels of knowledge. Connections between concepts and application in the classroom were also noted (Greene & Zimmerman, 1996).

Faculty began training preservice teachers as active consumers of the Internet and then followed the effects of Internet use into the regular classroom during the 1994-95 school year (Zimmerman & Zimmerman, 1996). The training enhanced lesson and unit planning and provided a medium for researching specific topics within the state mandated curriculum.

This same year, the North Carolina State Education Department created technology competencies for all preservice teachers. We started analyzing the year long block group of preservice teachers to measure their technological competence in comparison with state guidelines. This was completed through questionnaires and self report (Zimmerman & Zimmerman, 1996). Deficient competencies were then targeted for remediation.

Summary of Findings

Initially e-mail discussions were unstructured and substantiated previous studies which had found that student teachers used technology more for exchange of social and emotional support than exchange of ideas (Thomas, Clift, & Sugimoto, 1996). In an early investigation, e-mail discussions were categorized into responses to class assignments, socio-emotional exchanges, housekeeping queries and bulletins, and spontaneous sustained exchanges of ideas (Schlagel, Trathen, & Blanton, 1996). Findings indicated that e-mail facilitated the creation of active social context in which professional conversation led to professional growth.

To encourage more focused discussions via telecommunications, use of listservs were guided by faculty in the following academic year. Critical teaching concepts were targeted for development. Those included were: Instructional Goals, Learner Characteristics, Curriculum, Classroom Management, Allocation of Time, Instructional Strategies, Instructional Materials, Grouping Practices, Lesson Presentation, and Assessment. A strong knowledge base for the declarative and procedural levels of instructional strategies was evidenced by journal entries. The concept of classroom management was clearly a concern in their preservice development as teachers. The need to develop and link declarative and procedural with conditional knowledge exists in preservice teacher training programs. Reflections and dialogue provided ongoing opportunities for these concepts to be discussed and examined. An electronic community not only eliminated the isolation of teachers; it also created a forum for problem solving (Greene & Zimmerman, 1996).

During the first two years, cooperating teacher's participation was extremely limited. Individual training and encouragement was given by faculty to increase participation. Limited time and desire for personal contacts were cited as reasons for their reluctance. Currently, this participation has increased but is still inconsistent and less interactive.

New and emerging technologies continued to be incorporated, as they became available. In addition to listservs, notes conferencing, web authoring, World Wide Web boards, video-conferencing, and Internet searches were incorporated into the preservice training. When surveyed, the majority of the graduates of this program have noted that e-mail and word processing are the two major technological skills they obtained. The preservice teachers did not feel competent in other areas of technology. When a similar survey was given to the cooperating teachers in this program, teachers listed many more areas of technology in which they were competent. The attitudes of these preservice teachers were positive toward technology. The hindrances, however, were listed as limited funds, equipment, and time (Zimmerman & Zimmerman, 1996).

Implications

University professors have archived a wealth of information in the form of e-mail discussions, preservice teacher portfolios, professional publications, and faculty anecdotal notes. We have learned over the past five years that with careful preparation and facilitation, telecommunication tools are well suited for constituting social arrangements that enable students to jointly construct knowledge about teaching. This application provides rich opportunities for students engaged in internships and student teaching to discuss how they are making sense of everyday classroom experiences. Discourse of this kind becomes a tool for reflection and the creation and restructuring of knowledge about teaching. Further research aimed at demonstrating the effects of these applications on teacher preparation programs is needed.

An ongoing struggle in our college is to increase participation by cooperating teachers in this program. There may be little incentive for expert teachers to publicly reflect about teaching on a listserv. As Bull and colleagues wrote, "Benefits must also accrue to users from the public schools if use of the network is to flourish" (1989). He elaborates on potential instructional benefits for teachers in the public schools. Somehow our communication of these benefits has fallen short of effecting the cooperating teachers in this program.

Increased use of technology must be infused into our methods courses. The value of technology needs to be continually addressed. We found that classroom teachers were using more technology in their classrooms than our newly trained preservice teachers. This may be due to the fact that preservice teachers have less experience in education in general and do not have the necessary skills to adequately integrate the use of technology into their teaching at an early stage. More research is necessary to identify the reasons behind this phenomenon (Zimmerman & Zimmerman, 1996).

To summarize, with easy access to a network and a true social and instructional community for support, we have created an environment for teachers, students and university faculty to grow and explore. Factors essential for success – such as support, leadership, and funds – have been included in our plan. The application of technology has not replaced the special teacher-student relationship, but has helped redefine and strengthen it. Increased participation in this project is warranted and further research must be carefully planned for the future.

Current Participation

Where are we today? We have established an electronic community. We have connected our university with local public schools and other universities, creating a network where teachers, students, and university faculty can become full participants in shared pedagogical dialogue and activities. In this community of learners, we have multi-level, multi-skill membership. Experienced educators collaborate with new teachers, enabling their induction into teaching in a non-threatening atmosphere. Dialogue among participants creates a community where all members learn as they participate in practice. Throughout courses, the university faculty structures telecommunications activities to help students connect abstract university classroom knowledge to their public school experiences. Assistance in the application of technologies is also a common practice in this program. We believe that a key role for university faculty in these partnerships is to help public school teachers and preservice teachers learn to use telecommunications and other technologies by using them together. It is through participation in shared activity that learning best occurs (Zimmerman, Greene, Schlagal, Trathen, & Blanton, 1997).

When our new RCOE model for teaching and learning was implemented this year, our technological innovations were right on target. Faculty had started a serious transformation that reflected the current knowledge base on teaching and learning. With the aid of technology, we had started to use community collaboration as an asset in creating a quality learning experience. The disparity that exists between theory and practice was minimized. The goal of preparing teachers in this type of partnership can link state-of-the-art practice for preservice teachers with state-of-the-art preparation and induction for teachers (Darling-Hammond, 1994). Here a collective knowledge base will be the norm for our graduates who can learn by doing and ultimately develop a strong repertoire for understandings about practice.

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