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ABSTRACT

This document contains the following papers on partnerships across organizations from the SITE (Society for Information Technology & Teacher Education) 2002 conference: (1) "Modeling Instruction with Modern Information and Communications Technology: The MIMIC Project" (Ronale J. Abate; Jim Meinke; Mary Jo Cherry; Pam Cook; Jennifer Merritt); (2) "Problem Based Learning with Young Children: Designing and Implementing Action Research Projects in an Urban Classroom" (Comfort Akwaji); (3) "Mestrado Band: Developing a New Model for Teacher Professional Development in Brazil" (Cristiana Mattos Assumpcao); (4) "Strategies for Integrating Technology into Field-Based Teacher Training Programs: Perspectives from Educational Technology and Teacher Education Faculty" (Thomas Brush, Kathleen Rutowski, Krista Glazewski, Jean Sutton, Cory Hansen, Doreen Bardsley); (5) "Telementoring: A Partnership of Learners" (Donna R. Everett and Glenda A. Gunter); (6) "Riverlink: A Collaborative Technology-Based Project for Improving Science Teaching and Learning" (Cheryl Claxton, Dennis M. Holt, Scharyle Nottke); (7) "Collaborative Teaming on Technology Enhanced Problem-Based Learning Curriculum Units" (Judith Howard, Ann Cunningham, Jackie Ennis, Deborah Long, Barbara Mize); (8) "A Connected Lifelong Learning Community" (Kenneth Janz and Susan M. Powers); (9) "Technology for Participation" (Terrie Shannon, Louis Abrahamson, Lyle Shannon, and Karen Keenan); (10) "TOPS and STAT: Two PT3 Bridges for the Digital Divide" (Jennifer Kidd, David Kidd); (11) "Web Portal Strengthens Partnerships for Enhanced Teacher Preparation" (John A. Kinslow, Ellen Newcombe, Marlene Goss, Lesley Ann Welsh, Rose Marsh); (12) "Preparing Preservice Teachers to Use Technology: Program Experiences and the Research" (Denise Schmidt, Clyciane Michelini, Deb Versteeg); (13) "The NC Catalyst/SAS inSchool Partnership: Universities, Public Schools, and Business Working Together to Help Faculty and Cooperating Teachers Integrate Technology in Teacher Education" (Carolyn Sneeden, Marjorie DeWert) (14) "Never Bowling Alone: Building Social Capital and Professional Knowledge through Educational Technology" (John J. Sweeder and Maryanne R. Bednar); (15) "Collaborating Across Boundaries to Form Technology-infused Learning Communities" (Kathe Taylor); (16) "Building Successful School and University

Partnerships: 'Finding the Fit'" (Nancy Todd, Linda Kieffer, Patti Dean); and (17) "PT3: Connecting Educational Technology Integrated Curriculum in Higher Education with K-12 Schools" (Robert Z. Zheng). Several titles are brief summaries of conference presentations. Most papers contain references. (MES)

Partnerships Across Organizations (SITE 2002 Section)

PARTNERSHIPS ACROSS ORGANIZATIONS

Modeling Instruction with Modern Information and Communications Technology: the MIMIC Project

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Abstract: This session describes the distinct approaches employed by four of five Colleges of Education in the Greater Cleveland area partnering in the implementation. of the MIMIC Project (Modeling Instruction With Modern Information and Communications Technologies), a Preparing Tomorrow's Teachers to Use Technology (PT3) Implementation Grant. The common goal of this partnership is to increase the level of educational technology modeling in pre-service teacher education classrooms and field experiences. Each institution outlines different methods for technology integration unique to the needs of their specific constituency.

Introduction

The Modeling Instruction with Modern Information and Communications technology (MIMIC) Project is funded by the U. S. Department of Education PT3 program. The overarching PT3 goal is to prepare new teachers to effectively use technology in their teaching. The MIMIC project includes five Cleveland area colleges of education (Cleveland State University, Baldwin-Wallace College, John Carroll University, Notre Dame College of Ohio, and Ursuline College). Each of the partners conducts professional development activities for higher education faculty and classroom teachers involved in pre-service teacher preparation. The teacher preparation programs vary across the five institutions. To accommodate these differences, the MIMIC project supports local management of professional development efforts while promoting the exchange of ideas and solutions across institutions. Despite programmatic differences, all of the partner institutions are guided by a commitment to prepare pre-service education students to effectively integrate technology into K-12 teaching.

Cleveland State University (CSU) serves as the lead institution for the MIMIC Project. Implementation of the MIMIC project was influenced by experiences gained from a one year Capacity Building grant (Abate, 2000). Practices that proved successful during the Capacity Building year were continued in the Implementation project.

Cleveland State University

Four implementation features have proven critical to the success of the CSU implementation of the MIMIC Project. These features entail: 1) the use of K-12 classroom teachers as mentors for higher education faculty; 2) a focused project management scheme; 3) a sophisticated evaluation plan; and 4) individualized professional development for higher education faculty.

K-12 Classroom Teachers as Mentors. CSU was fortunate to have experience with incorporating the services of master classroom teachers into teacher preparation programs from 1982 to 1990 when the College of Education conducted a K-12 visiting instructor program that featured team teaching of methods courses by higher education faculty and classroom teachers (Takacs and McCardle, 1984). The MIMIC project extends this approach by employing technology-proficient classroom teachers in the mentoring of higher education faculty in educational technology. The K-12 teacher as mentor arrangement provides several benefits. The mentors serve as a support structure for bridging theory and practice. Also, during visits to their mentors' classrooms higher education faculty gain first hand experience of technology integration in "real" classroom settings. On occasion, mentors team teach with faculty in pre-service classes. Most importantly, the classroom teacher mentors supply technical, pedagogical, and content expertise to the mentoring process. The inclusion of classroom teachers in the process has also helped to establish a greater sense of community among CSU MIMIC participants.

Project Management. The goals of the Implementation project include support for the professional development of higher education faculty, the organization of professional development for the classroom teachers who accept pre-service students in field placements, coordination of partner programs, budget oversight, and dissemination efforts. Management of a project servicing five institutions, a diverse higher education faculty, full-time classroom teachers, technology service providers, and hundreds of pre-service teachers is an immense and complexundertaking. In addition to a Project Director, the MIMIC Project employs a full-time Project Coordinator who manages both the everyday and long term objectives of the project. Coordination of the MIMIC Project has a "job description" unique unto itself. Requirements include such unique skills as knowledge of K-16 academic environments and the ability to match personalities, content foci, and technology expertise with needs while setting up and sustaining faculty/mentor teams. Flexibility is a key aspect of Project coordination since the events of any given day may range from conference travel questions, article editing, equipment crises, budget attention, meeting planning, report compilation, and filing. To accomplish this, a Project Coordinator must be able to envision order in chaos and appreciate the intrinsic reward of in seeing the Project goals accomplished on a daily basis.

Evaluation. Project evaluation activities address both formative and summative evaluation questions that examine the validity and impact of the project. A local evaluator directs the evaluation effort for CSU and the partner institutions. The evaluator works closely with the project team to ensure that planned activities occur as scheduled. Progress is recorded via monthly review forms. The evaluator meets with the project team on a regular basis to provide formative reviews and to provide suggestions and modifications for planned activities.

Baseline data is collected via surveys to identify the technology proficiency of higher education faculty and supervising teachers. Information collected from the surveys is used to tailor mentoring, develop specialized workshops for College of Education faculty and to schedule instructional workshops for classroom teachers who supervise pre-service teacher field experiences. Mentors prepare an implementation plan with each faculty member and maintain notes on the support provided. This qualitative data is used to modify mentoring plans. A pre-post review of syllabi developed by the participating faculty members offers qualitative data that documents technology use by participants. End-of-the-year surveys, including a technology use follow-up, are administered to furnish a picture of faculty and supervising teacher skill development. Evaluation is ongoing and the constant interaction among the evaluation team, the participants, and project management leads to timely and effective action. Evaluation is interwoven into the fabric of MIMIC activities. As a result the evaluation team is directly engaged as a partner in the success of the project.

Individualization. The cornerstone of the CSU implementation is the individualized professional development provided participants. All professional development is derived from a "bottom up" perspective.

Novice, intermediate, and advanced faculty participants are encouraged to develop plans that best meet their interests and skill level. Mentors for faculty are selected based on how well their knowledge and skills meet the needs of a faculty member. As a result, mentoring is focused on individualized needs, and acceptance of the technology integration plans by higher education faculty is very high. The Project team also supports individualized technology skill development through selected workshops and continuous technical support. Individualization is further addressed with classroom teacher participants via a wide range of specialized workshops typically tied to specific content areas. As a direct result of this individualization faculty are more likely to fulfill the objectives of the project.

Overall the success of the CSU implementation revolves around the plan, the purpose and the people. Project team staff, participants and evaluators pursue goals that offer individual attention while addressing the larger purpose of the Project. Finally, the people involved in the CSU MIMIC Project see value in the purpose and are highly motivated to achieve this purpose.

Baldwin Wallace College

The MIMIC Project at Baldwin-Wallace College is alive and very involved over the past two years of work. BW has taken advantage of its position as a premier teacher training institution to spread classroom technology skills throughout the campus by pairing pre-service teacher candidates with both education and general faculty. Transformational and measurable results have been achieved. Within the education program, faculty members have adopted both PowerPoint and web resources into their regular classroom routines.

Students are encouraged to enhance their presentation skills through the inclusion of technology-based content. Additionally, a growing number of the faculty members are in the early stages of extending their classroom contact via implementation of BlackBoard postings and discussion exchanges. At BW our method of project management is one that attempts to direct the faculty to actively adapt their course syllabi by infusing technology where appropriate. In the academic year of 2000-2001 we had eight faculty members mentored on our campus. In the current year of 2001-2002 we have six additional faculty members being mentored. What follows are highlights of the accomplishments of these two years of work.

Year 1: 2000-2001 Listed below are some of the highlights of the first year of the project on BW campus. All of these faculty members were novice technology users prior to the Mimic Project.

- The development of the first online web-based course on our campus – The Geology of the Rocky River Reservation. This resulted in the professor leaving the techniques of Blackboard and creating a CD as a field manual and guide for the students. This same professor then served as the mentor for another professor the following year to creating a CD lab manual for Microbiology.
- Four of the education faculty developed courses in Blackboard (campus adopted) and began development of the creation and use of PowerPoint in the respective courses.
- One education faculty member saw the Mimic Project as a focal point for her sabbatical experience. She was very interested in reading and literacy and centered her study on the use and incorporation of "concept mapping" software into her course syllabi. Therefore, she pursued the use of Inspiration software into here course structures and recent presented a colloquium to the Division of Education on here results and findings.

Year 2: 2001-2002 In the second year of the project the emphasis is not only to continue the successes of the first year but also to expand on the project by dissemination of the innovative ideas to areas beyond our campus. Listed below are some of the current projects in progress.

- One special needs professor is building lab experiences into her course for assistive technologies. She is also incorporating audio-streaming for some assignments normally done in class that now can be linked to her Blackboard component of the classroom.
- Another educational faculty member is making maximum use of using Real Producer to incorporate streamed videos into her courses within the construction of Blackboard.

• A health professor is being mentored in Blackboard and is also planning on using CBL and MBL equipment in probe usage for teaching Health Methods to future teachers.
• A tremendous success story has played out as a result of last year's participant. Our geology professor has organized a trip abroad for the purpose of studying the volcanoes of Iceland. She plans to send downloaded images and videos of the experiences with the students for the remaining students on campus. This to be accomplished via the web as well as via desktop videoconferencing – campus to volcano.
• The Collaboration of the Americas grew out of the original PT3 Project MIMIC grant. The Collaboration of the Americas expands the MIMIC model through the use of desktop videoconferencing as well as into Internet 2 for distance mentoring....whether that is from within US (university to university) and/or in collaboration with foreign colleges and universities, (Argentina and Chile). The project has expanded into three sub-projects: One education faculty member is a MIMIC participant working in the area of early childhood teacher preparation. She will have a mentor who is a current 3rd grade teacher in a local school district. Her mentor is also finishing her Master's Degree in Educational Technology this spring. In addition to these two folks working together, a third tutor is being arranged at a distant University and the plan is to connect these people via Internet2 with distance videoconferencing. This professor works in the area of educational technology but is also interested in early childhood computer literacy.
• Two professors from the Instituto Superior de Formacion in Patagonia, Argentina, have formed a collaboration with Baldwin-Wallace College for Spanish audio files in exchange for technology skills for their teachers in training. The goals of this project are: 1) to actively collaborate with other teachers in a distant environment via email, discussion board, virtual classroom and hopefully live teleconference (iVISIT and NetMeeting) on various teacher classroom methods; and 2) to receive, from Argentina, Spanish audio files (male, female, teenager, different dialects) to assist our Spanish Department on the Baldwin-Wallace College campus in helping future Spanish K-12 teachers. (This is a problem we are experiencing on our campus with the PRAXIS II language test) and finally 3) to achieve cross-cultural pollination of teaching methods and ideas as well as other cultural variations between our two countries.
• A BW music education faculty member has been fortunate to be involved in three Artist Residencies sponsored through the Ohio Arts Council and the Chilean North American Cultural Institute in Chile, South America. Her target projects have been focused in the Chilean cities of Copiapo and La Serena.
Her work in Copiapo has been at the Liceo Experimental de Musica de Copiapo which is a grade three through twelve school of the arts in the middle of the Atacama Desert. The Chilean government has declared this Liceo as the model arts school for the country in the development of curriculum, scheduling and programming. Her residencies there have been multifaceted. In addition to guest conducting the bands, orchestras and choirs, she have been charged with assessing and evaluating all perspectives of the school from teacher and student performance in the classroom to scheduling, materials, teacher education, inventory and the coordination of the writing of the National Chilean Music Education Curriculum. It is her hope that the development of her technology skills will enable her to develop a web site that will support sharing web stream broadcasts of quality teaching and performance examples and professional development information. Through the use of video conferencing, she hopes to be able to maintain an ongoing dialogue throughout the year so that she is able to support her Chilean colleagues on a daily basis as they work to further music education in their country.
Her second project is in La Serena, Chile, at the Universidad de La Serena and Escuela Experimental de Musica "Jorge Pena Hen." This past August, she spent a week at the University de La Serena leading the "Encuentro de Directores de Bandes de Concierto Escuelas Artistics del Norte Chileno." This was a weeklong convention for all of the band directors in the north of Chile. She presented clinics on numerous subjects such as conducting, rehearsal techniques, repertoire, and singing in the instrumental classroom. This was the first time that an event of this type had been presented in Chile and the first time that these thirty music educators had ever met! It was an extraordinarily successful event that ended with a commitment on the part of the teachers to attend every year. The opportunity presented itself to start the very first Chilean Music Education Association. She is committed to working with these dedicated music educators to help them continue their professional growth through the year. She hopes to experiment with distance learning through the use of Intemet2, video conferencing and web stream broadcasting to share what she can with her new colleagues.
• Time during the visitation to the BW campus in January by the Universidad de La Serena and Escuela Experimental de Musica participants will be used to train them in desktop video teleconferencing software as well as in Real Producer and file transfer for streaming their future concerts. On Feb. 22nd BW will stream a live concert especially for these two intuitions. This is in preparation for their institution doing a stream back to BW. This maintains the dialogue of the instructors involved in the collaboration from the conferencing and the performance level.

Notre Dame College of Ohio

The MIMIC project at Notre Dame College focuses on three areas: (1) education college faculty members, (2) pre-service teacher courses and (3) cooperating teachers who supervise Notre Dame student teachers.

Education College Faculty Members. Notre Dame College has implemented the MIMIC project at this level through workshops and institutional policy. The education faculty participates in workshops in how to set up a class web presence, Power Point presentations and how to use the laptop/projector in their classroom. They have also added to their syllabi the requirement that in each class the student will produce an digital artifact which will be incorporated into an electronic portfolio when they take a required education technology class.

Pre-service Teacher Courses. In the pre-service integration of technology into the curriculum, the pre-service teachers have been paired with Master Classroom Teachers (MCT) in the development and implementation of a modeling of technology lesson. The pre-service teachers meet with their MCT and plan a lesson integrating technology and then team-teach the lesson with the MCT. Evaluation forms were developed which document the process and the reflections of both the Master Classroom Teacher and the pre-service teacher individually and jointly.

Cooperating Teachers Who Supervise Student Teachers. In each student teaching experience, the cooperating teacher and the student teacher model a lesson integrating technology into the curriculum. This policy has been added to the requirements both for student teachers and cooperating teachers. Each fills out an evaluation form on the modeling of technology lesson.

For the second semester, best practices in the college and field classrooms will be videotaped and the different experiences will be collected on one tape to be shown in the pre-service integration of technology class. The modeling of technology will encompass different content areas and different grade levels.

Ursuline College

The MIMIC project at Ursuline College is comprised of several parts. Implementation occurs during the spring semester of the year, as the methods courses involved are offered during that time.

1. Ursuline faculty responsible for teaching methods courses in the early childhood and middle childhood programs vary in technological expertise. They are, however, quite amenable to guidance and tutelage. These services are provided by technology faculty/directors from two local public-school districts. Methods faculty determine the technological process they would like to teach to students as a teaching/learning tool for the classroom. Joint sessions held with the technology faculty from the school district allow planning of three to five classes for the semester. School-district personnel serve as guest instructors in the methods courses, teaching the process to the college students. Methods faculty then guide students in projects which allow them to implement the techniques learned during the guest instruction. Methods faculty incorporate the processes in subsequent semesters with other students. Thus, the focus of this portion of the MIMIC project is to allow college faculty to learn processes which then become a planned part of future methods courses. This portion of the project has been quite successful.

2. During the first two years of implementation of the project, a school-district administrator served as an adjunct faculty member for the college, and worked with three teachers in the public school (middle-school level) to enhance use of technology as a teaching/learning tool within several sixth-grade classrooms. The goal was to place students from the college for pre- and student-teaching experiences with these three teachers so that the college students would benefit from observing and learning how to use technology in the classroom. Scheduling students to complete experiences in the school has proved problematic. A student teacher has just completed an experience with one of the teachers. However,

due to an extended illness, the teacher was unable to work with the student for the latter portion of the placement. This part of the project has not been as successful, and review of the process is underway.

3. During the spring semester '02, full-time faculty in the Education Department will participate in several in-service sessions which will address additional areas of technology use in the methods courses. These sessions will not occur within the methods courses; rather, the faculty will participate in the sessions first, and then pilot the processes within methods courses during the spring '02 and fall '02 semesters. The "mentor" teacher will be the technology director for a local public-school district.

John Carroll University

John Carroll University's overarching strategy for the implementation of the MIMIC grant has been to employ the expertise of skilled technology trainers to create fertile and relevant backgrounds in technology implementation for higher education faculty and for K-12 teachers. The goal of this effort has been to allow the higher education faculty and the K-12 educators to share their newfound technological skills with pre-service teachers and students. We have chosen to focus our work with K-12 educators in urban schools and have elected to work with higher education faculty at John Carroll University.

MIMIC in the K-12 Arena

JCU began its implementation of the MIMIC grant working with teachers from one urban, parochial school and later added two urban, public schools from the "alternative/option" school group. Incorporating the training skills of master classroom teacher, Judi Wolf, and JCU Department of Education faculty member, David Shutkin, MIMIC extended learning experiences to K-12 teachers including bi-monthly workshops on software application and Web exploration. Additionally, MIMIC created opportunities for K-12 teachers to work individually with the technology trainers to adapt their training for use in specific curricular areas, such as Social Studies and Language Arts. On several occasions, the trainers observed K-12 classroom teaching and co-taught lessons with K-12 educators, periodically modeling instruction for JCU pre-service teachers who were working as volunteers and work study students within the school setting. These efforts have been met with great enthusiasm on the part of K-12 educators who see technology training as a door to the classroom of the future and a bridge for students marginalized by the Digital Divide.

MIMIC in the Higher Education Arena

The first phase of professional development provided for JCU faculty as part of the MIMIC grant was created in accordance with the CSU implementation plan. Faculty received individualized professional development derived from a "bottom up" perspective and designed to meet their interests and skill levels. This training was very well received and seen as highly beneficial. The second phase of professional development focused on "technology transfer" and utilized a skilled technology trainer to work with higher education faculty from the Department of Education within their *student teaching seminar classes*. Thus, the trainer was able to extend her instruction across the continuum from JCU faculty members to pre-service teachers while supporting specific instructional goals.

Conclusion

A sense of community has developed among the five MIMIC partner institutions. The flexible project management scheme coupled with the structured evaluation plan has lead to unique and successful implementation at the five university sites. Indications at this point are that university faculty, and classroom teachers are reacting favorably to the various forms of technology modeling. More importantly the modeling appears to provide pre-service students with a context for understanding how technology can improve instruction and why the modeling of technology is so important.

References

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Problem Based Learning with Young Children: Designing and Implementing Action Research Projects in an Urban Classroom

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Abstract: This paper is a report on an early learning project, using technology in inquiry and problem-based learning strategies, by kindergarten children in an urban classroom. The benefits of the problem-based learning project are three fold; it allows young children to engage their natural curiosity through involvement in activities that utilize both real-life and laboratory based experiences, it provides pre-service teachers the opportunity for hands-on training and application of theoretical concepts while working with early learners in an applied setting, and the project affords the in-service teacher the opportunity to focus on instructional design and curriculum that is challenging, student-centered, hands-on and relevant to the students present and future needs. The focus on real-world problems enables students to become problem-solvers, constructors of knowledge, and engaged learners who understand the relevancy of their educational experiences.

Introduction

This project resulted from conclusions derived from the observation of kindergarten students over three years at an urban elementary school. There was a noticeable lack of cooperation, creativity and problem-solving skills among these students as well as frequent displays of inappropriate social skills. Additionally, the project provided an opportunity for teachers' efforts to enhance their personal/professional growth through action research. Base-line data were collected on beginning kindergarten students at an urban math & science magnet school. Included in the assessments were measures that looked at their problem solving skills through the utilization of real world scenarios. Analysis of these data showed that students needed lots of interactions and experiences with problem solving. As a result, I set out to find ways to facilitate the learning of this highly needed skill that would capitalize on social interaction/cooperative learning, one of the best ways to get kindergarten students to learn. Also, one Friday a month, parents and guardians were invited to eat lunch with their child followed by a short technology literacy presentation session or activity which could include a software demonstration, modeling hardware or software or a visit to a highly recommended and appropriate website for young children.

The development and implementation of the early learning activities focused on math, science and technology. This approach took into consideration developmentally appropriate practices in early childhood, best practice principles, national standards and benchmarks and the School District's curriculum expectations for kindergarten students. I collaborated with Dr. Larry Genalo, Professor of engineering at Iowa State University. His course, "Toying with Technology" for elementary pre-service teachers was designed specifically to provide students in non-technical fields, especially elementary education majors, with an appreciation for the basic principles underlying the technological innovations that surround them. One expectation for students taking this course was to assist in hands-on workshops involving K-12 students and teachers from area schools.

Problem-based early learning harnesses the power of creativity, natural curiosity and engages young children in challenging learning activities. Students completed activities that drew on real-world, developmentally/age appropriate problems designed as weekly cooperative learning activities presented in the form of scenarios called "Problems of the Day". Students had opportunities to construct their own knowledge about how things work (i.e. the technology & engineering involved), through a focus on scientific concepts such as wheels, pulleys and gears. Students planned, implemented and reviewed their solutions in ways that encouraged and built creativity, cooperation, collaboration and problem solving skills. Between sessions students engaged in learning across the curriculum through activities designed to reinforce the concepts embedded in the "Problem of the Day". Additionally, students were deliberately involved in a variety of literacy-based activities related to these concepts, to develop and strengthen their emergent literacy skills. The rationale for choosing problem-based learning includes the following reasons.

- It supports the way young children learn – seamless opportunities for exploration and natural curiosity
- It provides skills needed to succeed in the modern scientific and technology-intensive world
- It promotes hands-on, minds-on learning
- It provides for many "correct" answers/possibilities
- It accommodates diverse needs of students
- It encourages more active, less passive, learners

Implementation

On Tuesday October 10, 2000 and the following four Tuesdays (Oct. 17, Oct. 24, Oct. 31, and Nov. 7) a group of twelve students from the Computer Engineering 370 course (Toying with Technology) at Iowa State University, accompanied by a graduate student, went to Ms. Akwaji's Kindergarten class. It was the graduate student's responsibility to see that the ISU students understood the challenges that the Kindergartners were up against and to aid Ms. Akwaji in developing challenges for the Kindergarteners. The ISU students were not allowed to do the tasks for the students, but help them to understand the information before them. The ISU students were to understand the goals that Ms. Akwaji had for her Kindergarteners, which included: the ability to work in teams, to better explain themselves, and to understand the information presented to them (wheels, levers, pulleys, gears). Toying with Technology is a program in which pre-service teachers learn how to use technology in the classroom, and how to apply the knowledge in the classroom to the appropriate grade level.

During Phase 2 (the second semester), the early learning project exposed young children to science, technology and engineering in a highly motivational and non-threatening way by having them build computer-controlled LEGO models; a goal comparable with that outlined for ISU students enrolled in the "Toying with Technology " course. As a result of observing and understanding the needs, abilities/capabilities of these students during Phase 1 (the first semester), software appropriate for young learners was developed to enable the kindergarten students to design things and make them "work/go".

Conclusions

With respect to the objectives outlined for the project, the first phase was successful. Out of the 24 kindergarten participants, only four had difficulty working cooperatively with peers. The goal was to have all of the students assume the role of "group spokesperson" to explain how they solved the "problem of the day" and the rationale for doing it at the end of each session. About half of the students understood and actively participated in this review/share part of the project. Overall I have seen a lot of improvement in both the students' communication, computational and problem solving skills. Based on observation and information obtained from the ISU students' journal entries, some of the kindergarten students had difficulty staying on task during the project sessions. Generally these were students who had finished early. As an intervention, those who had finished with an assigned task were encouraged to move on or engage in other appropriate activities. This is a common classroom practice that allows for all to participate and continue to learn/progress at an individual pace and at the same time contribute to the group. Through manipulating legos and the other materials/tools utilized for activities, students enhanced their fine motor skills. Students have also demonstrated individual and group responsibility through caring for materials/tools, taking turns and showing respect for the work of others. With the exception of a few, students focused on learning through exploration, and completed assigned tasks with some support from their "university buddies". During the first phase (Fall Semester), the time on task for some of the students was twenty minutes. This is typical of students of this age. During the second phase (Spring Semester), the time on task for all students increased.

Mestrado Band: Developing a New Model for Teacher Professional Development in Brazil

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Abstract: The need for professional development in the area of technology integration has been an emerging theme throughout the latest reports released by major institutions (CEO Forum 1999; CEO Forum 2000; OTA Report on Teachers and Technology: Making the Connection 1995; Gibbons 1997; Greene 2000). Researchers have been studying several models to decrease the gap between higher education research and what is actually happening in the classroom (Fishman et al. 2000, 2001). This paper proposes the creation of a new model of professional development in technology integration at the secondary level, where a partnership is being developed between a private High School in Brazil (Colégio Bandeirantes) and Universities both in the United States and in Brazil. The model proposes integrating teacher professional development at the high school with actual research work, by developing an official master's degree course using the expertise of researchers and professors to teach the courses both face to face and via online learning.

Introduction

Learning to manipulate technology is shifting from a privilege to a requirement in today's global economy. This is not only true in the United States, but in other growing countries as well. Brazil is the 8th largest economy in the world, and several initiatives are already being implemented to ensure its educational system prepares its students to take leadership roles and participate equally in the growth of this global wealth. The *Mestrado Band* model is being created based on lessons learned from my doctoral research (dissertation to be published in 2002 – Earth2Class: The Role of Technology in Providing Structure for Science Content Delivery from the Research Scientist to the Secondary (6-12) Classroom Teacher, Teachers College, Columbia University) in professional development using online technologies to integrate the work of the research scientists at Columbia University with the work of Earth Science teachers from various communities in the New York – New Jersey area and beyond (Passow et al. 2001). To view this project, the website is www.earth2class.org. The problems being addressed by this model include: (a) the time constraints teachers face in improving professionally while dealing with the daily routines and requirements of teaching; (b) the lack of effective technology integration in the classroom; (c) the distance between the work of researchers in higher education institutions and the classroom practices; (d) the lack of recognition of the value of the work being developed by the teachers in their classroom; (e) the need to revisit academic standards to measure excellence in contributions to a field of study and (f) the role of strategic partnerships in developing new professional and educational paths for personal and institutional growth.

The Professional Development Model

The *Mestrado Band* program being proposed will consist of a complete M.A. curriculum in Computers in Education or Instructional Technology, where the teachers will have intensive courses during summer vacations at the partner universities, thus having the opportunity to see functional models of uses of computers in schools in the United States, and complete their coursework back at Colégio Bandeirantes, developing and testing out projects as they teach. The effort will be complemented by online courses, and guest professors will be invited to teach intensive workshops in Brazil, very likely once a month. Strong emphasis will be given to pedagogical theories and applications that use technology in innovative ways to enhance teaching and learning and truly transform classroom practices.

The advantage of partnering with Universities from other countries is to have access to specialists and projects in a country where the use of computers in education has been going on for a longer period of time, thus allowing teachers in Brazil to benefit from the experience already acquired there. As the Internet becomes more widely accessible, the potential for collaborative projects increases and should be taken advantage of.

In this proposed model, not only are there major advantages for the teachers, who can now use their time for personal growth and for school work that is officially recognized as valid research by higher education institutions, but also for the school, as it builds on the teachers' production and develops more advanced projects and products within the school context for their student body, therefore becoming more competitive in the market. The professional development efforts become more consistent and build upon the strengths and diversity of different participating institutions. When teachers are transformed into recognized researchers within the school context, the gap between researchers and practitioners is narrowed. A partnership relationship is developed, as both parties become collaborators in the greater effort of improving education.

This model would not have been possible without the development of the modern technology tools now made widely available to the community. The Master's program is being designed not only to capacitate the middle and high school teachers to teach using technology to enhance their lessons, but also to gain professional growth and research abilities using these same tools to learn, communicate, collaborate and network with the research community globally. The development of a network of education institutions (middle and high schools with universities) is a key element of this design.

As more educational researchers are becoming aware of the importance of building these strategic alliances with the classroom professionals to bridge the gap between theory and application, I propose that it is time to officially develop organized and institutionalized partnerships that build on the strengths of educational institutions at different levels, reflecting the same strengths this new technology has brought us – moving from a model of competition for few resources to one of collaboration to share widely available resources that are now accessible because of the democratization of information.

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Strategies for Integrating Technology into Field-Based Teacher Training Programs: Perspectives from Educational Technology and Teacher Education Faculty

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Abstract: Most researchers agree that more technology training is needed for teachers, and numerous suggestions already exist in the literature regarding the content of the training and the methods for delivering the training. One of these methods involves the integration of technology with undergraduate methods courses, thus providing students with knowledge and experiences applying technology to their specific content areas. This field-based model is the basis for teacher education experiences at Arizona State University (ASU). A collaborative effort between methods and educational technology faculty worked to identify and implement two key components of a model designed to provide pre-service teachers with the skills and experiences required to fully integrate technology into their future classrooms. This paper will consist of perspectives by the following key individuals regarding the effectiveness and challenges of implementing this new model:

- **Faculty in Educational Technology**, who will provide an overview of the field-based model and discuss the evolution of the technology integration component of the model over the past two years;
- **K-12 site coordinator**, who will discuss strategies for obtaining access to schools for use as field-based sites, and will describe how field-based placement teachers are involved in the technology integration activities;
- **Methods faculty liaison**, who will discuss strategies for collaboration between methods faculty and technology faculty with regards to technology integration activities for pre-service teachers;
- **Methods faculty**, who will describe the strategies they are using to integrate technology into the field-based experiences for their students, and;
- **Field-based technology instructor**, who will discuss technology integration activities completed by pre-service teachers, collaboration with methods faculty, and participation in activities with teachers at field-based sites.

Overview

Most researchers agree that more technology training is needed for teachers, and numerous suggestions already exist in the literature regarding the content of the training and the methods for delivering the training. One of these methods involves the integration of technology with undergraduate methods courses, thus providing students with knowledge and experiences applying technology to their specific content areas. This field-based model, also known as *job-embedded learning*, concentrates on providing pre-service teachers with authentic training experiences in real classrooms prior to their student teaching experiences.

At Arizona State University (ASU), students enter the pre-service teacher education program at the beginning of their junior year. Once they enter the program, they are immediately enrolled in a series of semester-long field-based teaching methods experiences at local "partner" schools. Each of these experiences requires students to successfully complete more traditional methods classes taught by methods faculty at the partner schools, and serve as interns to "placement" at the partner schools in which they spend a minimum of six hours per week in elementary or secondary classrooms observing classroom practices, assisting the placement teachers with instructional activities, and complete methods class assignments to learn about themselves as they begin to assume the role of a teacher.

Students are required to participate in a different methods experience (or block, as it is called at ASU), each semester. Each block focuses on different content and provides students with different experiences. For example, teacher education students who are pursuing elementary certification complete the following sequence of field-based methods experiences: Block I – Social studies and language arts, Block II – Mathematics and science, and Block III

– Reading and multicultural education. Students pursuing secondary certification in a content area complete one semester of general teaching methods and two semesters of teaching methods specific to their content area (these are also field-based and taught in conjunction with faculty in the College of Liberal Arts and Sciences). Thus, regardless of their certification program, students are involved in field-based teaching activities throughout the teacher education program. This field-based component is one of the unique and innovative aspects of the teacher education program, and also provides a mechanism for infusing technology throughout the program.

Prior to 1999, the integration of technology within these field-based courses was not emphasized. Pre-service teachers were required to participate in a campus-based educational technology class sometime during their junior or senior year, but there was no real coordination between what students were learning in this class and what they were doing in their methods experiences. The movement of methods courses to field-based settings, however, provided an opportunity to implement a plan to integrate technology skills and experiences with the field-based methods experiences. Working with the methods faculty, educational technology faculty, and field-based placement teachers at participating school districts, pre-service teachers were able to create technology-rich learning activities and implement those activities as part of their methods instruction. This involved a process of working with methods faculty to integrate technology skills into their field-based activities, providing methods faculty and field-based placement teachers with additional training (when necessary) in technology integration in education, and providing additional instructional technology expertise to field-based placement teachers and pre-service teachers at the point of instruction.

This paper will consist of perspectives by the following key individuals regarding the effectiveness and challenges of implementing this new model:

- **Faculty in Educational Technology**, who will provide an overview of the field-based model and discuss the evolution of the technology integration component of the model over the past two years;
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Perspectives from Educational Technology Faculty

Dr. Thomas Brush – Educational Technology Faculty Member. In order for pre-service teachers to acquire the skills and experiences necessary to fully integrate technology into their future, we felt that two key components were needed:

1. Providing pre-service teachers with field-based, situation-specific technology training they are able to integrate into the initial teaching activities they complete as part of their teaching methodologies experiences. In order to provide appropriate technology training for pre-service teachers, we collaborated to develop a set of technology competency activities to serve as a guide for both placement teachers and pre-service teachers. The competency activities were strategically created to align with both the International Society for Technology in Education (ISTE) National Educational Technology Standards (NETS) and the content covered in the field-based methods experiences (or "Blocks"). In this way, the competencies could easily be integrated into the teaching activities pre-service teachers are required to complete as part of their methods experiences. For example, a major competency area for Block I of the teacher education program is "Classroom Management and Technology Integration in Language Arts and Social Studies." In order to demonstrate this competency, pre-service teachers were required to design lessons that both focuses on language arts and/or social studies content and utilized some aspect of technology appropriately. To assist them with this activity, we presented field-based "workshops" in which we modeled appropriate uses of technology for various language arts and social studies concepts. We then assisted pre-service teachers in developing their own technology-rich lessons, and implementing these lessons with students at the partner school.

We are in the process of developing the foundation of a collaborative relationship among educational technology faculty, educational technology graduate students, and methods faculty that will form the basis for the alignment of activities across courses and increase the opportunities pre-service teachers have to design, implement, and evaluate technology-rich learning experiences for the children in their placement classes. In addition, educational technology graduate students are available in the partner schools to assist pre-service teachers with designing and implementing their activities with students. Through these collaborative practices, the expectations for the utilization of technology by pre-service teachers has dramatically increased. Pre-service teachers learn a variety of appropriate options for using and integrating technology, demonstrate the use of state-of-the-art technology in their teaching, and understand how this technology can be leveraged to enhance numerous learning activities

2. Providing College of Education faculty and field-based placement teachers with training, guidance, and just-in-time assistance as a means to more effectively enable them to support pre-service teachers with technology integration activities. Although many of the methods faculty and field-based placement teachers already possess exceptional skills in integrating technology with teaching, there was still a need to provide many of these individuals with additional training regarding effective uses of technology in various teaching domains, as well as available technology resources in those domains. Methods faculty and field-based placement teachers were not expected to possess comprehensive knowledge of the vast number of resources available or which of the resources might be most appropriate for various teaching and learning activities. In response to this need, we developed a series of intensive summer institutes. Working in collaboration with the partner schools, these institutes are led by teams of educational technology faculty, methods faculty, and educational technology graduate students. Each institute is designed to focus on specific content areas emphasized in each of the methods blocks. For example, faculty responsible for the social studies and language arts methods block participate in workshops that specifically address the technology resources available in those content areas and receive hands-on opportunities to use the resources and discuss how those resources could be integrated into classroom activities. These institutes serve as opportunities for faculty and placement teachers to learn about both strategies for integrating technology into teaching and the vast technology resources available that teachers should be using with their students. With this ongoing training, methods faculty and placement teachers are better able to assist pre-service teachers in making informed decisions regarding effective technology integration during their field-based experiences.

In addition, ongoing support is provided *in the field* to methods faculty and field-based placement teachers by the educational technology faculty and educational technology graduate students. Educational technology graduate students are continually placed in the schools to assist both pre-service teachers *and* field-based placement teachers. These students have expertise in both teaching and technology integration; thus, they are able to assist the placement teachers with activities they would like to attempt with their students, as well as activities the pre-service teachers are planning. This resource and support structure helps methods faculty and field-based placement teachers better model effective integration of technology into teaching and learning activities.

Perspectives from the K-12 Site Coordinator

Jean Sutton – PT3 Site Coordinator. As Site Coordinator, I worked directly with the individual schools to schedule and coordinate the PT3 technology workshops for the Fall semester. I found the school principals to be enthusiastic and cooperative when I met with them individually before the school year began. The technology instructors, computer lab teachers, media specialists, and ASU methods professors sometimes attended these meetings. To encourage the teachers from each site to participate in the program, I attended and spoke at a faculty meeting at each school. I distributed flyers explaining the benefits of attending the PT3 workshops with times, dates, topics, and locations.

I built a profile of each school with the information that I obtained from the principal, other school personnel, and the school web sites. This profile included information such as grade levels, number of students, location (written directions), phone numbers, types of computers/programs in computer lab, etc. This profile was made available to the technology instructors.

Overall, the first semester of the program went smoothly. I met with principals at the conclusion of the semester to obtain suggestions and feedback. They all reported no problems and felt the program was successful. One of the challenges has been to motivate on-site teachers to participate in the filed-based workshops and summer institutes. Although the principals viewed this part of the program as a "perk" for teachers, in reality, the teachers were overwhelmed with other teaching responsibilities. The principal at one of the schools remarked, "This is a topic that teachers are interested in, they are just too stressed out and busy."

Two of the field-based schools have been involved in a performance-based pay plan in conjunction with "Section 301," which is a specially allocated Arizona state tax revenue designated for teacher training and skills enhancement. Since the PT3 workshops were included as an option for fulfillment towards the required 15-hour staff development, teachers at these two sites were more motivated to attend.

Any scheduling and staffing problems during the semester were minor. For example, classes that fell on a Monday needed to be rescheduled because of several holidays. Although the on-site computer labs were scheduled ahead of time for the regular workshops, on a few occasions the school had scheduled something else in the same room. This problem was easily solved by temporarily using a regular classroom. If one of the technology instructors was sick or unable to attend, I was available to substitute. In addition, I rotated schools to assist the technology instructors with the workshops.

Scheduling and planning began several months prior to the start of the Spring semester. Many adjustments and improvements have been made. Suggestions taken from school administrators, PT3 staff, methods teachers, and ASU students have been taken into consideration. I have worked closely with the methods faculty liaison to improve the effectiveness of coordinating the activities. Information she has shared regarding student expectations, schedules, and requirements has been invaluable. We hope by anticipating some of the student conflicts, we will be more successful in meeting students' needs. This next semester should be even more successful and productive with the experience gained from last semester and the comprehensive planning.

Perspectives from the Methods Faculty Liaison

Dr. Kathleen Rutowski – Methods Faculty Liaison and Instructor. In this section of the paper we describe a strategic framework employed to support the development of a collaborative style of interaction among methods faculty, educational technology faculty, and educational technology graduate students. Collaboration was essential to integrate educational technology experiences into the preexisting field-based methods courses in our elementary teacher education program. It also provided the opportunity to model a collaborative style of interaction for our preservice teachers. The ability to collaborate is a critical component for developing productive relationships between teachers and educational technology experts in schools, teaching practices that support diverse learners (Fennick & Liddy, 2001; Friend & Cook, 2000; Pugach & Johnson, 2002; Stainback & Stainback, 1992; Villa, Thousand, & Chapple, 1996), and has been cited by principals as an important consideration when renewing teaching contracts (Pugach & Johnson, 2002).

Friend and Cook (Friend & Cook, 2000) defined interpersonal collaboration as "...a style for direct interaction between at least two coequal parties voluntarily engaged in shared decision making as they work toward a common goal." (p. 6) They identified several characteristics evident in educational institutions endeavoring to develop a collaborative culture among faculty: collaboration is voluntary; collaboration is based on mutual goals; collaboration requires parity among participants; collaboration depends on shared responsibility for participation and decision making; individuals who collaborate share their resources; and individuals who collaborate share accountability for outcomes. During the course of the initial 18 months of the program we have deliberately worked to develop a strategic framework that fosters the development of these characteristics.

The PT3 grant designed to integrate educational technology into the field-based component of our elementary teacher education program was secured through the educational technology faculty at ASU. Elementary education methods faculty were invited to participate in the project which was designed to better prepare their pre-service teachers to use technology using the same constructivist pedagogical approach embraced by the elementary education program. In addition, participation would provide them support to refine and expand their own technological expertise and bring additional technology resources to the partner schools hosting their methods courses. The stage was set for voluntary participation of the methods and educational technology faculty in a three-year project with the goal of integrating educational technology throughout the pre-service teacher program and predicated on evolving collaborative relationships among participants.

During the first 18 months of the project a framework has evolved that provides formal and informal opportunities for methods faculty, educational technology faculty, and educational technology graduate students to interact in ways that enable them to share responsibilities, resources, and accountability for the outcome of the program. The formal components of the framework include: retreats during which methods faculty and the educational technology team share syllabi and align course activities; summer technology institutes; educational technology team meetings that include a methods faculty liaison; joint presentations at professional conferences documenting the program; and the development of a compendium of technology-rich lessons and activities for pre-service teachers. Interactions are structured to establish parity among all participants in the program, faculty and graduate students, by valuing the contributions of each individual and encouraging involvement through a process of shared decision-making. The formal components of the project have stimulated the emergence of informal collaborative opportunities. Methods faculty have begun to participate in technology workshop sessions at their partner schools. Methods faculty and educational technology graduate students are beginning to engage in ad hoc discussions regarding pre-service teacher participation in and response to workshop sessions. And, there have been several requests by methods faculty for demonstrations of new technologies they think will complement the content of their courses. There is an emerging sense of trust and community exemplified by an increased interest in team teaching and enthusiastic participation in efforts to merge and integrate course content.

Perspectives from Methods Faculty

Cory Hansen – Elementary Methods Faculty. I attended the PT3 Summer Institute and have integrated the knowledge I gained in the teacher preparation courses I teach. As an introduction to Early Childhood Education, students at Arizona State University are required to take a course in child development. Besides developing knowledge about children, we wanted our future teachers to become aware of the resources available on the internet, to be able to access those resources to meet the needs of children and to instruct parents how to find the same information to benefit their families.

In collaboration with other methods faculty, I developed a syllabus based on students using and sharing technology. The students in my ECD 314 class ranged from freshmen to post-bacs with the same goal of applying to our Education program. Each student was required to locate 14 articles to present to the class and 5 website reviews to share. To ensure students had the technological base to complete the course requirements, they were required to complete an internet training exercise for early childhood educators and to attend a Library Research Class to learn how to search ERIC, Education Abstracts, Psych Info and EBSCO. I would not have been confident guiding my students through this process without the experiences of the PT3 Summer Institute.

In order to scaffold this technological – and - learning experience, topics and key words were provided. For example, within the construct of maturationist theory, students were provided with the following key words: Gesell, School Readiness Tests, Developmental Screening. I instructed my students to locate articles within those boundaries, yet still to address individual areas of interest. The resulting conversations were focused and varied. Consistently, my students were surprised at the range of ideas within the topic at hand and pleasantly surprised at how choosing their own articles broadened their interest and knowledge about the subject.

Each student was required to compile a Resource Notebook for future reference. They are now secure in their ability to access the information they will need as teachers. In addition to these assignments, my students were required to observe, interpret and assess levels of child development. Without direction, the majority of my students referred to information they had retrieved through technology to assist them in making these judgments and suggestions.

Before completing the PT3 Summer Institute, I would never have had technology be emphasized as such a strong component in a child development course. Now, I wouldn't do it any other way. My ideas for future sections include power point presentations of child observation studies and, for myself, an electronic grade book.

Doreen Bardsley – Elementary Methods Faculty. I teach two Reading Methods courses and an integrated Children's Literature course (to the same group of students) in the third semester of the Elementary Education program at Arizona State University. I have been directly involved with the PT3 program for the past two years through attending workshops, meetings and a week-long summer institute.

By the fall 2001 semester some my methods class students had been involved in the PT3 pilot program during their first two semesters, while others had taken a regular technology course instead. One of the major assignments in my methods class was the development of a theme-based unit encompassing all subject areas. Students worked in groups according to grade level interest to develop their unit, and one large component of the unit was the inclusion of technology. We first brainstormed possible ways to include technology, then each group decided how they and their elementary students would use technology to enhance their learning.

As we talked about using technology in elementary classrooms it became obvious to me which students had been involved in the PT3 pilot program and which had not. Students who had been in the program were able to suggest more ways to incorporate technology in their unit planning, and they also were more likely to have used technology in their own teaching during their internships. There was a higher degree of technology knowledge and comfort with the students who had been involved in PT3 and had therefore received more practical experience with applying technology in the classroom. As a methods instructor I, too, felt much more knowledgeable about using technology, especially computers, as a result of participating in PT3 workshops and the summer institute, and as a result I felt more comfortable guiding my students.

In their unit plans my students suggested numerous ways that they could have their elementary school students use technology to enhance their learning: students could communicate with pen pals via email; they could research topics in the internet; they could use spreadsheets for graphing; they could use Web cams to see other places and people; students could use scanners and printers to input and reproduce information; they would use word processing for report writing; they could develop web pages or use power point presentations to show what they had learned; they could use digital cameras to add visual information; they could use computers for tests or educational games, and they could use calculators to help with math activities. The ASU students also saw a use for fax machines, CD players, videos, audio books, telephones and telescopes; they were very able to suggest ways to use technology in their teaching, and many gave evidence that they were already doing so.

Perspectives from a Field-Based Technology Instructor

Krista Glazewski – Technology Workshop Instructor. Instructing the technology workshops proved to be both a challenging and rewarding experience. The first challenge was in setting the context and expectations for the students. Students entered with the expectation that they would learn "computers," even though we went to great lengths to describe the goals of the PT3 project. Having no previous context for the ineffectiveness of the campus-based model, the students initially expressed disappointment in the realization they would not learn skills. In response, we, as the instructors, continued setting and reinforcing the expectations, which would not change.

The primary manner in which we set the expectations for the students was in modeling a language arts and a social studies lesson which incorporated technology. We as the instructors taught the lesson and the students experienced it as if they were the elementary students. They then received copies of the lessons and experienced a debriefing session in which we examined the preparation for the lesson, delivery of the lesson and the technology incorporated, and the lessons' overall effectiveness. Students were then asked to plan and deliver a similar lesson in which they taught language arts or social studies content and incorporated technology.

While the students enjoyed the experience of the modeled lessons, they expressed uncertainty in knowing how to proceed, especially since for most this was their first lesson planning experience. Many complained about not having adequate skills, while others had difficulty thinking of an idea. In anticipation of this, we had planned optional workshop time into the schedule; students could attend and receive one-on-one assistance from one of their instructors regarding any stage of the lesson planning with which they were having difficulty. However, only a few students took advantage of the support offered to them, preferring instead to ask their questions via email. Those who did choose to seek support, however, were extremely pleased with the patience and understanding offered by the instructors.

Despite their initial reticence, almost all students were able to create and deliver their lessons, and the final debriefing session proved to reflect the greatest reward for us as the instructors. Students described their lessons and experiences delivering them to each other, and the tone as they spoke reflected a positive, enthusiastic attitude. One student was placed in a classroom where the teacher had never taken the students to the computer lab. During the debriefing session, she related being called "the computer teacher" by the elementary students, and expressed her feeling of pride at providing students with a new and different learning opportunity.

Another student related the continuous technical difficulties she experienced in delivering her lesson, but concluded by showing us her final product, which was a book she had created with her students. With pride, she displayed the book for us, and stated that in spite of the difficulties, she found the experience invaluable because she was able to do something she had not been able to do prior to this class.

As instructors, we saw and articulated the value in having students experience what they would actually be doing as a teacher someday. The overall result was a feeling of effectiveness in our instruction as we listened to our students relate their sense of succcss.

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Telementoring: A Partnership Of Learners

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Abstract: The purpose of this qualitative study was to offer opportunities for mentoring and communication through a telementoring computer-mediated communication project. The researchers wanted to examine the relationships that could develop between experienced teachers enrolled in a Master's of Educational Technology program at the University of Central Florida, Orlando, Florida, and pre-service teachers enrolled in Business and Marketing Education at Morehead State University, Morehead, Kentucky, during their professional semester (student teaching) via asynchronous technology. The results supported and added to the research in telementoring and qualitative research.

Introduction

Like most institutions in a sea of change, the age-old practice of mentoring (a process which establishes a relationship between a protégé and an expert to provide guidance, advice, support, and feedback) is being influenced by new forms of work, technology, and learning. The benefits of mentoring are not only work related, but can provide individuals with opportunities to enhance cultural awareness, facilitate personal and professional growth, and provide the runway for successful admittance into a selected profession.

Mentoring is potentially one of the most powerful influences in a person's life. Whether it emerges out of an intimate relationship (grandparent, parent, sibling, a spouse or life partner), or a professional role (teacher, manager/supervisor, co-worker), most people have been, or will be a protégé, a mentor or both at sometime during their life (Zachary, 1997).

Mentors assist employees in dealing with the challenges associated with entry into and advancement toward successful, productive, meaningful professional lives. Historically, mentoring is based on the traditional apprentice learning from a master. The Industrial Age focused on mentoring to advance careers within organizational hierarchies (Haney, 1997). However, the Information Age demands a wider range of cognitive, interpersonal, and technical skills; therefore, mentoring is bound to change to meet these needs.

Creating new opportunities for students enrolled in teacher education programs to learn and integrate technology into all types of classrooms and to reach all types of learners has been the focus of much discussion in teacher education programs (Web-Based Education Commission, 2000).

The purpose of this study was to determine whether mentoring of pre-service students in their professional semester (student teaching) by in-service teachers could provide support and enhance assimilation into the teaching profession. Additionally, was it possible to mentor over distances, using computer-mediated communication?

Review of Related Literature

Many mentoring relationships today still are rooted in the "old paradigm" of power, prestige and hierarchy, based on the assumption that one learned something from a mentor (more often than not passively) and eventually separated from a mentor. The new mentoring paradigm is a partnership based on mutual learning, growth, and satisfaction. Through active engagement the needs of both partners are met. "Wisdom is not passed from an authoritarian teacher to a supplicant student, but is discovered in a learning relationship in which both stand to gain a greater understanding of the workplace and the world" (Aubery & Cohen, 1995, p. 161).

The academic arena has been reported by students as a stressful and sometimes overwhelming experience (Gunter and Jones, 1999). Many mentoring programs have developed from the philosophy that students need to connect with other experienced teachers and work together as a team to have a more favorable educational experience (National Center for Research on Teacher Learning, 2001). This particular pedagogy lends itself well in pre-service teacher programs.

Technology in itself can be an overwhelming and intimating factor for students, adding to students' stress level. Teachers who teach with technology to support student learning also share these fears. Knowing this then, a program design could be adjusted to meet the needs of students by providing mentors. At the same time, experienced teachers also might gain expertise at becoming effective leaders and mentors.

Examples of mentoring projects using telecommunications technology are prevalent in the literature (see Web sites listed in *References* for a host of examples of telementoring projects). The upshot of all of these telementoring projects is that they use peer coaching, cognitive coaching, and other mentoring techniques to increase support for students, teachers, and faculty during all types of new learning experiences. Pre-service teachers who are entering the classroom may need even more support and may not always feel comfortable seeking advice from their peers, supervising teachers, or their university supervising professors. The researchers assumed a telementor might be able to provide advice and support in a non-threatening, non-judgmental environment. And no formal telementoring project was found that paired in-service teachers and pre-service students in the manner designed by this study.

Methodology

The mode of analysis used to present the data from the study focuses on the content analysis (semiotics) of the telecommunications exchanges. Krippendorff (1980) defines content analysis as "a research technique for making replicable and valid references from data to their contexts." The researcher searches for structures and patterned regularities in the text and makes inferences on the basis of these regularities.

The primary purpose of this study was to investigate the phenomenon of the relationship between graduate students enrolled in a Master's of Educational Technology program who telementored pre-service teachers enrolled in their professional semester (student teaching). Another purpose was to examine whether experienced teachers could assist pre-service teachers at a distance in topics, such as tips and tricks, students, methodology, teaching resources, technology integration, and assessment.

The sample population for this study consisted of five graduate students who were experienced teachers (with an average of 9 years' teaching experience) and nearing completion of their Master's program and five pre-service students during their professional (student teaching) semester. The teachers were matched by teaching areas, personality traits, and other areas of interest. One pair was disbanded when the pre-service student dropped out of student teaching. Therefore, four pairs of students participated in the study.

The researchers created a sense of community at the beginning of the semester by introducing themselves and by creating a personal Web page in a Blackboard course site set up specifically for the telementoring project. Each mentor and pre-service teacher also created Web pages so all participants could get to know each other. After that, the two professors let the paired students communicate via e-mail for privacy. Specific directions and criteria were outlined for the purpose of creating dialogical communication. The only quantitative requirement was that the pairs had to be in touch with each other at least twice a month during the four-month semester.

Findings

The researchers considered they might have to stimulate the communication or facilitate the interaction to keep the messages flowing so both researchers were copied on all messages. However, this proved not to be the case. The communications between the pre-service and in-service teachers were enlightening to the researchers and the students. The telementoring proved to be a successful communication experience. All the participants gained in the process of collaboration, community, support, leadership, kinship, and at the same time learned and shared classroom strategies and techniques. To present the findings, the results are presented in the following categories: tips and tricks, students, methodology, technology integration, and assessment.

Tips and Tricks. As in any profession, experienced workers know or have a few techniques that they have learned to enhance their effectiveness in the job. Teachers are no exception. Telementors shared some of their tips with the pre-service teachers, as follows:

David C: Here are a few goodies I've picked up along the way in my 20 years in the classroom. Learn the kids' names; get to know them; get advice; and whatever you do, don't run screaming into the night!

Pam: I truly believe that [teaching] is the most important profession and when I see "the light bulb go on" for a student, it is the most rewarding. Learn students' names right away...I cannot tell you how many times I had my day all planned out and when I came in to school the day had to be rearranged. I had to go into my teacher bag of tricks and pull out an activity...one of the reasons I love what I do is that no two days are exactly alike.

I have trained my students to give me nonverbal signals to show me that they need help. This helps me and it doesn't disturb the others. Signals also keep the student that I am helping from feeling rushed to finish so I can help someone else because the other students usually don't see the signal.

William: Respect your students and expect them to respect you. Treat your students like students and not friends.

Pam: Your first day teaching is a day that you never forget. You are definitely stepping into the unknown but it sounds like you are in a wonderful situation. The students may try to test your authority but imitate the discipline/control procedures that your cooperating teacher uses. When students find out that the same rules and consequences still apply, they will stop. Also, don't worry about knowing the answers to every question. Students understand as long as you are honest with them. Good, constructive feedback is helpful...sometimes we don't hear our own slang. Proper English will help communicate ideas clearly.

William: How do you rate your time management skills?

Nirsa: The more you teach, the more you will find you will be able to focus on many things at once. You must know your content, though; because if you don't, then you won't be able to focus on the other aspects of teaching...I have to be honest—after 11 years of teaching I still feel disappointed in some of my lessons. Because students all have different learning styles, they each need different levels of support to learn a skill and concept...I totally agree with you: they need to know you care and that takes time.

Effective teachers have a repertoire of "tricks" to engage students. Enthusiastic, supportive comments from all telementors laid the runway for solid interactions. As the semester progressed, other tips evolved from the exchanges. The teachers' voice of experience, as well as their love of teaching, was clearly evident.

Students. The researchers noted a definite student-centered approach taken by the telementors. The following comments support this observation:

David C: They're [Students] all good at something. Or, at least, they all have areas of interest. Find out what they are and figure out a way to make use of them in the classroom... Different learning styles! Don't try to teach all kids with your favorite style of teaching. [Use] verbal, non-verbal, auditory, tactile, hands-on, writing, reading, pictures, color, etc...It's a lot more work than "worksheets for everybody," but in the long run, it's better for everyone, including yourself.

William: My kids will be testing for two weeks (FCAT) under very stressful conditions. Hey! Did you notice I kept saying "my kids"? Have you started doing this yet? If so, can you remember when you started referring to your students as yours? Kind of cool.

Nirsa: My best teachers are my students and their parents. Recently, I was having a casual conversation with one of my students about a TV show they all watched. She was amazed to know that I watched the same show and I was talking to her about it. Out of nowhere she exclaimed, "...You are like a regular person." This was the greatest compliment I have ever received.

Pam: I always get very attached to my students. I get emotional when they leave...I have found that students are very accepting to the response "I don't know but I can look it up or ask __________ and I will tell you the answer when I find it."

Our sense was that the telementors were very dedicated teachers and learners; their comments were grounded in experience and in caring whether the students learned and grew as individuals.

Methodology. Methods of teaching take on as many forms as there are teachers. Coupled with a high energy level in the classroom and attention to the "teachable moment" in their students, the telementors provided specific, ready-to-use techniques to enhance student learning.

Pam: Don't feel bad about having a part of a lesson that the students didn't understand. This happens often. I remember one lesson I abandoned for the day and taught it again the next day in a different way when I sensed I was confusing them. The next day went perfectly! A good review of previous knowledge is always worth the time. You can do this in ten minutes and it helps students connect their prior knowledge with the new knowledge...The problem of boredom is always present. I get bored as well as my students. I am constantly reading. I feel that it is important for me to continue to grow and learn. I read professional literature as well as articles with ideas for teaching. I have learned how to adapt these ideas to fit my situation and subject. This is a challenge but my students appreciate the variety.

Nirsa: As we know, repetition is important but boredom is not...one of the keys I have found to make a boring subject more interesting is to anchor it in a real world situation. Create a scenario or find a way to make it relevant to their lives. Nothing makes my students perk up more than when I start relating the subject to where they are.

Flexibility! Flexibility! Flexibility! What great intuition and insight you have on being flexible. Not only did you show how well prepared you are but you did it with a fabulous attitude. The better you handle these unexpected challenges, the more you will love what you do!

William: Congratulations on the grant. I think the SmartBoard is an awesome tool for teachers.

David: My best advice on this topic is "if it's not working, change it!" In response to your question about job searching, have your students search for resume templates and fill them out. I'd also have them start a file of their own personal skills, talents, abilities, interests, hobbies, travels, volunteer activities, accomplishments, etc. Have them keep it updated throughout the year. Most folks are usually pleasantly surprised when they see a year's worth of their value accumulated into a single file.

What great advice from seasoned teachers! Even the researchers learned a lot from the suggested methodologies from the telementors.

Technology integration. Researchers expected, and rightly so, that this was an area in which the telepartners would be able to share and exchange techniques. We were not disappointed.

Pam: I moved into my new lab over the weekend; found out that they are bidding on installing a ceiling and air conditioning for my class. I can't believe that they forgot to put those important things in my lab...I have had to work out a few "bugs" in the network and some software.

Nirsa: Joke for the week: After doing a Web scavenger hunt on the revolutionary war, I asked my students to draw a picture of what they think the Boston Tea Party must have looked like. Much to my surprise some students drew pictures of ladies (some in hats) drinking tea around a table. (True story)

Check out this site (Website inserted) for Monopoly Accounting. BTW, thanks for the commercial Website. I will let them know that my teacher friend in Kentucky gave it to me. You will be the toast of the town!

You won't believe this! I was in my car and my daughter was telling me how her middle school teacher reviewed spreadsheets using Jeopardy...I would sure like a copy of the Jeopardy game so I can modify it for my purpose.

Incorporating higher level thinking skills is an important part of learning. Check out this Web site (Website inserted) and let me know what you think...my students are working on PowerPoint projects this week. One group even narrated its entire presentation.

William: I really like using PowerPoint in my classroom. I also have my students complete a project or two every year that includes using PowerPoint. Using technology takes a lot of planning so that it is truly beneficial to the students...

David: Use every available technology resource at your disposal to its best advantage to most efficiently help children learn what they need to know. And remember, "technology" does not just mean "computers," although computers should be a natural, integral part of what's happening in any classroom that is properly preparing kids for their world. A couple of favorite computer integration techniques are scavenger hunts and WebQuests.

I'm attaching two files I use to introduce formatting in Excel...I have other files that I can also send you later. Here's a Web site (Website inserted) also I found that's a quick reference guide.

A summary of the exchanges between the telepartners can be summarized in one telementor's comments: "The measure of success with technology is not so much how well you can teach with it when it cooperates, but how well you can teach with it when it acts cantankerous!"

Assessment. Only one telementor shared comments about specific assessment techniques, as follows:

David: Hopefully, you have been taught about rubrics and project/portfolio assessments as alternatives to traditional written tests, but don't overlook having the students help design the rubric for given assignments. Given the chance to show some responsibility, kids can usually come up with a pretty legitimate set of assessment criteria.

Summary and Conclusions

The study revealed that the telementors provided support to pre-service teachers in a less stressful learning environment. From the exchange of communication, a rewarding relationship developed between the experienced and pre-service teachers. At the same time, the experienced teachers also gained a great deal from the pre-service teachers. They self-reported a sense of accomplishment and heightened self worth by helping these prospective new teachers. They spent time looking for answers to questions, strategies to suggest, Web sites, lessons plans, and other pertinent suggestions and advice. The researchers found the students communicated at a much higher level and continued the communication far beyond their expectations.

One of the last activities in the project was to meet in the synchronous environment (the Virtual Classroom) provided by the Blackboard courseware. The last exchanges between the telepartners reported very enthusiastic results from the chats. Comments, such as "I really enjoyed our chat last night," "I was really glad to meet with you live," and "Wasn't the chat room fun!" put the icing on the cake for the telementors, the telementees, and the researchers. Concluding remarks in the last email showed the supportive relationships that had been forged: "I really enjoyed working with you. You seem to be a person who puts in quality work [my kind of person]. Good luck and enjoy your graduation. You are going to be so successful!"

The successful conclusion of the telementoring project provided the answer to the research question: Yes, it is possible to mentor over distances, using computer-mediated communication.

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Riverlink: A Collaborative Technology-Based Project for Improving Science Teaching and Learning

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Abstract: This article presents the details of a collaborative technology-based science learning project completed through a learning community of students and teachers at four public schools with participation by university faculty. The project involved a study of the impact of the environmental health of the St. Johns River and feeder creeks on residents of Jacksonville, Florida. Through field studies, analysis of data, and the use of educational technology for research and communication, the participants developed new ways to facilitate science teaching and learning.

Project Description

The Riverlink project was a collaborative project among four public schools within the Duval County Public School District in Jacksonville, Florida and the preservice teacher education program at the University of North Florida. The project coupled selected students and teachers in two of the school district's elementary schools with selected students and teachers at two area high schools. The project incorporated several educational technologies to link the four schools so that students of different ages and cultures could work together to find solutions to commonly shared science learning topics.

Background

The purpose of the project was to develop an awareness of the impact that the environmental health of the St. Johns River has on Jacksonville's residents. The project created a four-school educational technology connection to monitor the health of selected feeder creeks and streams that flow into the St. Johns River.

One of the elementary schools (Lone Star) and one of the high schools (Sandalwood) is located in suburban Jacksonville. One of the elementary schools (Carter G. Woodson) and one of the high schools (William M. Raines) is located in urban Jacksonville. Participating teachers at Lone Star and Sandalwood worked together on a similar project for two years prior to beginning the Riverlink project.

Through field studies, analysis of resulting data, and the use of educational technologies for research, communication, documentation, and dissemination, project participants discovered new ways to facilitate science teaching and learning through cooperation and collaboration in a learning community.

Structure

To accomplish goals of the project an eleven-member team of experienced educators was formed. The team consisted of three teachers from Lone Star Elementary School, two teachers from Sandalwood High School, two teachers from William M. Raines High School and three teachers from Carter G. Woodson Elementary School. A teacher educator from the University of North Florida participated in the project's planning, training and evaluation. New delivery strategies were developed and used which impacted the roles of all project participants. Project activities were designed to enable teachers at each school to achieve objectives of their school improvement plans and to integrate new teaching strategies and technology-based learning materials and strategies into their classrooms.

Unique Attributes

As a multi-agency collaborative partnership involving public schools and an urban university teacher education program, the project enhanced the effectiveness and productivity of partner institutions by simultaneously addressing related educational concerns. These included the achievement of educational accountability through standards-based teaching and learning coupled with effective uses of educational technology, including the authentic assessment of the academic achievement of P-12 students through the production of their electronic classroom portfolios. The project used a collaborative interdependent change system thereby initiating a redesign of roles for university and school-based faculty. Exemplary classroom teachers examined the link between theory and best practice. The project also provided assistance to participating educators in achieving institutional improvement goals.

Research-Base for the Project

The work of Reeves (1992) provided a useful foundation for identifying four critical success factors used as benchmarks for the project.

1. Clearly defined goals for the project.

Reeves states that "Technology infusion as well as other restructuring activities should be driven by clear goals" (p. 520). Goals for this project involved "authentic achievement" for students and teachers in the form of teacher training, cooperative education, documentation of project activities through digital photography and video, electronic portfolio production and professional presentations at education conferences. Newman (1991) also supports the approach of the project by suggesting that "Rather than reproducing knowledge, students should be involved in producing knowledge, through discourse, through the creation of things, and through performance" (p. 459).

2. Thorough documentation in all phases of the project, Riverlink provided an understanding of where teachers started, where they were at any one point, and where they were going. Reeves states "Documentation attempts to capture all the changes that occur in the process of reform so that interested participants can understand what is really occurring" (p. 522).

3. Formative experimentation is defined by Newman (1990) as follows: "In a formative experiment, the researcher sets a pedagogical goal and finds out what it takes in terms of materials, organization or changes in the technology to reach the goal" (p. 10). The Riverlink project adapted and restructured the project to incorporate new knowledge and improved methods for meeting project goals.

4. Impact evaluation is defined by Reeves as "attempts to assess the effects of innovative instructional practices on factors such as organization, climate, teacher and student self-perceptions, parental and community aspirations, and numerous other difficult-to-measure factors" (p. 524). The Riverlink project used traditional and non-traditional methods of assessment to measure progress toward goals.

The three critical success factors that follow are based on research by Rogers (1983) in which adoption of interactive communication innovations differ from similar processes with other kinds of new ideas or new tools.

Critical Mass of Adopters

The Riverlink project began with four very interested teachers as a core group to influence and persuade school district personnel to get involved with innovations in curriculum, instruction and assessment using educational technology. Rogers found that the usefulness of a new communication system increases for all adopters with each additional adopter. Over 150 elementary and high school students and 11 educators successfully participated in the Riverlink project.

Degree of Use

Continued, supported use of educational technology throughout the Riverlink project was critical to its eventual classroom infusion and diffusion to other users. Rogers also found that the degree of use of a communications innovation rather than the decision to adopt it to be the most important factor indicating the success of the diffusion effort.

Re-invention of Innovations

Rogers defines re-invention of the innovations as the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation. Infusion of technology into school classrooms in the Riverlink project took place as teachers were able to successfully design and implement instructional activities using the educational technologies that met their own specific classroom needs and those of their students.

Seven Project Goals and Their Outcomes

Goal 1: Elementary and secondary students will use technology to collaborate between classrooms and between schools in solving age-appropriate aspects of real-life problems as they develop mastery of related Sunshine State Standards.

Student portfolios created in HyperStudio were produced by elementary and high school students that displayed their new understanding of science and the applications of newly acquired knowledge and skill in using educational technology.

During the year, selected Lone Star Elementary School 1st, 4th, and 5th students traveled to Sandalwood High School where they paired up with high school students to work on computer-based electronic portfolios dealing with science learning outcomes resulting from their study of Gunsmoke Creek, Pottsburg Creek and the St. Johns River. Carter G. Woodson Elementary School teachers and students traveled to the Lone Star site to view Gunsmoke Creek and learn more about Lone Star's science learning activities, materials, experiments and projects.

Throughout the school year, teachers and students at William M. Raines High School and Carter G. Woodson Elementary School worked together to establish a computer laboratory, a Riverlink project laboratory, and establish learning sites at the Pumpkin Hill Preserve. The teachers developed skill in using the educational presentation tool, HyperStudio and the Internet. They also created a distance-learning laboratory to help facilitate communication between the two schools.

Goal 2: A cadre of preservice teachers and veteran teachers will become skilled in the use of high-end technology for classroom instruction.

Partner institutions modified the original goal for the project as project activities were implemented. To guide their students in the display the learning outcomes of their study of the creeks and rivers, all participating teachers received training in the use of Hyperstudio and in procedures for facilitating the development of student electronic portfolios. Participating teachers at Lone Star received additional educational technology training in web page development at New Horizons Learning Center. Web sites were developed for Lone Star and Carter G. Woodson elementary schools. Refinements were made to web sites at Sandalwood and William M. Raines high schools.

Goal 3: The district's professional development model will be expanded to include an experimental learning approach based on the National Writing Project philosophy involving teachers in the same processes and activities required of their students.

Throughout the school year project teachers developed written science lessons, documented science learning outcomes, and created new approaches to science teaching and learning that incorporated language arts learning outcomes.

Goal 4: Students will develop self-initiated learning habits in which they become active questioners and gatherers of information to solve problems.

Students at each project school were actively engaged in science observations, recording data and drawing conclusions to solve scientific problems. The outcomes of the student learning were reflected in their Hyperstudio portfolios and work prepared for posting on the web sites.

Goal 5: The role of the teacher will evolve from a dispenser of information to a facilitator who asks analytical questions, presents challenges, stimulates discussion, and models the learning process.

Students at project schools conducted research, compiled data, and presented it to their peers and students at each other's project schools. The teachers participating in the Riverlink project facilitated the learning and supervised the documentation of science learning outcomes.

Goal 6: The learning environment will change to one in which information technologies are readily accessible to all constituents and one in which questions, discussions, and investigations are at the heart of teaching and learning.

The work with Internet sites provided considerable information to stimulate the students' imaginations. The educational technology provided tools for accessing and effecting scientific communication among students and teachers participating in the project.

Goal 7: Students will understand that science, technology, and society are interwoven.

The artifacts and descriptions provided throughout the project provided considerable evidence that participating students were actively engaged on their own learning. The Hyperstudio portfolios displayed considerable knowledge and skill in the use of technology and the learning of science.

Outcomes and Future Plans

The following dissemination techniques were designed to ensure that other educators had an opportunity to benefit from the outcomes of the Riverlink project.

1. The electronic portfolios produced by each participating student were used in presentations to educators on an invitational basis. Depending on the audience, the presentations were made by either students or teachers.
2. The creation and maintenance of a central website would allow regular student publication of data, articles, and fliers that promote environmental education throughout the community.
3. Students will produce a periodic newsletter that chronicles their investigations.
4. Participating schools will participate in the city's Earth Day celebration by developing and monitoring a public display that describes their involvement in the Riverlink project.

5. Participating teachers developed independent, multi-grade lesson plans and assessments that addressed Florida's Sunshine State Standards in science.
6. Participating teachers developed and presented the outcomes of the project at professional conferences.
7. Participating teachers began the development of their personal professional portfolios.
8. Preservice teachers from the university used the school websites and related Riverlink materials during their clinical experiences in the schools.

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Software Sources

International Business Machines Corporation, New Orchard Road, Armonk, NY 10504. Available online [http://www.ibm.com]

Microsoft Corporation, One Microsoft Way, Redmond, WA 98052-6399. Available online [http://www.microsoft.com]

Roger Wagner Publishing Company, 1050 Pioneer Way, Suite P., El Cajon, CA 92020. Available online [http://www.hyperstudio.com]

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Collaborative Teaming on Technology-Enhanced Problem-Based Learning Curriculum Units

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Abstract: This paper describes how collaborative teams consisting of arts and sciences faculty, teacher education faculty, K-8 teachers, and teacher candidates worked together during a weeklong summer institute to produce technology-enhanced problem-based learning units of study. Each of the units features a conceptual theme, a metacognitive emphasis, a guided inquiry approach, principles of universal design for learning, and technology infusion. One of the units that was developed during the institute, *The Alhambra*, is used to illustrate these design elements.

Introduction

Problem-based learning (PBL) is widely recognized as a powerful teaching/learning strategy, but its success depends on both the quality of the problem and the skill of the teacher. Problems must be sufficiently complex to demand an in-depth exploration of important content and sufficiently challenging to stimulate critical and creative thought. Instruction must be carefully crafted to engage students and to model effective inquiry, investigation, and problem-solving strategies. Ideally, a team comprised of a range of education professionals would be involved in the development of PBL units of study to ensure that complex, authentic problems are addressed in a carefully crafted learning environment.

The T^2 Summer Institute

In June 2001, Project T^2, Teachers and Technology, held its first Summer Institute. This weeklong institute provided the setting to bring together a team of education professionals to develop PBL units of study for use in K-8 classrooms. Teacher candidates, arts and sciences faculty, teacher educators, and K-8 teachers from each of the three partner institutions and their associated school districts came to the Summer Institute with the express purpose of developing technology-enhanced problem-based learning (TE-PBL) units of study. Two consultants, one in the area of problem-based learning and the other in the area of universal design for learning, worked with institute participants in the design and development of the units.

On the first day of the institute, participants were divided into five teams, each consisting of at least one arts and sciences faculty member, at least one K-8 cooperating teacher, at least one teacher education faculty member, and two or more teacher candidates. Each member of the team had a different perspective and an important role to fill on the team. The arts and sciences faculty members ensured that rich content was associated with each problem scenario. They served as the content area experts and provided the knowledge base necessary to give the unit authenticity and relevance. The teacher education faculty members provided the pedagogical content knowledge. They ensured that appropriate instructional techniques would be used to challenge and guide a wide variety of learners in a wide variety of settings. The K-8 cooperating teachers contributed their expertise and experience in today's complex classrooms. They brought an element of "reality" that ensured the content addressed state curriculum standards and the skills were appropriate for students' developmental level. Teacher candidates were central team members. Since they planned to use the units the following year in their student teaching, they asked the questions that made certain the units were clearly written and usable by novice teachers (or teachers unfamiliar with problem-based learning).

Students and faculty from the three partner institutions were mixed on each team so that there would be an enriched exchange of ideas and techniques. We recognized, however, that it would be important to provide time for team members to get to know each other, so team-building activities were built into the first day's agenda and a number of opportunities for working together were provided during the week. Most participants lived on campus during the institute, which gave them additional opportunities for socializing and working together during the evenings.

Team Collaboration

Participants responded very favorably to working in teams. Teacher candidates later listed the benefits they felt, most frequently mentioning the following:

- Learning from those with more sophisticated skills
- Having experts there to facilitate the process
- Developing confidence and recognizing our own areas of expertise
- Getting ideas from arts and sciences faculty that would not have occurred to us
- Having our teachers (teacher education faculty) there to help us with designing the unit

The Units

Five TE-PBL units were designed, one from each team. We found that we did not have enough time in one week to fully develop complete units, but each was well started with a problem scenario and a basic outline of content and activities. All units feature 5 design elements: a conceptual theme, a metacognitive emphasis, a guided inquiry approach, principles of universal design for learning, and technology infusion. Each is based on state (NC) and national content area and technology standards. In the remainder of this paper we will illustrate these design elements as built into one of the units developed during the institute, *The Alhambra*, which presents students with the following problem scenario:

> A mild earthquake occurred last week and damaged some of the precious mosaic panels in the Alhambra, a palace in Granada, Spain. Many of the most beautiful rooms in the palace have had to be closed. You have been asked to join a team that has been hastily put together to make recommendations to the Granada Municipal Council on whether it would be worth the cost to restore the panels of the Alhambra and, if so, how this might be done.

Conceptual Theme: Patterns

The generalization that provides the underpinning for this unit is "*Pattern recognition is fundamental to problem solving.*" In *The Alhambra*, pattern recognition is highlighted in at least two ways: one, the pattern in the mosaics and how shapes tessellate to form an authentic design, and two, the pattern of replacement cost change as affected by design change. In this unit situations are set up so that students will come to understand that recognizing patterns is an important skill in problem solving.

Metacognitive Emphasis and Guided Inquiry Approach

A guided inquiry approach is used during each phase of the PBL process. As TE-PBL units are developed, essential questions are built in so that teachers can lead their students to ask questions that will guide them in their information gathering and in their thinking about the problem. During the problem engagement phase of *The Alhambra*, for example, the teacher may ask students such questions as:

- What questions do we need to answer to begin solving this problem? (e.g., What is a mosaic?)
- How might we find answers to our questions? (e.g., Where could we find pictures of the Alhambra?)
- How can we focus and organize our research? (e.g., What is most important to find out first?)

As teachers model this type of questioning, they encourage students to ask questions, to plan, and to monitor their own progress.

Principles of Universal Design for Learning (UDL)

To ensure that quality curriculum is accessible to all students, T^2 units are constructed with principles of universal design in mind. Multiple forms of engagement, representation, and expression are considered from the beginning and built into each unit. *The Alhambra* provides several examples of UDL. For example, to provide multiple forms of engagement, selected websites give students realistic views of the palace, gardens, and mosaics while links to information on tessellations and tiling techniques provide different ways to engage with geometry. *The Alhambra* also includes multiple opportunities for students to express what they have learned. In addition to the rubric that evaluates the final product, there are "skill and content checkpoints" where students can assess their own progress as frequently as they wish without teacher assistance.

Technology Infusion

Technology is infused throughout *The Alhambra* unit. As noted above, students can see photographs of the palace and its mosaics at sites available on the Internet. They can also investigate geometric shapes, tessellations, and nibbling techniques by utilizing sites on the Web. There is a sample spreadsheet for calculating cost of renovation designs, and the unit links to an online dictionary of math terms in case students need to look up unfamiliar terms. Test authoring software is used to insert the skill and content checkpoints .

Conclusion

Collaborative teaming facilitated by technology provides an ideal means of developing high quality TE-PBL units. Content knowledge, pedagogical knowledge, and real-world experience combine to lend authenticity, challenge, and accessibility to curriculum development.

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A Connected Lifelong Learning Community

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Abstract: Recently, the Lilly Endowment announced their latest Community Alliances to Promote Education (CAPE) projects, and Indiana State University was a recipient of $5,000,000. Indiana State University is collaborating with the local school corporations to assist Sullivan County in the implementation process to enhance the educational opportunities of the citizens of Sullivan County. Sullivan County lacks the technology foundation, or delivery system, needed to access the resources to meet its educational challenges. To address the identified changes, the following solutions are being implemented in this project: a fiber optic network to connect the county schools and main library; a community learning center; video-enabled distance education; and training in technology for all the county's teachers. This presentation will focus on the project goals and successful opportunities and challenges confronted by the venture.

Introduction

Recently, the Lilly Endowment announced their latest Community Alliances to Promote Education (CAPE) projects, and Indiana State University was a recipient of $5,000,000. Indiana State University is collaborating with the local school corporations to assist Sullivan County in the implementation process to enhance the educational opportunities of the citizens of Sullivan County.

To understand the needs of Sullivan County stop – for a moment - and place yourself in a rural community, Sullivan County in particular. Then consider how technology, or the lack of it, affects the people who live there. This project appears to be all about computer technology, video conferencing and fiber optic networks. But is it? This project is about elevating the ability of a rural community to compete in an increasingly technologically driven society. This project is all about leveling the playing field.

Sullivan County is a predominantly rural community located in the southwestern part of the state between Vigo and Knox counties. It has a population of 20,280 people with the city of Sullivan serving as the county seat. Two school corporations, Southwest (SWSC) and Northeast School Corporations (NESC), currently serve the educational needs of the children of Sullivan County. Currently, according to the 1990 census, 26% of adults in Sullivan County do not have a high school diploma and only 10% have four years or more of college compared to 16% of the population of Indiana. Poor education is accompanied by low income, which is reflected by a 20% difference in annual income between Sullivan County and the state of Indiana ($23,141 compared to $28,936) according to the Indiana Department of Workforce Development. Sullivan County also has a large senior citizen population. According to the 1990 census, 18% of the citizens in Sullivan County are over the age of 65 while the state and national levels are 10%.

A representative group of citizens from education, business and industry met to discuss the educational strengths, weaknesses, opportunities and threats facing Sullivan County. While a number of deficits were noted as being serious, solutions to these difficulties as well as opportunities for advanced training for students and economic development of the county were identified in technology. Unfortunately, Sullivan County lacks the technology foundation, or delivery system, needed to access the resources to meet its educational challenges. To address the identified changes, the following solutions are being implemented in this project:

- A fiber optic network to connect the county schools and main library
- A Community Learning Center
- Video-enabled distance education
- Training in technology for all the county's teachers

The schools share facilities with the communities in the evenings and on weekends for educational purposes. Trained students, building their skills for future employment, will staff the computer labs. Studies show training continues to be a significant barrier to using technology effectively in the learning environment. To address this issue, a new generation of staff development programs is being created for teachers in the county. The new in-service program is aligned with Indiana's Department of Education's new state standards and guidelines and nationally recognized technology standards.

Fiber Network

In education, rural schools have always been behind urban schools in educational opportunities because of the lack of ability to offer a variety of advanced and elective classes. With the advancement of the technology age the gap is widening because of a lack of resources necessary to provide an adequate number of computers and Internet access to poor rural areas. Ironically, this same technology would lessen the gap if technology were available to rural areas.

In Sullivan County, while efforts have been made to provide students with computers, access to the Internet is very complicated, slow, unreliable and expensive because three separate telephone systems and two LATAs (Local Access and Transport Area) serve the county. 56K lines connect all the schools in both corporations, which is a cause for frustration resulting in limited access. 56K frame relay circuits do not allow for distance learning, voice or video. A fiber optic backbone is being constructed to connect all the county high schools, public library and Community Learning Center to allow for Internet access as well as other distance learning technologies (Figure 1).

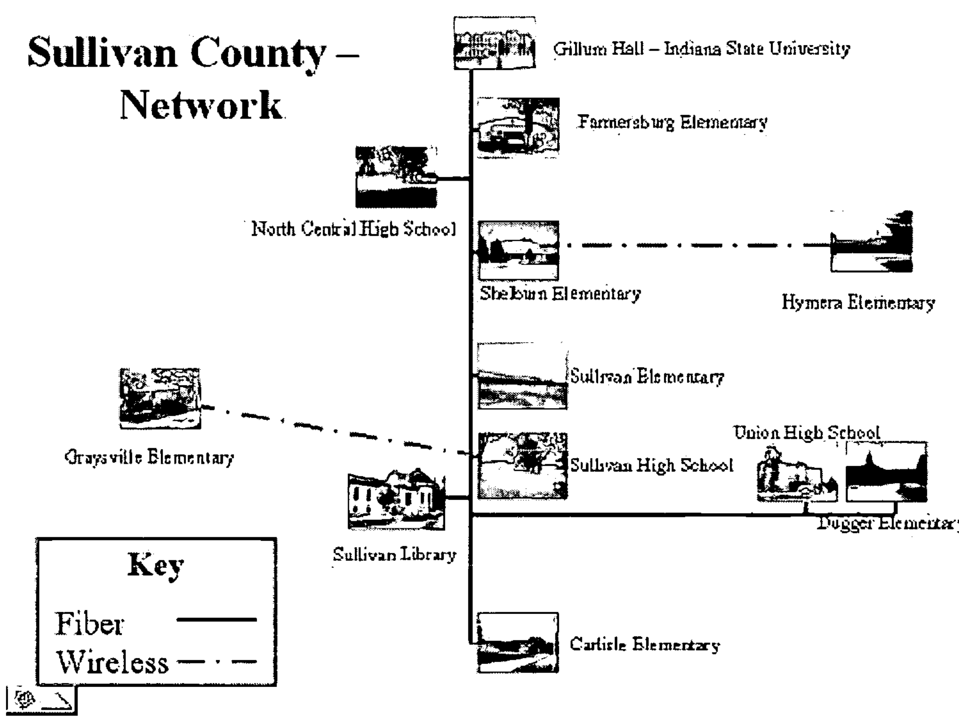

Figure 1. *Diagram of Sullivan County Fiber Optic Network*

This project is replacing the present dependency on lower speed T-1 and 56K leased lines. This issue is problematic to all rural K-12 schools in the state of Indiana and the nation as a whole. Sullivan's Connected Lifelong Learning Community project could be a catalyst for the state of Indiana in demonstrating the capabilities of a fiber optic network in a rural setting. This goal of building a fiber optic network is the foundation on which all programming and training of the subsequent goals are based.

Community Learning Center

Network technologies do not become powerful until they serve the purpose of improving the human situation. The Community Learning Center is being designed to offer programs using distance education and instructional technology as a promising solution for life-long learning in a rural area.

While the Learning Center is being housed in a central location, the services offered to the County are not to be viewed as being in "four walls". The Center is mobile to the extent that equipment and personnel can go out into the community to provide services. Sullivan's Community Learning Center is enhancing skills for life-long learning through flexible (time, location, method) programming.

Video-Enabled Distance Education

This project is providing video-enabled distance education to and from the schools and Community Learning Center within the county and from higher education institutions in the state of Indiana. For example, Southwest School Corporation offers French as a foreign language while Northeast School Corporation offers German. It is financially impossible for each school corporation to offer both, but with video-enabled distance education classrooms, students in both corporations will have a choice of either class. In addition, the two school corporations will offer a complete set of advanced placement (AP) courses for college bound students. Currently, only Sullivan High School offers two AP classes.

The state higher education system offers a plethora of courses available through distance education. The community will be able to access the courses from any one of the high schools and the Community Learning Center in the county with the installed video equipment.

Staff Development

Internet access and video conferencing provides schools with resources that would not otherwise be available. Training continues to be a significant barrier to effectively using technology in the learning environment. Connected Lifelong Learning Community staff will be representative of a new generation of professional development with instructional technology. A new generation of professional development is <u>differentiated</u> according to participant needs; it is <u>contextual</u> according to teaching and work assignments; it <u>integrates</u> the technology for teaching and learning; and it is grounded in the <u>standards</u> and professional development guidelines that affect teachers, staff, and administrators in Indiana (i.e. K-12 curriculum standards, Indiana Professional Standards Board [IPSB] teaching standards.)

Programmatically, the staff development is designed for all school corporation and Community Learning Center employees. Staff development utilizes strategies that are shown to be indicative of effective professional development (McKenzie, 1999; NCREL, 2000):

1. <u>Organizational Technology Planning</u>. Staff participated in technology planning that begins with assessments to determine the current technology integration abilities and technology capacity of the staff, schools, and district. This assessment utilized the "enGauge Framework for Effective Technology Use in School" (<u>http://engauge.ncrel.org/</u>). This assessment tool was developed with support by the North Central Regional Educational Laboratory (NCREL) and provides baseline data for long-term evaluation, as well as for the purposes of planning.

2. <u>Personal Technology Planning</u>. The staff engaged in personal technology planning. Baseline data on personal technology capacity being collected through the web-based tool called "My TARGET"

(http://mytarget.iassessment.org/). My TARGET is a tool that allows users to assess and reflect on growth with educational technologies and was developed in Indiana with support from the Lilly Endowment.

3. Technology Facilitators. The staff includes the current technology facilitators of Southwest School Corporation and created additional facilitators in the Northeast School Corporation. Technology facilitators are full time staff that assist teachers on the integration of technology into the learning environment and are available to solve technical problems on a continuing basis. The technology facilitators are an integral component of the remaining staff development strategies.

4. Professional Growth Teams. As the staff completes the assessment and planning process (which addresses district, school, and personal needs) staff are placed in smaller, support units that coincide with the IPSB Professional Growth Teams. Team members will help each other develop Professional Growth Plans (PGP), work cooperatively throughout the project period, and provide support and feedback. The PGP's will guide the development of the topics and format of the staff development. (For example; instruction over video conferencing would not occur until participants are competent with the technology) The PGP's utilize the baseline data collected and forecast individual objectives and goals that encompass technology standards such as the Recommended Foundations in Technology for All Teachers, developed by the International Society for Technology in Education (ISTE), the Professional Competency Continuum, developed by the Milken Exchance on Educational Technology, and the National Educational Technology Standards for K-12 students, developed by ISTE and related consortium. Teams meet and communicate face-to-face, through electronic technology, and where appropriate through video conferencing.

5. Connected Student Learning. The objective of this professional development is to implement new teaching strategies that will engage students and develop their cognitive skills for higher order thinking, not on training for training's sake. Student learning will always be a contextual element present in all staff development. Participants will be expected to map professional development activities back to student learning activities and outcomes.

6. Create a Knowledge Base. In order to help teachers understand how instructional technology can be connected to student learning and how it can enhance teaching, learning, and assessment, as well as to aid in planning, all the professional growth teams will work to create a common knowledge base related to instructional technology. A significant portion of the staff development budget is devoted to the purchase, development, and duplication of training materials (books, CD's, online materials, etc.), and research materials (books, journal reprints, etc.) to develop and enhance the participants' knowledge regarding educational technologies.

7. Hands On Learning with Technology. Talking about technology will do little to enhance the ability of participants to use technology for teaching, learning and assessment. At all times, participants are active users of the various technologies, and even use a particular technology to learn about its application. For example, teachers who are learning how to effectively deliver instruction over a two-way video and two-way audio system participate in instruction through that system. Experience as a learner will enhance their abilities as an instructor. Active learning with various technologies takes time and staff are permitted the time to "play" with technologies and engage in their own constructivist and discovery learning. Therefore, two important items were necessary to alleviate this time issue. First, staff members that participate in staff development beyond their contracted hours will received a stipend. For staff development that needs to take place during the regular school day, substitute teachers are hired cover classes.

8. Collegial Learning and Support. Effective professional development teams provide supportive learning environments. The professional growth teams are one source of support that has already been described. In addition, each participant will identify a "buddy." Participants will select their own buddies from a peer group. This type of support provides invaluable experience for the students and helps the staff to better understand the facilitative mode of instruction that technology can engender. These individuals may or may not be in the same professional development team, but are a connection to share learning experiences, frustrations, celebrations, etc. Consultants also are another form of support for the staff development participants. Consultants do more than just hands-on training activities but continue to participate both before and after a particular training element to provide support and continued learning for participants.

The consultants were selected, according to the outcomes of the planning process. Selected consultants needed to agree to be available for an extended period beyond training to provide online support as needed by participants. Finally, students in the school are an excellent source of support. Whenever possible, students were used to provide assistance with training and technical support. This type of support provides invaluable experience for the students and helps the staff to better understand the facilitative mode of instruction that technology can engender. Formats for learning include but are not limited to: for-credit courses, field trips, visits to educational resource centers, Indiana Department of Education sponsored technology associates, online training, expert consultants, etc.

9. Mentor Teachers. There currently exists a number of staff who have a high level of experience and comfort with technology. Their assessments and PGP indicate that they need little actual training but need more "practice" and time at utilizing technology in the classroom. These teachers are prepared early in the process to experiment with technology integration for teaching and learning. These teachers will then be able to serve as mentors to other staff members.

10. Follow Up Assessment. The staff development budget includes money for a follow-up evaluation. The project allows for a variety of baseline data to be collected using a number of online tools. These same online tools will be revisited at the end of the third year to determine growth. In addition, an on-site technology audit of both school corporations will be conducted to receive additional feedback.

This presentation will focus on the project goals and successful opportunities and challenges confronted by the venture. When the project is completed students from both school corporations will have the opportunity to use the most up-to-date technology available in preparation for higher education and the job market. Students and teacher will experience the following improvements and enhancements when this project is complete:

- Fast, reliable Internet access for all school personnel (fiber optics is much more reliable and over 100 times faster than our present system)
- Improved network security
- Ability to share resources between school corporations
- Advanced applications such as full-motion video
- Distance Learning
- College credit classes
- Centralized software and data backup
- Centralized maintenance
- Employment of students in the Learning Center and computer labs
- Early education of children through the Learning Center
- Career exploration
- Tutorial instruction

The Connected Life-Long Learning Community from vision to reality is giving the citizens of Sullivan County the educational opportunities they will need to succeed in the 21st century.

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Technology for Participation

Dr. Terrie Shannon, Dr. Louis Abrahamson, Lyle Shannon, and Karen Keenan, partners in the Arrowhead Preparing Tomorrow's Teachers to use Technology (APT3) Project, Education Department, University of Minnesota Duluth, Minnesota, are the presenters for this 2002 SITE Conference interactive session.

Technology for Participation

The Arrowhead PT3 (APT3) project is an innovative teacher preparation program at the University of Minnesota Duluth. Working in collaboration with the Duluth Public Schools, Fond du Lac Ojibwe Schools, Apple Computer, Texas Instruments, and Better Education, Inc., APT3 educators are working to increase student active participation and faculty collaboration through the use of wireless hand held communication response devices. This interactive session will demonstrate classroom pedagogical and group interaction applications enhanced through the use of these devices.

The objectives of Technology for Participation are to provide participants with:

- An opportunity for educators to experience hand held communication response devices
- The pedagogical theory supporting the use of these technological devices
- The opportunity to become familiar with two types of software applications for increasing student participation.

- A venue for discussion about possible research about and applications for hand held communication response devices.

This session is applicable for beginners through advanced technology users.

APT3 educators will demonstrate and facilitate the use of two types of interactive infrared response devices: Classroom Performance System (CPS) and Performance Response System (PRS). Both systems support real-time interaction in traditional classroom settings through teacher questioning and anonymous individual student response. Immediate feedback is provided through graphic and text display. Additionally, each software application allows for saved and tracked digital student records.

CPS and PRS promote active participation for each student in an environment where only the teacher knows the answer each individual student provides. This type of anonymity decreases student anxiety, which in turn promotes better student engagement of the content of the class, rather than a fear of being incorrect. Additionally, teachers who apply PRS or CPS technologies in their classrooms provide themselves with a means to accurately diagnose student learning in a meaningful and formative way. Further, CPS and PRS technologies can be used for collaborative learning that encourages teamwork. Finally, due to the record keeping features, these systems diminish administrative teacher tasks, allowing for time generation, a valuable commodity for any teacher.

During this session participants will experience both systems. Additionally, information about a current research project, The Use of Interactive Instructional Technology to Facilitate Classroom Instruction, by Robert L. Lloyd, Ph.D. will be summarized for participant review and discussion.

This interactive session can accommodate 30 participants. The materials needed include the following:

- Internet access
- A digital projector and screen
- An easel, flip paper and markers
- A power strip with a long cord

TOPS and STAT: Two PT3 Bridges for the Digital Divide

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David Kidd, Brunswick County Public Schools, US

Aligning Credentialing with Technology Training (ACTT Now) is a Preparing Tomorrow's Teachers to Use Technology (PT3) project partnering Brunswick County Public Schools, a k-12 district in rural Southside Virginia, with Old Dominion University's Darden College of Education. It is intended to counter the effects of the digital divide felt so profoundly in this region. ACTT Now consists of five major components:

(1). An internship program for Old Dominion's pre-service teachers
(2). A field-based masters degree program for Brunswick's uncertified and provisionally certified teachers
(3). Technology Opportunities for Parents and Students (TOPS): An evening technology-training program for Brunswick County community members
(4). Student Technology Assistance Teams (STAT) and
(5). Technology Training for Old Dominion's Methods Faculty

Despite the dismal statistics of its community, including one of the highest illiteracy rates in Virginia, Brunswick County Public Schools has emerged as a leader in technology. Through the innovative leadership of the technology department, Brunswick County has acquired technology resources parallel to those in the rich districts surrounding the nation's capital. Four instructional technology specialists and the director of technology work to help teachers integrate these new tools into their classrooms and curricula. Now in partnership with Old Dominion University, Brunswick has improved resources with which to accomplish this mission.

Old Dominion University's Darden College of Education has been a technology leader for the past decade. Its Teletechnet program brings 4-year degree program to students in remote areas throughout Virginia and the nation. Previously focused on the development of the urban area of Hampton Roads, the Darden College of Education now has an opportunity to expand its reach into the surrounding rural communities that are greatly in need of educational and economic resources.

This paper will focus on two ACTT Now initiatives aimed specifically at increasing the technological proficiency of Brunswick's population: TOPS and STAT. Technology Opportunities for Parents and Students (TOPS) offers free technology classes for adult community members in Brunswick County and entices them to participate with free dinner, child care and nightly raffles prizes. While parents and grandparents are learning basic computer skills, their children are engaged in crafts, games and technology activities of their own. What makes TOPS truly a learning experience at all levels is the instructors. Brunswick teachers participating in ODU's field-based masters program serve as the adult and student instructors in the TOPS programs, helping the teachers to reinforce their own technology skills and building a stronger bond between the community and the schools. Providing a needed service to their community, Brunswick teachers take pride in their efforts and contribute to the emergence of a technology culture in the county.

Student Technology Assistance Teams (STAT) likewise focus on helping different populations simultaneously. Many good teachers are reluctant to use technology in their classrooms. STAT provides in-classroom support to teachers when and where they need it. At the same time, STAT students learn responsibility and earn respect from their teachers and peers as the take on new roles as technology helpers. STAT encourages Brunswick's students to explore information technology jobs and programs, a field where undoubtedly, a significant proportion of future jobs will lie. Working as part of STAT, students gain valuable and marketable experience that will give them a head start toward a future career.

Through the efforts of the ACTT Now project staff, STAT and TOPS are working to bridge the digital gap in Brunswick County. As works in progress, these two initiatives are experiencing successes and setbacks. The paper will explore both. Data collected by the project manager and ACTT Now's external evaluator will be presented to analyze the effects of these two initiatives on the technology literacy and the self-efficacy of Brunswick's population.

Web Portal Strengthens Partnerships for Enhanced Teacher Preparation

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Abstract

This paper and presentation follows the development of a web portal for a PT3 project based at West Chester University of Pennsylvania. Through work with school, business and community representatives, WCU is in the process of strengthening partnerships that enhance pre-service teacher education and building an on-line community of learners among the members of the partnership. Included in the portal community will be pre-service and in-service teachers, WCU faculty, and other project partners. The portal design facilitates ongoing communication and support for teachers whether they are new to teaching, have not yet taught or are experienced veterans. This paper discusses the development of the web portal and outlines the key decisions in establishing its design and in choosing the technology used to implement it. Also, it describes the creation of a community of learners among the partners and the evaluation of outcomes from the portal implementation.

Introduction

West Chester University (WCU) of Pennsylvania graduates 600 new teachers each year. WCU together with their P-12 partners, share a sense of urgency in preparing WCU graduates to meet the challenge of educating P-12 students successfully in today's digital age (Carlson & Gooden, 1999). To meet current educational challenges, the partners recognize that the teacher preparation program must evolve into one that: models the effective use of technology, requires online learning, and expects that pre-service teachers will use technology daily as a productivity and communication tool. Also this should be a program that engages pre-service teachers in the best practices related to content-specific, technology-based solutions; provides pre-service teachers with field experiences that engage them in authentic effective uses of technology with P-12 students, and teachers; and consistently engages pre-service teachers in high-quality professional dialog and reflection through online communities throughout their preparation into their induction. Building on the extensive work of WCU and its partners through a number of initiatives (including a 1999 PT3 Capacity Building Grant), this strong P-16 partnership plans to develop a "21st century" teacher preparation program.

There is nation-wide, urgent need for technology-savvy teachers who are able to effectively integrate technology for improved teaching and learning environments (Carlson & Gooden, 1999; Green, 1998; NCES, 1999). Recent studies show, when used intelligently as a tool, technology can help to leverage improvements in K-12 classrooms (SIIA 2000 Report; Milken Exchange, 1999; Valdez & McNabb, 1997). The United States Department of Education, through its *Preparing Tomorrow's Teachers with Technology* (PT3) initiative is supporting the improvement of technology integration in teacher education programs, as are organizations such as the National Council for Teacher Accreditation (NCATE) and ISTE. The CEO Forum, a U.S. business-education collaborative, has recommended that teacher training in computer technology become a mandatory component of licensure by 2002. Locally, in Pennsylvania, this need has been highlighted by evidence showing that simple access to technology resources is not sufficient for the creation of technology-enhanced learning environments (PA Link to Learn Initiative, 2001).

Through this PT3 initiative, cohorts of teacher candidates will authentically experience what it means to use technology as a learning, teaching, productivity, research, and communication tool. The four PT3 program goals focus on technology integration, partnerships for enhanced teacher preparation, university leadership, and communities of learners. The initiative is grounded in research and best practice and based in the reality of the P-12 classroom - critically important for providing pre-service field experience and the supportive environment needed for future technology integration (Bell and Fidshun, 2000).

Existing Partnerships, the Foundation

Many educators have identified that the collaboration between K-12 schools and universities as essential to school improvement. Neither set of institutions can achieve alone what they can when they join together to solve problems which impact both of them. (Goodlad, 1991). Over the past three years, WCU School of Education identified a strong group of partners that has agreed to work with WCU to improve teacher preparation in order to meet educational challenges. Current partners include 7 School Districts, 3 Regional Consortia, and 3 Regional Educational Organizations. Each partner has offered to engage in activities that enhance the preparation experience of our pre-service teachers. The activities offered by each partner depend upon its strengths and interests, for example, teachers from the West Chester Area School District will engage in on-line technology integration courses with pre-service teachers and WCU faculty members as partners. The School District of Philadelphia has offered to host pre-service teachers for field experiences in technology-rich classrooms. Teachers in several local school districts will work with two pre-service teachers to integrate appropriate technology into a lesson or curriculum unit. Pre-service teachers will benefit from enhanced field experiences focusing on the use of technology in real classrooms; teachers in those classrooms receive assistance with technology. The current partnerships built around common interests in effective technology integration and a willingness to support improvement in teacher preparation will be extended and strengthened by development of the portal.

Portal Design and Content

The word portal implies a gateway; an Internet portal is a web site that provides entry into a comprehensive and well-organized collection of content, tools, and value added services. The portal concept is becoming increasingly important as the amount of educational information and resources grow. Educators need quick access to web resources that meet their needs and interests without having to wade through information that is not suitable. Portals can tailor information to different educational audiences with varying interests. Our portal will have specific web pages for pre-service teachers, K-12 teachers, and university faculty and content that is directed to each role group.

Portals also, provide tools that make communication between partners easier. If the PT3 partners can communicate easily at the portal site, they can exchange information that will assist them to more effectively integrate technology and strengthen teacher preparation programs. Portals will supply the tools and resources that support learning communities.

Development Process and Technical Considerations

Development of this portal has taken place over the course of six months and the website will continue to grow and be refined as a tool for the building of the WCU PT3 community. Initial work on the site began with brainstorming sessions that included the ideas of key faculty, teachers, project directors, evaluation team members and the project coordinator. These early ideas and a timeline for their implementation were originally scripted on paper, and then later committed to electronic text forming a set of homespun web pages. An important understanding, learned early on in the development of this web site, was to consider the portal user at all times, from the sequence of pages and the path a user would take through the descriptive text and databases that lay behind each button or choice a portal user might make.

In the beginning,.two web site development firms were interviewed and meetings were held with these groups that actually helped the development process, if only through the thought experiments that ensued. One of these firms, a local commercial website company, was selected based on the successful work they had done with a for-profit educational site for K-12 students. Unfortunately, it quickly became clear that their experience with teaching and teacher-preparation was very limited and although our initial work together was helpful, this firm was not retained beyond phase one.

Finally, though collaboration with another PT3 Grantee at the Miami Museum of Science, an agreement was made with their in-house, web site development team. By working with this group who intimately understand teacher preparation, and technology integration through their own work, we have been able to make much faster progress in the development of this site. Many of the types of databases, JavaScript, and other coded programming needed to support an on-line community, have already been used in the Museum of Science site and with some alteration will be useful in the WCU portal as well. An early lesson learned when developing a web portal is that it is helpful to find technical support professionals who understand the key issues and content of a particular project. Without this already-existent shared understanding of the work that a portal is to accomplish, much time will be needed to bring developers "up-to-speed", creating problematic and costly delays in development.

Partnerships Transformed into a Community of Learners

WCU will use its new web portal to strengthen its partnerships by creating a learning community in which partners collaborate, conduct joint projects, review and critique ongoing work and share challenges and successes with other members of the teacher preparation community. In other words, partners will collaborate in a setting, the portal, where they build their future by learning to "implement our best ideas of today" (Jilk, 1999). Technology will serve as the catalyst that enables the partners, which may be distant in time and place, to work more closely with one another to solve problems and build new futures (Reil, M. & Fulton, K. 2001). The web portal now being created links the teacher preparation partnership to enhanced learning with technology. Pre- service teachers who have this collaborative experience during their professional training are more likely to engage in learning communities as they continue to develop as education professions (Slowinski, Anderson, & Reinhart, 2001) Resources such as lesson plans based on the ISTE/NETS standards, integration strategies for teacher preparation programs developed in this project, and mentors for tech users will be available on line. This portal will also serve as the electronic "meeting place" for identified project members and will be a gathering place for collaboration and exchange of ideas. Students from the George Washington High School of the School District of Philadelphia will be responsible for online technology support to the WCU PT3 Partnership for Excellence through the web site. We will disseminate project findings, announce face to face meetings, share resources, materials, advice and connect the entire PT3 Partnership for Excellence membership through the Web Portal.

Early Outcomes and Next Steps

At the time of publication, the WCU PT3 web portal is still in the second phase of its development process. Databases to support in-service, pre-service and faculty members have been designed and are now being configured. Pathways from page one through page fifty-one have been thought out and submitted to the webpage developers using *Inspiration* as a concept-mapping tool. Colors have been selected for the web site, and a functional site should be available for partners within the next two months (2/02).

Next steps for the development of this portal, which will likely be organic or continuous in nature, include "fleshing out" content descriptions for each web page, adding partner information, adding students at the beginning of the Spring semester, and encouraging in-service teachers to sign-on as hosts and collaborative partners for our pre-service teachers. As we reach toward our goals, we plan to enhance and expand our pre-service teachers field experience, and not simply teach *about* educational technology integration -- but teach *with* technology in this university and in the partnering K-12 classrooms with the students we serve. When faculty model effective technology use, students can become more effective teachers. The energy level is up in the WCU School of Education for technology integration and positive change, and our new *PT3 Implementation* grant will help to sustain our efforts. Tracking the use of this web portal will allow us to see longitudinally the concrete results of an extended, forward-looking effort.

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Preparing Preservice Teachers to Use Technology: Program Experiences and the Research

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Teacher preparation institutions all over the world are focused on providing experiences for preservice teachers so they will learn to use technology and then meaningfully integrate those technologies into the learning process. Because of its complexity, this task has been quite challenging for most teacher education programs. It challenges all teacher educators involved in preparing preservice teachers to think critically about the role of technology throughout the entire teacher education curriculum and the quality of field experiences the undergraduate students have in K12 schools. To adequately prepare preservice teachers to use technology in their own classrooms, teacher education programs must develop comprehensive models for technology integration that include meaningful uses of technology to improve and renew the teacher education and K12 curriculum.

Iowa State University has designed a technology-infused teacher education model. The goal of this comprehensive model is to prepare cohort groups of preservice teachers who are ready for leadership roles and who have had technology-enriched course and fieldwork throughout their teacher education program. This model's design is based upon the successful Project Opportunity cohort model developed previously at Iowa State University and uses John Goodlad's model of simultaneous renewal as a guiding theoretical framework (Goodlad, 1994).

In this teacher preparation model, a cohort of preservice teachers begin taking all of their professional education and methodology courses as a group starting their sophomore year. In addition, a three-year relationship with a school district is established, so students can participate in field experience opportunities in classrooms each semester. It is anticipated that these students will accumulate over 250 hours of field experience in schools prior to their student teaching experience. This model also provides extensive professional development opportunities for inservice teachers at the partner school sites. All facets of the model are designed to improve the quality and increase the quantity of field experience opportunities for students in the teacher education program.

A research agenda has been designed to examine the impact this comprehensive model has on the preparation of preservice teachers at Iowa State University. The cohort students have completed two surveys, Survey of the Use and Integration of Computer-Related Technology (Schmidt, 1995) and Cultural Diversity Awareness Inventory (Henry, 1991; Phillips, 2000), to provide baseline data in these areas. Additional data are being collected through focus group interviews, journals, and classroom observations. Results to date will be shared.

In summary, this technology-infused teacher education model addresses the challenge of helping preservice and inservice teachers define and implement technology applications that will expand and enhance curriculum in K-12 schools and will model comprehensive uses of technology to facilitate teacher education renewal.

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The NC Catalyst/SAS inSchool™ Partnership: Universities, Public Schools, and Business Working Together to Help Faculty and Cooperating Teachers Integrate Technology in Teacher Education

Carolyn Sneeden – University of North Carolina
Marjorie DeWert – SAS inSchool

Abstract:

In 2000, the University of North Carolina system received a Preparing Tomorrow's Teachers to Use Technology (PT3) grant from the US Department of Education. The statewide grant, titled NC Catalyst, is aimed at strengthening North Carolina's administrative, human, and technical infrastructure to ensure that all teacher education candidates are ready, willing, and able to use technology to enhance teaching and learning when they graduate from our 15 public teacher education programs.

A major focus of NC Catalyst is helping university faculty and cooperating teachers develop the knowledge, skills, and dispositions they need to integrate technology into their teacher education programs and field experiences. To accomplish this goal, each of the teacher education programs in the University of North Carolina system provide professional development opportunities for their faculty and cooperating teachers.

SAS inSchool has partnered with NC Catalyst in this important undertaking. As part of the partnership, SAS inSchool provides each teacher education program in the University of North Carolina system with an annual license to all of its curriculum software for secondary students as well as to Curriculum Pathways™ a curriculum resource for secondary teachers that provides quick and easy access to high quality, standards-based lesson plans, teaching ideas, and web resources.

Through the NC Catalyst /SAS inSchool partnership, we are helping university faculty and cooperating teachers meet the challenge of preparing the next generation of secondary teachers for our state's public schools. In this panel presentation, we will present NC Catalyst from four perspectives: that of the system-level grant coordinator, university faculty member, a cooperating teacher, and a business partner.

We will:

- provide an overview of NC Catalyst professional development efforts and related evaluation data to-date
- present an overview of SAS inSchool products and describe our unique, problem-based, collaborative approach to professional development
- share examples of how university faculty and cooperating teachers are using SAS inSchool products in teacher education programs and field experiences
- present and discuss the lessons we've learned about how universities, public schools, and business can work together to achieve mutually beneficial goals

Never Bowling Alone: Building Social Capital and Professional Knowledge Through Educational Technology

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Abstract: This paper maintains that teacher educators who infuse a multi-layered reciprocal cognitive apprentice "idea technology" (Ryan, Sweeder & Bednar, 2002) into teacher preparation programs will build social capital (Putnam, 2000) and enhance professional knowledge among graduate preservice teachers, teaching assistants, novice and veteran certified teachers, and university faculty. These 5 groups participated in a two-week summer immersion teaching practicum that included 65 middle-school children. A quantitative and qualitative survey was distributed to all pre- and in-service teachers as well as university faculty. Each questionnaire was analyzed systematically to determine the extent to which social capital had been built using the aforementioned idea technology. Results suggest that study participants formed strong bonds across both horizontal and vertical social networks (Driscoll & Kershner, 1989), bonds that, in turn, fostered professional development with respect to technology usage, leadership skill, collegiality, and personal reflection.

Introduction

A well-connected individual in a poorly connected society is not as productive as a well-connected individual in a well-connected society. – from *Bowling Alone* by Robert Putnam (2000)

Our paper argues that teacher educators who incorporate a multi-layered reciprocal cognitive apprenticeship model, an idea technology (Ryan, Sweeder, & Bednar, 2002), into their pre-service teacher preparation programs, build social capital and enhance professional knowledge in a variety of powerful ways. "Social capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam, 2000, p. 19); likewise, social trust, an element of social capital, not only "promote[s] productive behavior," but also serves as "the cornerstone of reciprocal action..." (Coleman, 1988, as cited in Smylie & Hart, 1999, p. 423). Social capital comprises good will, fellowship, sympathy, and social intercourse among individuals who make up a collective unit. When pre-service and in-service teachers have opportunities to make connections with all parties involved in a professional development school (Mittleton, 2000) or in an immersion program such as a six-week summer practicum (Sweeder & Bednar, 2001), they are more likely to refine their professional decision-making abilities dealing with issues such as classroom management, lesson planning, and technology use (Wilen, Ishler, Hutchison, & Kindsvatter, 2000).

In our secondary education graduate immersion program, educational technology is deployed using an specifically-tailored cognitive apprenticeship model (Woolfolk, 2001) with five distinct, yet interrelated groups: graduate pre-service teachers, a graduate teaching assistant, newly certified secondary teachers, veteran certified secondary teachers, and university faculty. Our multi-level apprenticeship model was created to support the preservice teachers in their initial endeavors, to provide additional learning opportunities for the newly certified teachers, and to offer renewal opportunities for the veteran teachers involved.

Eleven graduate students, who possessed little, if any, classroom teaching experience, matriculated into our two-course, six-week integrated summer practicum. They were each responsible for creating and teaching a unit of study to classes of middle-school students who attended the enrichment program component of the practicum. One graduate assistant, who had successfully completed the summer practicum the previous year, served in a support role to the graduate students. Three newly certified teachers, our curriculum assistants, who had recently completed their own successful student teaching experiences, served collectively as a technology support system for the practicum. Three veteran teachers, our university supervisors, served as pedagogical content knowledge experts (Shulman, 1987) and provided midlevel supervision for the graduate students as they developed and taught their daily classes. Two university faculty served not only as experts in technology, adjustment, and instructional methodology, but also as universal problem-solvers across all five apprenticeship levels.

At the conclusion of the practicum experience, all participants completed a "Building Social Capital" survey wherein they reflected upon the degree to which they had established connections or bonds with each other during the six-week program. The anonymous survey included two different types of questions: ones requiring Likert-type responses and ones requiring brief narratives.

Results

Table 1 presents the participants' mean responses (*M*) to the Likert-type questions, with respect to their perceived growth in social capital, "the construct being measured" (Mason & Bramble, 1997, p. 309). The pre- and in-service teachers and university faculty were required to circle Likert-like ratings in response to a series of statements. (For example: "In my estimation, I have built social capital with the university supervisors: to a great extent, somewhat, not sure, a little, or not at all.") After the surveys were collected, the five Likert ratings were numerically converted. For instance, "to a great extent" was converted to a 4, "somewhat" was given a 3 rating, "not sure" was awarded a 2, "a little" was deemed a 1, and "not at all" received a zero.

	Graduate Students	Graduate Assistant	Curriculum Assistants	University Supervisors	University Faculty
Graduate Students	$M = 3.88$	$M = 3.88$	$M = 1.88$	$M = 3.33$	$M = 3.77$
Graduate Assistant	$M = 4.00$	*Not Applicable*	$M = 1.00$	$M = 4.00$	$M = 4.00$
Curriculum Assistants	$M = 3.00$	$M = 3.66$	$M = 3.66$	$M = 4.00$	$M = 4.00$
University Supervisors	$M = 3.50$	$M = 4.00$	$M = 4.00$	$M = 4.00$	$M = 4.00$
University Faculty	$M = 3.50$	$M = 3.00$	$M = 4.00$	$M = 4.00$	$M = 4.00$

Table 1: Mean ratings (*M*) for perceived growth in social capital: 4 represents greatest growth, while 0 represents no growth.

The following question stem was used in prompting the participants as they crafted five, short-answer narratives: "To what extent, if any, have you benefited personally and/or professionally from the connections or bonds you established with the" graduate assistant, curriculum assistants, fellow graduate pre-service teachers, university supervisor, and university faculty. All written responses were reviewed to identify common themes or "thought units" (Glaser & Strauss, 1967). "Thought units" were then analyzed, and subsequently categorized using a systematic cognitive framework (Sweeder & Bednar, 2001, October)

– an idea technology – namely, Woolfolk's (2001) six common features for cognitive apprenticeship models. (See Table 2.)

Cognitive Apprenticeship Features	Total Number of "thought units"	Survey Thought Unit Example	Who Said What About Whom
Feature 1. *modeling*	31	"I learned more by watching and trying to model your actions."	Curriculum assistant re: university faculty
Feature 2. *coaching*	28	"She gave great feedback with helpful and practical suggestions."	Graduate student re: university supervisor
Feature 3. *scaffolding*	14	"Great resource person to bounce ideas off of and talk to."	Graduate student re: graduate assistant
Feature 4. *articulating*	18	"Both were extremely helpful in just observing their example and listening to the advice they gave the preservice teachers. More specifically the technical aspects Dr. Sweeder gave in producing the PowerPoint and video presentations, e.g. what makes a good shot."	Curriculum assistant re: university faculty
Feature 5. *reflecting*	19	"This experience has been such a positive one. It was easy for me to dwell on what went wrong. You did not let me do this. You showed me my strengths and helped me to overcome many of my weaknesses."	Graduate student re: university faculty
Feature 6. *exploring*	10	"Professionally, I've gathered newer ideas that I would definitely incorporate into my classrooms (such as approaches to discipline and novelty in teaching style)."	Curriculum assistant re: graduate students

Table 2: Total number of "thought units" for each of the six shared cognitive apprenticeship features.

Discussion

We believe that the multi-layered reciprocal cognitive apprenticeship model is a particularly effective mechanism to enhance professional development, because it fosters not only *horizontal* but also *vertical* social networks amongst the various groups (Putnam, 1993, as cited in Driscoll & Kerchner, 1999). To illustrate this point, the mean social capital ratings for each group reported strong connections with members within their respective groups. For instance, one horizontal network, graduate students with graduate students, produced a 3.88 mean rating. Another horizontal network, curriculum assistants with their fellow curriculum assistants, established strong relationships (M = 3.66). Several groups, however, indicated that they believed that they had built similarly strong connections with other participants along vertical networks (Driscoll & Kerchner, 1999). For example, the curriculum assistants indicated that they each had built social capital with the university supervisors (M = 4.0) and the university faculty (M = 4.0), while the university supervisors indicated similar 4.0 mean ratings with the curriculum assistants, the graduate assistant, and the university faculty.

Social capital was not as strong between two distinct groups: the graduate students with the curriculum assistants (M = 1.88), and the graduate assistant with the curriculum assistants (M = 1.00). The curriculum assistants had very specific technology roles during the practicum experience, and even though they spent a portion of their time assisting technology-related issues in the graduate students' classrooms, they spent a more substantial period of time assisting technology issues related to the overall practicum. This may limited the number of opportunities to develop connections with the graduate students and the graduate assistant. In addition, the graduate students and graduate assistant may have viewed the curriculum assistants with their newly earned undergraduate degree as having less legitimate power (Wilen et al., 2000).

In light of our findings, we believe, as do Etcheverry, Clifton, and Roberts (2001) that "because students are strongly influenced by their interactions with each other, it is important for university professors to attend to the social structural characteristics of the educational environment vis-à-vis students' interactions in their classrooms" (p. 36). Extending their findings using an undergraduate population, we found that our graduate students, as well as the supporting in-service teachers, were similarly influenced by their interactions with others; hence, we put our emphasis upon establishing a multi-layered apprenticeship model so that each of our participants had multiple and varied opportunities to build social capital within our specific educational environment.

Our multi-layer, reciprocal model provided ample opportunities for all of the participants to refine their professional decision-making skills. This is supported by both the quantity and quality of the "thought units" elicited from their written comments. For example, the pre-service graduate students indicated that they believed that they had extensive opportunities to observe experts *model* (see Feature 1., Table 2) a practice, procedure, or attitude. The graduate students defined *expert* along both vertical and horizontal relationships associated with the building of social capital. Several indicated that they viewed the lone graduate assistant as an expert because " she went through the practicum the previous summer" and, thus, they valued what she had to say. As one would expect, graduate students pointed to both the university supervisors and the university faculty as experts, e.g. "I benefited from their example and leadership."

There was strong recognition of the external support made available through *coaching* and *scaffolding* (Features 2. and 3.) by the different participants. The graduate students, for instance, indicated that they felt highly supported by one another. One commented, "We shared ideas and brought materials for each other"; while another wrote, " I was inspired by the variety of teaching methods [I observed]." The graduate students also indicated that he university supervisors were instrumental in supporting them through mentoring. "The focused feedback was what I really needed and I got it from each of the supervisors differently," stated one graduate student. The university supervisors commented about the individualized and contextualized scaffolding they received by the university faculty members. In turn, the university supervisors mentored both the graduate students as well as the curriculum assistants. This mentoring was reciprocated when the curriculum assistants taught the university supervisors about the newer product technologies they used during the program (e.g., Sony Mavica Digital Still Cameras and Sony Digital 8 Camcorders).

The graduate students indicated that they felt they had ample opportunities to *articulate* (Feature 4.) their knowledge both formally and informally. Six of them specifically stated that they valued the "lunch and free periods" where they were able to discuss events that occurred in their classrooms. Others indicated that their journals, as well as their interactions with the graduate assistant, the university supervisors, and the university faculty were all critical in helping them to *reflect* on their progress (Feature 5.). Finally, the university faculty enhanced their professional knowledge. One commented that it was "professionally and personally invigorating to watch the 'little Sweeders' [a sobriquet that the graduate students invented for the curriculum assistants]. I caught their wave and am *exploring* new ideas for next year " (Feature 6.).

At the conclusion of the enrichment program we produced two multimedia presentations highlighting the middle-school students' experiences during the practicum. The first, an electronic slide show, was created using PowerPoint; the other, an edited video production, was created using a Sony Digital 8 camcorder and MGI's popular *Video Wave III*, a piece of inexpensive, nonlinear editing software. Both productions were projected onto a theater-sized screen and amplified by "surround sound" for added emotional impact. Not only were these productions warmly received by the middle schoolers, but the shows also spawned a multimedia parody that the curriculum assistants spontaneously (and surreptitiously) created. Featuring adults only -- the graduate students, the graduate assistants, university supervisors, and university faculty -- this lampoon provided a further example of the social capital built amongst all of the participants.

Conclusion

We believe that teaching, like the sport of bowling, is seldom as engaging – or productive – when performed alone. To paraphrase Robert Putnam, "A well-connected [teacher] in a poorly connected [school] is not as productive as a well-connected [teacher] in a well-connected [school]." Thus, during our summer practicum experience, we created a school community (a microcosm of our larger society) where mutual trust and reciprocity helped to de-isolate our novice teachers and lubricate the social intercourse amongst the pre-service and in-service teachers as well the university faculty. *No one* in our summer enrichment program "bowled alone."

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Collaborating Across Boundaries to Form Technology-infused Learning Communities

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The term, "learning community" has many meanings and is often used in a general way to describe any community of learners. Our PT3 catalyst grant adopted a definition of learning communities that was very specific and consistent with a curricular approach common to The Evergreen State College. We asked faculty in teacher education courses to create technology-infused learning communities by purposefully restructuring curriculum to link together courses and create an interdisciplinary experience for students that faculty would collaboratively plan and perhaps team teach. Technology would be an integral part of the community.

How technology was integrated into the learning community experience was left in part to the discretion and creativity of the faculty. We did specify two requirements, however. One stipulated that students would have opportunities to participate in an electronic learning forum. The second asked the faculty to create opportunities for preservice students and Generation www.Y students to work together on technology-related projects. Generation www.Y is a program designed to train K-12 students with the technology, collaborative and pedagogical skills necessary to help teachers integrate technology into learning.

Fundamental assumptions of this project were that it would be beneficial for students aspiring to be teachers to 1) experience learning that was collaborative, authentic and integrated; 2) view K-12 students as sources of knowledge, particularly in the areas of technology and learning; and 3) acquire and apply technology skills in context.

Nine colleges of teacher education and 16 K-12 schools were part of the consortium that tested these assumptions. And, as might be expected, nine different learning community models emerged. The story of each learning community is not one we can tell in an hour-long presentation. But stories told from different perspectives might offer a glimpse into the benefits and challenges a technology-infused learning community can present. A panel will also model the very nature of the collaboration that this project has been about.

In this panel presentation, five individuals—two teacher education faculty members, a Generation www.Y teacher, a teacher education student, and a Generation www.Y student—will discuss the following questions:

1. How was technology <u>integrated</u> into this learning experience, and what were the benefits and challenges of teaching and learning about technology in this way?
2. How did you participate in this learning experience both as a learner and as a teacher?
3. From your perspective, how can this type of learning experience contribute to the education of a teacher?
4. What role did technology play in building community?

Each participant will preface his or her remarks with a brief description of the learning community he or she has been associated with.

Building Successful School and University Partnerships: "Finding the Fit"

Dr. Nancy Todd, Professor, Eastern Washington University
Dr. Linda Kieffer, Associate Professor, Eastern Washington University
Patti Dean, Technology, Director, Cheney School District

The PT3 partnership between Eastern Washington University (EWU) and the Cheney School District (CSD) has emerged as being exceptionally collegial and productive. The partnership has been a catalyst for systemic change in the district beginning with the entire curriculum being re-examined and developed with a base of technology integrated in all areas.

Key district personnel readily attribute the new focus on change to the opportunities provided by the Preparing Tomorrow's Teachers for Technology program. As stated by the Technology Coordinator, "Cheney School District teachers need help with integrating technology across the K-12 curriculum. EWU teacher candidates are providing a significant amount of help to our teachers."

Like other universities, Eastern Washington University (EWU) has worked with many school districts in Washington State, as well as with the Cheney School District with varying levels of commitment over the years. The CSD of 3500 students surrounds this regional university in a small town of about 8000 permanent residents. We asked ourselves, is there anything about this partnership that would be applicable to other partnerships? What are the unique features of this partnership?

In thinking about these questions, we kept returning to the concept of "finding a fit" among school district personnel, education faculty, and teacher candidates. Questions such as "What is it you need? How do our institutional goals work together? How can we help?" have been continually asked by all parties.

We found that there were some key elements that help find the fit, such as administrative commitment, accountability, and communication.

Administrative Commitment.

While the university and school district have been close neighbors for over 100 years, cooperation between the two institutions was not always fruitful. About two years ago, we had the convergence of a new university president and college of education dean who are both committed to working closely with the local school district.

At the district level, the superintendent has also committed to work closely with the university. Because of the size of the district, it has little hierarchy. A superintendent, assistant superintendent, technology coordinator and curriculum coordinator make up the district level administrative "team." The partnership has been so successful that this group has designated the district technology coordinator to spend 50% of her time working on integration of technology in school district classrooms in which teacher education candidates have field experiences. All teachers have direct access to the Technology Coordinator.

Mutual Accountability

Cheney School District will be implementing new technology student learning targets in the fall, 2002. Teachers will be expected to demonstrate proficiency in the learning targets that are scheduled for mastery as their respective grade level. In addition, teachers will be evaluated on the presentation of a technology-integrated unit of instruction. "Classroom teachers hold the key to the effective use of technology to improve learning. But if teachers don't understand how-to-employ technology effectively to promote student learning, the billions of dollars being invested in educational technology initiatives will be wasted." (NCATE)

Cheney teachers are developing skills in technology integrations in two ways: 1) They have the opportunity to participate in the Intel Teach to the Future program where they receive 40 hours of free technology training. 2) Teachers may participate in the PT3 grant which partners an EWU teacher candidate with a classroom teacher to create and deliver a technology-integrated unit of instruction meeting technology standards (ISTE). After jointly delivering a module of instruction, they will evaluate the positive impact on student learning. An extra pair of hands for planning and implementing has been an asset for many teachers. The district technology coordinator assists with planning for all teacher candidate placements that relate to technology initiatives, as well as evaluating results of each of the projects. Results are communicated to the candidate's professors.

Working with teachers and technology together, EWU candidates are gaining experience and insight into how classrooms work when technology is infused. These experiences are the "laboratory" for what is discussed in teacher education courses. Teacher candidates are better prepared to use technologies in classrooms. Schoolteachers and education faculty are more willing to try technology with an extra pair of hands. Being able to assist classroom teachers integrate technology has been valuable in being able to have these hands-on experiences, rather than, say, develop theoretical lesson plans one might use "someday." As a growth opportunity it helps students stretch in a professional environment by trying out new technology activities with kids to find what works and what does not.

Continuous Communication

Communication of successes is an important element. A professional video was produced that consists of interviews with Cheney teachers and pupils. The video portrayed successful projects that we facilitated by teachers and teacher candidates working together. The video was used in October 2001 at faculty meetings in each of the district schools to sell PT3 partnerships with teachers who had not yet participated with EWU candidates helping with technology in their classrooms. Hearing testimonials of fellow teachers, who admitted on tape to being technophobes, many teachers responded, "If so and so can do that with an extra set of hands, I might be able, too." Seeing local success was inspirational to teachers and encouraged them to give technology a try. It was well worth the production cost of the video.

Continual communication is necessary between key players from both university and school (i.e., CSD Technology Coordinator and PT3 Project Directors), to clarify, re-examine, track progress, and make recommendations. How are we affecting the K-12 pupils? The district teachers? The EWU teacher candidates? In particular, the university personnel look for ways the university candidates can fit in and enhance the CSD technology goals. CSD personnel are also committed to providing teacher candidates with quality classroom experiences. And, importantly, neither institution is being prescriptive to the other. This mutual respect is an underlying aspect of "finding the fit."

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PT3: Connecting Educational Technology Integrated Curriculum in Higher Education with K-12 Schools

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Abstract: The teacher education in schools, colleges and departments of education (SCDEs) faces the challenge of how to prepare future teachers to teach competently in a digital age. An important question has been raised: how to prepare preservice teachers to transfer their tech-rich experience in higher education to K-12 settings? This paper will address the issue by examining the ways to (1) redesign teacher education programs, (2) improve pre-service teachers' use of the technology through a K-16 networked learning environment, (3) establish partnership with local schools. The notion of "Virtual K-12 Classrooms" will be introduced and the way of how such classrooms can be used to establish a K-16 networked learning environment will be discussed.

Introduction

In less than a decade there will be over two million new teachers entering the educational arena. How do schools, colleges and departments of education (SCDEs) meet this new challenge? How do SCDEs prepare the future preservice teachers to teach competently in a digital age? The existing teacher education programs in many SCDEs do not seem to have answers. Yet as a way of meeting the imminent challenges ahead, the teacher education programs in SCDEs have begun to offer computer specific courses as a tentative solution to the problem. However, such an approach does not change the already aggravated situation: the limited exposure to appropriate models of computer use in the classroom prevents the preservice teachers from effectively integrating modern educational technologies into K-12 classrooms (Vannatta & Beyerbach, 2000).

Although huge efforts have been made to improve the status quo of using technology in teaching and learning, approximately $70 million per year has been spent in Wisconsin in the area of professional development for use of instructional technology, the results have not been satisfactory. A recent survey made jointly by Wisconsin DPI and Cooperative Educational Service Agencies (CESAs) indicates that 15.6% of teachers do not know how to use modern learning technologies in their classrooms, 6.8% of teachers have used technologies which have little or no relevance to the individual teacher's operational curriculum, 42% of teachers employed technology either as extension activities or as enrichment exercises to the instructional program. The survey shows that only 18.8 percent of teachers are able to integrate educational technology into their curriculum to some extent with an emphasis on higher levels of cognitive processing. Only 16.9% teachers can integrate technology into their curriculum at various levels from mechanical to routine (Lohr, 2000).

To face the challenges and prepare future teachers to become technologically competent to teach in the 21st century, Marian College proposed a systemic change in undergraduate teacher education by aligning technology integrated curricula in higher education with K-12 schools and establishing a K-16 networked learning environment that enables preservice teachers to teach effectively in a tech-rich setting. The project was supported by the *Preparing Tomorrow's Teachers to Use Technology* (PT3) Grant from the U.S. Department of Education. The purpose of this project is to bring a systemic and fundamental change in teacher education.

The Study

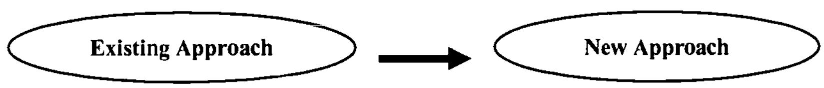
Starting from mid 1990s, Marian College began to embrace the idea of using technology in undergraduate teaching. It worked closely with K-12 schools to substantiate a change in the use of technology in K-12 classrooms. This effort was supported by an earlier federal grant Goals2000 which resulted in some positive changes in terms of technology use at Marian and its partner schools. However, like other SCDEs the undergraduate program at Marian College offers technology-specific courses as a remedy for the lack of technology proficiency in students. Such an approach may develop basic computer skills in pre-service teachers who may become "aware of the impending use of technology in their future classrooms, but they were unsure of how technology could be used" (Vannatta & Beyerbach, 2000, p.144). Moreover, our recent alumni survey suggested that Marian graduates were not quite prepared to use technology in a variety of instructional settings. We believe that such a problem originated in large part from the existing curricula in SCDEs. Being fully aware of the seriousness of the problem in K-12 education, Marian College therefore, proposes that:

(1) There must be a fundamental change in the teacher education curricula.
(2) Educational technology must be fully integrated into every education course.
(3) Partnerships with K-12 schools must be established so that pre-service teachers can be exposed to various technology uses in K-12 schools.

How to start and what change must be made to trigger a paradigm shift in teacher education in terms of technology integration? First, we examined the difference between the existing and the new approaches in the use of technology; Secondly, we looked at the strategies that will trigger a paradigm shift in technology integration; Thirdly, we created ten virtual K-12 classrooms in which pre-service teachers would engage in various learning activities as the K-12 students do and transfer what they learn in virtual K-12 classrooms to real K-12 classrooms.

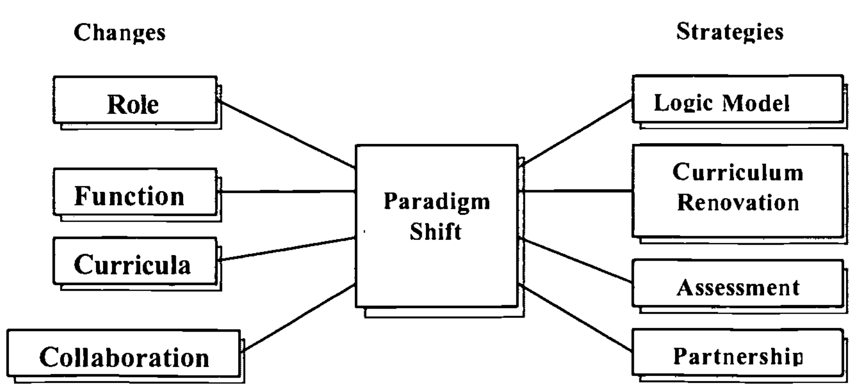
Existing Approach vs. New Approach. Analyses were done to distinguish the existing use of technology in teacher education from the new approach in terms of the role, function, curriculum, and collaboration of technology in classrooms and schools. The following diagram shows the differences:

A Paradigm Shift in Technology Infusion



Role	An extension, add-on	Integral part of instruction, related to learning objectives
Function	Productivity tool, low level thinking	Both productivity and mindtools, higher level thinking
Curriculum	Focus on individual course renovation	Focus on systemic change in teacher education
Collaboration	Occasional, sporadic collaboration with K-12 schools	Sustained efforts to build K-16 learning environment

Strategies for Change. The paradigm shift in technology integration in undergraduate teacher education is defined by the changes needed and strategies for such changes. As has been discussed above, the areas need changing are the role, function, curriculum, and collaboration of using technology in schools. To make sure such changes occur in teacher education, we develop strategies in each needed area: we developed a logical model that identifies the resources, the technology activities, the customers impacted, the short-term, mid-term, and long-term outcomes for the changes. In curriculum renovation, we develop a technology renovation road map that indicates the steps from simple application to effective technology integration in teaching. We also developed an assessment model that monitors the steps of technology integration. In partnership, we tried to establish a K-16 networked learning environment by working closely with out partner teachers in K-12 schools.



Virtual K12 Classrooms. Part of this project is to establish ten virtual K-12 classrooms. Instead of placing preservice teachers in the computer labs - a common practice that prevails in most traditional SCDE curricula - the preservice teachers will learn how to integrate educational technology into content area in a regular classroom equipped with high-end computers. Such technology-rich classrooms will simulate the ideal K-12 classroom learning environment in which preservice teachers will engage in various learning activities as the K-12 students do.

Partnership with K12 Schools. In addition to learning in a virtual K-12 classroom, the preservice teachers will have the opportunity to practice technology integration in real K-12 classrooms through partnership programs. The pre-service teachers will use technology to teach their clinicals and participate in various K-12 related courses and practicums, including students teaching. In so doing, Marian College and its partners will create a K-16 networked learning environment in which the preservice teachers will be fully exposed to various modern learning technologies and will learn how to infuse those new technologies into teaching and learning. The preservice teachers who are merged in this K-16 networked learning environment will develop a better understanding of the use of various technologies in K-12 schools, and hence will effectively integrate educational technology into subject areas.

Findings and Conclusions

This project is still in its trial stage. Five undergraduate faculty were involved. Seven courses have been revamped for technology and curriculum integration. The change affected 115 pre-service teachers. Four partner school teachers joined the seamless curriculum development between higher education and K-12 schools. The initial implementation indicates that (1) the project has profoundly changed teachers' and students' perception of the use of technology in classrooms, (2) technology is no longer regarded as an add-on or extension to teaching and learning, (3) more and more teachers and students use technology as a cognitive tool to engage in higher level thinking rather than something as electronic paper and pencil, and (4) preservice teachers know better how to integrate technology into various learning settings. Both the college faculty and cooperating teachers commented that there has been a great improvement in the quality of the lesson plan developed by pre-service teachers and the teaching they did in K-12 schools.

Our study shows that offering computer specific courses does not solve the problem in existing undergraduate teacher education, particularly in technology integration. A fundamental and thorough way for the change is to revamp the existing curricula, redefine the role and function of technology, and establish partnership with local schools as a path for educational renewal (Goodlad, 1984). In order to reduce the gap between higher education and the K-12 schools in terms of technology integration, a seamless curriculum between the two ends needs to be created so a transfer of learning experience and knowledge between both settings can be realized.

References

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