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ABSTRACT

This document contains the following papers on technology diffusion from the SITE (Society for Information Technology & Teacher Education) 2002 conference: (1) "Faculty Technology Integration Project" (Comfort Akwaji); (2) "If It Is Broke, Then What?" (D. Lynnwood Belvin and Jennifer Leaderer); (3) "Developing Video-Based E-Learning Applications" (Mario A. Bochicchio and Nicola Fiore); (4) "Developing a State Technology Plan To Promote State-Wide Technology Integration in K-12 Education: Preparing Arizona Students for Future Success" (Jeannie Brush and Donovan Evans); (5) "Preparing Technology Proficient Teachers" (Teresa Franklin and Bonnie Beach); (6) "The Human Cognitive Functions and the Cyberspace: A Brazilian Point of View" (Susane Lopes Garrido); (7) "Revisiting Schools: A Curriculum Check-Up" (Madeline Justice and Sue Espinoza); (8) "Becoming Proficient in Using Technology in Teaching: Stages of Acquisition from Novice to Expert User" (Colleen S. Kennedy); (9) "Online Challenge: Teaching Teachers To Share the New Hi-Tech Wealth in the Classroom" (Lesia Lennex); (10) "Using Technology To Improve Instructional Planning" (Guan-Yu Lin and Feng-Kwei Wang); (11) "Enthusing Teachers about Infusing Technology: Increasing Teachers' Use of Technology in the Classroom" (Annette B. Littrell); (12) "National SMETE Digital Library for Teachers: Process, Promise, Progress" (Ellen S. Hoffman and Marcia A. Mardis); (13) "How to Successfully Implement Change--Build It and They Will Come" (Donna Musser, Cheryl Bielema, Robert Keel); (14) "Digital Reality or Digital Insanity? The Lived Experience of Teachers in a Digital School District" (Christian Penny); (15) "Communication in the Virtual Teaching and Learning Space" (Antonio Simao Neto); (16) "Be the Technology: Redefining Technology Integration in Classrooms" (Steven C. Mills and Robert C. Tincher); (17) "Handhelds: Important Technology for Classrooms and Educators" (Neal W. Topp and Paul Clark); and (18) "An Investigation of Traditional and Constructivist Models for Internet Training and Effects on Cognitive Gain" (Chenfeng Zhang). Brief summaries of several conference presentations are also included. Most papers contain references. (MES)

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Technology Diffusion (SITE 2002 Section)

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TECHNOLOGY DIFFUSION

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Papers in the Technology Diffusion section address issues associated with the implementation of technology in educational settings from K-12 through Higher Education. Successful ways to integrate the use of various forms of technology continues to be a pressing concern in this area. Integration efforts operate at several levels. It is a primary goal in federal Preparing Tomorrow's Teachers to use Technology (PT3) grants, State offices of education are taking an increasing role in promoting technology integration in State-level technology plans, university programs are attempting to infuse it into their teacher preparation programs through stand-alone courses and in methods and student teaching, districts and schools are exploring ways to support teachers efforts at integration, and even individual teachers in the content areas are examining ways that integration can be subject-specific.

One of the central issues associated with technology integration is making good educational usage of technology a sustainable and ongoing reality. That is, technology becomes integrated into the culture of the classroom in a meaningful and productive way. A fundamental problem with previous efforts to integrate technology into U.S. public schools has been an emphasis on installing and maintaining the physical equipment, without ensuring the technology is effectively used to support and enhance student learning. Recent work has examined various ways to motivate and support teachers and teacher educators as they begin to provide technology experiences for students. Helping faculty understand how technology integration differs across content areas and grade levels is a valuable part of this process, as is developing familiarity with the available technologies, the types of support systems available to them, and how to cope when the physical equipment is inadequate. Projects designed to promote teacher development are essential if we are to realize technology integration goals.

One road to professional development for teachers involves building cooperative partnerships among the many constituents who have a stake in integrating technology into classrooms. Effective partnership efforts can take many forms. Pairing K–12 teachers with university faculty has been mutually beneficial for both groups. University faulty gain an understanding of how classroom teachers use technology with students and K-12 teachers can benefit from ideas and resources available through university settings. Classroom teachers can also connect with parents and the local community through technology and technology-related activities. Cooperative relationships can help K-12 teachers, parents, librarians, university faculty, and administrators help each other understand the vital role that technology can play in educating children in schools.

Technology diffusion is also concerned with the use of various tools in the learning environment—whether that is in a traditional classroom, or through a virtual online experience. Devices like handheld computers, or "palm Pilots" provide an exciting new option for teachers and students to use in collecting, manipulating, and representing data. Other cognitive tools like databases and computer-based concept mapping software provide opportunities for students to use the technology to develop higher-order thinking skills. Some of the greatest potential in technology diffusion is apparent in the use of the Internet to provide a virtual environment for students and teachers. The nature of the World Wide Web is such that it provides access to information and resources in a widely distributed fashion. This allows for the creation of virtual communities for sharing ideas and experiences, cooperative online learning activities, and web-enhanced teaching opportunities. Widespread Internet access will likely spawn a new and expanded vision of technology diffusion in education.

The papers in this section will provide you with many insights into the various aspects of technology diffusion. The authors address some of the central themes from their unique perspectives. This work is valuable in that understanding technology diffusion seems to be central to our efforts to integrate technology into the educational system and use it effectively in classrooms.

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Faculty Technology Integration Project

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Abstract: This paper is a case study report on the creation and ongoing implementation of a faculty technology integration project at a small liberal arts college in the Midwestern United States. The project seeks to prepare faculty to utilize computer technology in curricula, develop technology integration mentors and to foster ongoing mentoring and constructivist relationships in a community of teacher/learners. Experience in the project thus far has shown that factors originating in such disparate areas as equipment resources, faculty academic backgrounds, software currency and instructional perceptions have strong impacts on the conduct and progress of the project. Additionally, project management issues with partners and staff, largely unanticipated, have arisen and created discordance in the project, especially with respect to building a community of practice culture among the facilitators and the participants.

Introduction

Technology integration in the curriculum is becoming more widely accepted and implemented at most educational levels. New concepts of classrooms and formal schooling have come of age with the advent of the use of computer and communications technologies like desktop publishing, presentation and spreadsheet applications, the Internet and virtual classrooms. Preparing instructors for technology integration at the tertiary level, however, is problematic. The provost of this small college has long sought to enhance, and in some cases inaugurate, the faculty's ability to use modern computer technology in their coursework as a result of numerous requests from the faculty. Consequently, I was asked to create a project for the faculty for the understanding, acquisition, and implementation of technology-based teaching and learning strategies. The project was to focus on faculty training and preparation along with the generation of a community of practice around technology skills acquisition, implementation and integration and the creation of a cadre of technology savvy mentors that would serve as resources for the faculty's initial training and as support for the maintenance of post-project efforts. At issue were concerns about the adoption and use of the technology-based strategies due to a litany of factors including faculty member age, attitudes toward technology and its use in coursework, experience and competency with computer technology, anticipated use of the strategies, time and facilities for the project's implementation and access to viable computer resources. Participants were asked to complete a pre-project familiarity, skills and attitude survey to inform the process of determining the appropriate initial level for the project content, and to provide ongoing qualitative evaluation for formative critique of the affective factors in the project as well as the project's effectiveness. Evaluation sessions are also held with the provost and project partners to ensure all are informed and current with the project's progress.

Project Definition

Creation of the project began with discussions with the provost. This particular aspect was very important in that this momentous change in how the college was to go about the practice of education was being initiated from the top of the administration. The provost asked me to generate and submit a proposal outlining the project's implementation process, the projected schedule of meetings (sessions) and their agendas, specifying what would be required of his office and the participants and listing the facility and computer resources required.

My project partners and I approached the design/definition of the project from Instructional Systems Design (ISD), Constructivist and community building perspectives. First came the analysis of the audience. At this initial stage of the project, we used some general characteristics of the group as benchmarks for strategic planning purposes, e.g., the fact that all participants possessed advanced degrees. Next we determined and established an overall goal and a purpose for the project. We then established the structure of the project, which comprised five phases; I, II, III, IV and V, each containing several face-to-face sessions. The project has just begun; Phase I is being used to introduce the participants to the project – including what to expect and what is expected of them, the review of theoretical foundations for the project, the generation and collection of the audience's entry data and the introduction and modeling of several technology-based applications for communication and collaboration. Phase II is for mentor recruitment and training as well as community building. Phase III, then, involves participant training in computer and computer-applications knowledge and skills, in association with their mentors, based upon the entry surveys and the identification of participant-chosen technology-based projects to be completed in Phase IV. Phase IV features the "hands-on, minds-on " application of their knowledge and skills by the participants, again in concert with their mentors. Phase V provides culminating exercises and acknowledgements. The participants were asked to maintain a journal of their experiences and reflections of the project's implementation, to be collected as part of the summative evaluation facet of the project, and to share such thoughts as they may deem appropriate with the facilitators and colleagues during the course of the project. Subsequent to fashioning the overall structure of the project I generated goals and objectives for each phase to provide bases for project performance measurements. Then came the deliberation and decisions about the best strategies for effecting the technology learning, for the support for the participants' project assignment activities and for post-project scaffolding of participant efforts in applying their new-learned facility. Based in part on Knowles (1984) work on adult education, we chose the one-on-one mentoring approach for both the in-project learning and post-project support. Finally, for project formative evaluation, we opted to use surveys for the collection of participant affective, perceived skill change and project improvement data at the close of each session, and to use interviews of the provost and department heads at the end of each phase. Summative evaluation will be effected via post-project surveys, interviews and observations.

Project Implementation

The inaugural session of the project was attended by more participants than expected. The extra number were at once a bane and a boon since increasing the size of the audience posed additional logistics problems, while at the same time serving to keep the ranks at the expected number, later on, due to drop-outs. The session comprised an introductory session using a MicroSoft PowerPoint electronic presentation, a discussion and the introduction of the first communications tool, "eBoard", via a PowerPoint presentation followed by a hands-on practice session. Interestingly, some of the participants balked at the requirement to do the hands-on portion. They explained that they had expected the project strategies to consist only of lecture style presentations from which they were to glean understandings about technology-based applications and interventions. This was a totally unanticipated issue that provided welcome insight into the need for ascertaining and addressing participant expectations in projects of this sort, as part of audience analysis.

Logistics was another issue. We had requested and received assurances of access to a number of machines. Instead we used a conference room where several computers, some older, and a digital projector had been set up. Few machines meant that participants accessed them in groups causing problems and affordances that generated interesting dynamics, e.g., there was only one mouse "operator" and, depending upon the operator's facility, learning the application was either facilitated or hampered. A constructivist dynamic surfaced when misunderstandings were assuaged by the expertise of others in the group. Additionally, computer shortcomings and comments by facilitation partners that drew negative comparisons between the resource capabilities at this institution versus Iowa State caused frustrations in that were not easily dispelled. Session evaluations pointed up the participants' satisfactions and disappointments.

Conclusions

Lessons learned so far in this project include the necessity for more enlightened audience analysis, more coordination among project partners, better resource coordination and modern equipment and applications. These issues were addressed in a meeting with the provost resulting in assurances of both logistical and coordination improvements. Some of these concerns could most likely have been mitigated through collaboration with others who have conducted similar projects.

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Saved by Blackboard: Web-Enhanced Teaching

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Web-enhanced courses are selected by some faculty to develop the competence, self-efficacy, and technical skills required for designing and delivering on-line courses. A faculty who was using Blackboard as an enhancement in teaching a regular course was struck by a severe health condition that required hospitalization. The nurses' station in the hospital brought Blackboard technology to her rescue and successfully completed the course. This paper tells that success story of Blackboard rescue.

If It Is Broke, Then What?

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Abstract : A major problem schools face is the maintenance of existing computers. Several studies have examined a school system's technology capacity as defined as adequate technology, networks, electronic resources and support to meet the system's learning goals. This study examines the technology capacity of a group of middle schools in Northwest Georgia. Teacher perceptions of the school systems ability to adequately support technology and the effect that has on using technology as everyday tools for learning are examined. The quality of the technology available for classroom use and its impact on instructional methods are also examined.

Introduction

One of the many problems schools face is the maintenance of existing computers. Computers in schools are more often community computers rather than personal computers. Classroom computers usually experience heavy usage and habitually need repairs.

School districts are regularly swamped with repair requests, and repairs are sometimes delayed for weeks, or even months. This delay creates a problem for teachers who have developed lesson plans that integrate the use of computers in instruction. Unless teachers can be confident that computer glitches will be fixed in a day or two, they are unlikely to invest the time and effort to modify their curriculum to include technology.

Many districts have begun placing computer resource personnel in schools, with the goal of helping teachers use the technology more effectively. These specialists, often centrally trained, deal with a wide range of skills among teachers and dramatic differences in the specific needs of individual schools. The problem is compounded when these resource people must provide support to multiple schools (Odden, 2000).

Other factors in a school's technology capacity include adequate technology and networks. Classroom computers connected to the Internet have increased significantly over the past four years. The quality of technology in the classroom has also improved due to the fact that prices for technology have dramatically decreased over the same four-year period. School systems have purchased technology and connected classrooms to networks more than they have allocated funds for the repair of technology, software, and the training of teachers during this period of time (Solmon, 1999).

Study Demographics

The study identified five middle schools in Northwest Georgia. Locations ranged from small county schools to larger city schools. The average class was 23 students with teachers seeing approximately 100 different students per day. Most teachers in the study had taught twelve years with the most years of experience being thirty-one and the least being one. Eighty percent of the reported operational computers used some form of the Windows operating system, 16 percent were Macintosh and the remaining 4 percent were Apple //e. Sixty-two percent of the computers were connected to the Internet. In a recent national study the percentage of computers in instructional rooms connected to the Internet was seventy-seven percent (Cattagni, 2001). The study did not assess the quality of the computers found in the classroom and therefore many of the computers reported are obsolete for today's classroom standards (i.e. Apple //e's still in use).

Technology Access

Most schools reported having both computer labs and computers in individual classrooms with the average number of computers in lab being twenty-five and the average number in a classroom being less than two. Computer labs were also identified as being used by a special technology class rather than subject specific (i.e., reading, math, science, language arts, etc.). The placement of classroom computers was equally balanced in the major academic areas (1.5 / classroom) with no specific area averaging more computers than others.

Technology placement was also equally balanced between grade levels with no significant difference found between sixth, seventh, or eighth grade classrooms. The student-to-computer ratio based on average class size and average number of computers in a class is approximately 14 students to each computer. The student-to-Internet access is approximately 16 students for each computer. When lab computers and special education classes are removed from the total, the ratio changes to approximately 17 students per computer and 24 students-per-Internet access computer. The most frequent classroom computer to student ratio is 25 to 1. The most frequent Internet access to student ratio is 0 to 1 due to the fact that over fourteen percent of the classrooms have no Internet access. National trends for students per instructional computer with Internet access were 7 to 1 (Cattagni, 2001).

Technology Usage

Teachers were asked to identify how often they used technology with their students and specifically what applications were used and how often. Frequency of usage was defined as daily, weekly, monthly, once or twice a year, never, and not available. Forty-two percent reported using computers in general on a daily basis. The most common daily usage related to word processing (15 percent) and Internet activity (11 percent). Databases, Desktop Publishing, and Integrated Learning Systems were reported as never being used by a majority of the teachers. Other applications reported as never being used by a high percentage of the teachers were Spreadsheets (49 percent), presentation software (41 percent), and search engines (44 percent). The data on individual schools reporting using computers in general on a daily basis varied from seventy-two percent of the teachers at one school to twenty-five percent of the teachers at another. The school that reported the highest daily usage was the school that did not have a computer lab or special computer/technology class. Integrated learning systems and simulation programs were reported as either never used or not available in eighty percent of the classrooms. The percentage of daily use with students is much higher than any one application. Teacher productivity applications were not a listed usage on the survey since the intent was to measure how technology is used with students. Additional comments from several teachers detailing how they use the technology to prepare tests, scan tests, and store grades help to explain the computer in general usage being much higher than any listed application.

Student time on computers in classes averaged 1.5 hours per week. The range was from no time to as many as ten hours. The most frequent amount of weekly time was thirty minutes. All classrooms identified in the study reported having at least one computer. In as many as thirty-six percent of the classrooms it was reported that students spend no time on computers during the week.

Repair Time

In most schools the amount of time to fix the problem of a computer breaking down was measured in days rather than hours. The average number of days a computer was unavailable due to being broken was five days. The longest reported time for a computer to be in need of repair was thirty days. The average repair time for Windows-based computers was measured in days and the average repair time for Macintosh-based computers was measured in hours. The repair time for computers in labs was most often reported in hours as opposed to days for classroom computers. The highest average repair time was over seven days to fix the problem. The fastest repair time average was two days. National averages for repair time were reported to be 5.6 hours to 3.6 days for an average range of 53.6 hours to repair a broken computer (Solmon, 1998).

Sources of Repair

Maintenance to computers was most often provided by either local school staff specializing in that service (computer lab teachers, computer aids) or library media teachers. Classroom teachers provided technology support more often than district level technology specialists. Students and commercial providers were rarely if ever used to support technology. The sources of repair identified are very similar to a national study that found on average 68.5 percent of schools reported lab teachers or special computer staff provided technical support for the maintenance of technology (Solmon, 1998). The same study found that library/media teachers and classroom teachers to be the next level of support with students being rarely used (4.9 percent). Nationally, school districts provided greater technology support than found in the schools in the study.

Constraints to Technology Integration

When asked to identify the most frequent barrier to technology integration the most common barriers were too few computers in the classroom, not enough computer labs, and limited budget for technology. Broken computers in need of service were reported as a problem either occasionally or frequently by over 70 percent of the teachers. Other barriers that were reported as either occasionally or frequently impeding the integration of technology included obsolete technology (77 percent), too little or inadequate software (88 percent), and teachers' lack of experience with technology-oriented pedagogy (64 percent). Teacher lack of computer skills and student lack of computer skills were seen as never being a limitation by over sixty percent of the teachers. Teacher and administrator lack of interest in technology was viewed as never limiting integration by eighty percent of the teachers. The findings for this area are similar to national studies. In the 1998 Solmon report to the Milken Foundation outdated computers were seen as a constraint to technology usage by 63.2 percent of the states reporting. The percentages for lack of teacher training (31.5 percent) are also similar to the population identified in the study.

Study participants identified other constraints to the daily integration of technology in teaching. Such factors as pressure to prepare students for accountability testing, lack of freedom to install software, having only one computer for as many as twenty-five students, lack of access to the Internet, and a lack of on-staff technologist to repair computers and train teachers were provided in the additional comments section of the study.

Conclusions

Technology is often placed in classrooms in a top-down fashion with more emphasis placed on acquiring the artifact than supporting its daily use. Teachers are expected to make the classroom usage of technology a natural part of instruction. The study found that teachers on average had less than two computers in their classroom to share with an average of 23 students. In many cases classrooms had no access to the Internet and therefore the usage of the computer was limited to the installed software. Many teachers found the lack of software, low number of computers, and time to repair broken computers to be constraining in their ability to adequately use technology in their instruction.

Teachers did not see their skill or interest as a barrier to technology in the classroom nor did they perceive school administration as a limiting factor. The most common barrier was a lack of adequate funds to support technology and a limited number of computers with Internet access. The quality and quantity of the technology available for classroom use creates a negative impact on instruction.

The technology capacity of school systems has not been sufficient to adequately support teachers using computers as everyday tools for student learning. In order to increase system capacity the additional budgetary requirements to support, maintain, and replace classroom technology will be enormous. The challenge that districts face is finding cost effective methods to sustain and support existing technology as well as identify resources to obtain new technology.

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Developing Video-Based E-Learning Applications

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Abstract: In the paper we present Lezi II, a tool to easily transform normal lessons or lectures into powerful multimedia applications based on a very simple and regular structure. The tool has been conceived and produced at our Lab to simplify the production process, especially for non technical users. Lezi II is extensively used in our computer engineering department to produce educational multimedia applications.

Introduction

In general, the production of hypermedia applications is a complex and expensive task, requiring both technical skills and communicative abilities. Nevertheless, some specific kind of multimedia production can give good quality results, even without specialized IT skills, and at low costs. We have concentrated on this particular field, with the aim to supply with a valid tool the teachers who want to publish their educational material easily and at low costs.

We can in fact observe that traditional lessons/lectures, when performed from good teachers, can be easily transformed in good quality multimedia applications for both on-line (the Web) and off-line (CD/DVD) distribution. The key point is that for a good teacher it's easy to speak, to explain using images and slides, to show objects, to write on the blackboard and to use his mimic to grab and hold the attention of his students. In our opinion this kind of educational contents can be effortlessly transformed in a very usable multimedia application based on the video of the lesson, on a simple and regular navigation structure and on a little set of user-friendly multimedia objects.

The Lezi II Tool

Starting from these requirements, and from an accurate bibliographic analysis, the project of a complete prototype, called Lezi, was started at the SET-Lab of the University of Lecce, within a large research project aimed to the development of innovative educational tools and applications. The prototype includes two distinct parts: the authoring part, suitable to create a new Lezi lesson, and the fruition part (also referred as "lesson player" in the following), used to navigate among existing lessons and to select and play the desired one.

Two version of the prototype have been produced, with the same functionalities, for both on line and off line operation. The off line version is suitable to create and/or use stand-alone Lezi lessons, most of all for CD/DVD production, while the on line version allows remote users on Internet to create and/or play Lezi lessons. At any time is it possible to port stand-alone lessons on the Internet and vice versa. The fundamental requirement, for Lezi, is a very high ease of use, so that it can be truly accessible even to users with very basic computer knowledge. This is essential for many good teachers or scientists who have, a great communicative strength and could easily offer high quality lectures and lessons.

Experiences with Lezi II

In the poster presentation we describe both the Lezi tool and the experience we gained at the University of Lecce by using Lezi to produce various real courses and other teaching events (conferences, scientific seminars, on-line training resources, etc.) in different authoring situations.

The first experience we describe is based on the class of Informatica Grafica given by Prof. Paolo Paolini and Prof. Franca Garzotto in three Italian Universities (Milano-Lecce-Como 1999). In the lesson we can see a classical authoring situation: a teacher exposes his concepts in a classroom with a blackboard or with some slides. In the second example we describe the use of Lezi to document a preliminary meeting for a large research project supported from the European Community. Other specific real productions based on Lezi (on-line training etc.) are also described.

Conclusion

In conclusion, the idea described is very simple: it is possible to publish good educational multimedia applications developed by academic staff with very little technical effort, in a short time and with limited financial resources.

In our opinion, Lezi can enable a teaching staff without a specific technical preparation in multimedia production, but with valid contents and good didactic skills, to easily prepare good multimedia interactive lessons, both for off-line (CD/DVD) or on-line (the Web) purposes. More in general, the widespread use of Lezi II or other similar tools can effectively support the development and the use of educational multimedia contents into universities and into schools. Obviously, this kind of multimedia contents is not intended to replace the publications of professional editors.

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The Diffusion of Communication Highways Connecting Parents and Schools

Susan Borzych
Geraldine DiPalma

Parental involvement has continually been an important piece in the development of student learning and success in school. The increasing availability and access to the Internet provides schools with an effective way to communicate with the community via school web pages. However, there is still a large void in reference to timely communication between schools and parents regarding personal information, such as grades, attendance, demographic information, discipline, and health issues. New software programs are now being made available to address this void and provide timely information through the use of technology--specifically, the Internet.

Parental involvement is not restricted to a physical presence in the building but includes involvement outside school and in the home. With the increase in single parent homes, working parents, and situations that prohibit many parents from frequently visiting the school building and talking one-on-one with teachers and principals, it has become increasingly difficult for parents to stay current with their child's progress in school. If information about student progress were provided to parents on a timely basis--in a format that was easy to understand and access--necessary interventions could be provided that would help students experience increased success in and out of the classroom. These strategies would increase the probability of improved student performance on assessments and standardized tests. Information about assignments, projects, upcoming events, and due dates would require students to be accountable for their progress and would provide information to parents and guardians about a student's development and growth in the classroom. This would discourage excuses and claims of miscommunication amongst the involved parties, promoting increased interaction and understanding of expectations.

Critical to the communication between schools and parents is the inherent meaning, or the subjective perception of the innovation of communicating about student progress via the Internet (Rogers, 1995). The diffusion of this type of communication system is an "authority innovation-decision" that is subscribed to and made available by individuals in the educational system that possess the technical expertise to realize the inherent value that such a system would be able to provide (Rogers, 1995).

A large school district in the central part of the United States--a district of approximately 87,000 students, attending 165 schools--agreed to pilot the NCS software product ParentCONNECTxp for the 2000-2001 school year. The pilot took place at a newer high school serving approximately 1,500 students in grades nine through twelve in the west corridor of the district. The pilot project followed the district-approved process, which included piloting the web-based program for one year at a district school. At the end of the year, a feasibility survey was conducted with the staff of the school, and a survey was conducted amongst participating parents and guardians. The data were analyzed, and the resulting report has been made accessible to all schools in the district. The challenge of this pilot was to convince the parental population of the advantages of this type of communication and the value that timely information could provide for them in their quest to be effective parents and provide an adequate support system for their students.

The results of the surveys were very positive, and suggestions were reflective and reasonable. Parents valued being able to access timely student data on-line and felt that it was a positive step in helping students avoid pitfalls and be successful in their academics. Parents who received e-mail notifications for unexcused student absences, felt that early intervention was critical and beneficial in addressing student attendance issues. A recommendation has been generated, addressing the possibility of implementing the product district-wide.

This poster session will illustrate the results of the feasibility study and the parent survey and will address the possibilities and the restraints that accompany the accessibility of student information via the Internet, as well as address issues directly related to the diffusion of the software product amongst parents. This session will also address the structure of the socio-economic system, communication channels, social order and their association with the "s" curve, as well as the implementation of a new innovation (Rogers, 1995). Also included in the session will be technical information about installation issues, security concerns, hardware requirements, and software performance. CD's will be available that contain a PowerPoint presentation illustrating points of interest for those who might be considering implementing such a program.

Rogers, E. M. (1995). *Diffusion of innovations.* New York: Free Press.

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Developing a State Technology Plan to Promote State-Wide Technology Integration in K-12 Education: Preparing Arizona Students for Future Success

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Purpose

Constructing a framework for technology integration in Arizona K-12 will establish a "roadmap" enabling the state to consistently and coherently promote a coordinated state-wide infusion of educational technology in the K-12 education system. It will bring direction to and support for all activities that impact the integration of educational technology across Arizona elementary and secondary education.

A comprehensive state technology plan seeks to ensure that an educational technology vision is reached for every student, every teacher, and every school in the state of Arizona. It is intended to support and to align the growing movement of teachers, administrators, parents, industry and business leaders, and government officials that recognize the need in Arizona for a new comprehensive state educational technology framework. By integrating Arizona's many educational initiatives, a statewide educational technology framework has the potential to maximize resources, coordinate efforts, and guide all education partners to move in the same direction with minimal duplication or conflicting goals.

This paper will provide an overview of the Arizona K-12 technology plan, and describe the processes involved in developing the plan. These processes involved determining key stakeholders in the state, acquiring input from stakeholders to develop a framework for the plan, disseminating a draft framework to teachers, administrators, and business leaders in the state, and using feedback from these individuals to refine and enhance the plan. After the plan has been refined, key stakeholders will take the plan to the Arizona Department of Education for review and adoption. Each component of this process will be discussed, and the resulting technology plan will be described in detail.

Educational Technology is Important for Student Success

The use of educational technology is no longer the path to future success for Arizona children. It is the path to current success. If used appropriately, research shows that it enriches the learning environment leading to better student performance. Educational technology can:

- Allow learning to occur in ways not possible otherwise;
- Be a means for improving learning in all subjects;
- Expand students' creative abilities;
- Promote students' taking responsibility for their own learning;
- Impact at-risk student populations positively;
- Promote students' interaction with a larger community (e.g., discussions directly with experts, with other students working on the same or similar projects, etc.).
- Give students experience with modern workplace tools.

In short, technology, when implemented appropriately, has great potential to give Arizona K-12 students an enhanced learning environment. As an additional benefit, Arizona children will be exposed to and utilize technology that will better prepare them to enter today's society and economy as an active participant.

Providing Access to Technology

Educational activities that integrate technology in meaningful ways are useless if students do not actually have access to that technology. The significant enhancement to teaching and learning afforded by resources available on the Internet is lost if schools do not have the infrastructure necessary to deliver broadband voice, video, text and graphic data to adequate multimedia computers available in the classrooms. Thus, meeting professional development and student achievement goals relies upon the creation of a networking infrastructure and provision of adequate numbers of multimedia computers in every classroom throughout Arizona. This goal is even more crucial in the remote areas of Arizona where community resources are insufficient to provide students the opportunities that more affluent students in the more dense population centers may enjoy in their homes.

Since 1999, Arizona has made groundbreaking strides in this area. Initially, each of Arizona's 228 public school districts were provided enough computers to ensure a 1:8 computer:student ratio. The second phase of the statewide educational technology initiative will connect every network-able computer to a local area network (LAN). Also in phase two, every school in every district will be connected via a wide area network (WAN) with a district aggregation point that is then connected to the Internet with a broadband connection that allows transmission and reception of voice, video, text and graphic data.

This initiative is making an Application Service Provider (ASP) available to every public school at no charge to the schools until June 2005. The ASP will host school and teacher websites, e-mail services for staff and students, student information management systems, student assessment tracking systems, and teacher resource management systems. The ASP will enable schools to access productivity software, over 250 educational titles, (i.e., content, courseware, reference materials), and communications software. These resources will be available over the Internet, making them accessible to students, staff, parents, and teachers whether working from school or home. Students will be able to access their own work and the school district's software from any location that has access to the Internet.

As cutting edge as these initiatives are, they are only the beginning of a continuing challenge. Given the speed with which technology information systems are changing, this State Framework, covering all aspects of educational technology including provisions for assessment and updating, is necessary.

Components of the K-12 Technology Plan

Focus groups consisting of K-12 administrators, teachers, parents, industry stakeholders and university faculty determined twelve key issues that should be included in a comprehensive state framework. Review of other state educational technology plans and interviews with state technology directors helped determine the corresponding benchmarks of these components. These components were combined into the following eight categories following a stakeholders meeting:

1. Integrating educational technology into the curriculum
2. Professional development for teachers and staff
3. Pre-service training for teachers
4. Capacity, infrastructure, staffing, and equipment
5. Collaboration and partnerships
6. Equity of use
7. Review, evaluation, and accountability
8. Current and future funding requirements

Addressing these issues requires a framework of vision and implementation strategies. All of these categories may be considered interdependent, often with considerable overlap of concept and, where possible, shared use of resources. Each component is described in more detail below:

1. Integrating educational technology into the curriculum. The purpose of education is to help students think, learn, and achieve in new ways in and across disciplines. Educational technology is a necessity in fulfilling this purpose. Educational technology (ET) will help students in all subject areas develop and nurture the ability to access, to analyze and to communicate information. In every school there must exist a positive and supportive attitude toward ET. Six critical objectives for educational technology integration are:

- Build the foundation for the integration of educational technology within schools

- Address technology and content/curriculum standards complimentarily by teachers and administrators
- Structure the reward system to strongly provide the incentive for teachers and administrators to integrate educational technology
- Provide training for teachers and administration of all schools
- Align school educational technology plans with State Framework
- Assess student and teacher competency using state educational technology performance standards

2. Professional development for teachers and staff. Teachers must be comfortable using educational technology if it is to be integrated effectively into the classroom. Providing access to resources along with time and support to develop educational technology competency represents the most logical means by which to ensure effective curriculum integration. To develop teachers and administrators into confident professionals with the educational technology skills to use educational technology resources appropriately three issues must be addressed:

- Build an infrastructure to support the design and delivery of professional development for teachers and administrators
- Provide incentives and encouragement for teachers to engage in educational technology professional development
- Assume ownership of teacher and administrator roles as educational technology leaders and integrators

3. Preservice teacher training. Future teachers must enter their respective fields equipped with educational technology skills and experience. Teacher education programs are responsible for preparing future teachers to integrate educational technology. Teacher education programs must also work collaboratively with the school systems to ensure that student teaching experiences occur in learning environments that support the integration of educational technology.

4. Capacity, infrastructure, staffing, and equipment. Technical standards will provide a foundation for collaborative planning and support efforts among local, regional, and state-level groups, including the worthiness of the individual school educational technology plans and the ultimate success of the technical infrastructure at the local school buildings. Comprehensive plans regarding the required capacity and infrastructure issues include the following steps:

- Establish policies and procedures whereby the infrastructure for broadband Internet connectivity delivered to public school classrooms is regularly upgraded to provide capacity commensurate with state-of-the-art information systems delivery;
- Ensure that numbers and technological configuration standards of multimedia computers available in the public schools stays abreast of the increase in student enrollment and the increase in technological configuration standards as the industry standards advance,
- Provide affordable ET resources (people, professional development, technical support, etc.) to every school district;
- Create plan for equity of access to technology for all students, schools and districts, ensuring that resources are provided in an equitable manner throughout the state regardless of the socio-economic status or ethnicity of the students
- Provide for continued cost-effective delivery of curriculum software that is correlated with state education standards... not just technology standards (Objective 1.2)

5. Collaborations and partnerships. Educational technology plans are better poised to succeed if they include support and partnerships from state and community resources. These include universities, community colleges, libraries, museums, community resources, industry, and state and municipal governments. Successful partnerships and collaboration require a commitment to:

- Provide access to and aid in applying information that promotes collaboration and partnering, and;
- Build and highlight models of exemplary partnerships and collaboration

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6. Equity of use. A comprehensive educational technology framework will ensure that all of Arizona's children will have equitable use to educational technology regardless of socio-economic status, race, gender, language, or special needs. The success of statewide equity of use relies upon the commitment to:

- Disseminate data widely regarding issues posed by ethnicity, minority, gender, and physical and mental ability, and
- Address equity of use issues in educational technology widely

7. Review, evaluation, and accountability of the framework. Educational technology is not stagnant; better and better hardware, software, and networks appear each day. Although this Framework is written in a rather generic way, any effective plan for educational technology usage must address the need to periodically update its elements. Regular review of progress in implementing a plan will ensure a timely pursuit of the goal of ubiquitous educational technology infusion in the K-12 system as well as an effective and efficient investment of public and private funds and resources. Of course, the ultimate goal of K-12 educational technology plans is to provide the resources and processes necessary for enabling students to meet the technology education standards. Thus, the ultimate accountability is that students make reasonable progress in meeting these standards. Three specific areas must be directly addressed:

- Maintain currency of the Framework
- Monitor progress in implementation
- Monitor student progress in educational technology use

8. Current and future funding requirements and sources. Providing the technical infrastructure, equipment, human resources, and professional development needed to implement educational technology into K-12 schools requires significant Funding Requirements and planning. Critical steps would include:

- Determine funding requirements
- Determine funding sources
- Acquire and allocate funding to meet requirements

On-line SITE Forums: Joining and Participating

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Abstract
Educators increasingly live more frenzied professional and personal lives. Yet, the demands to stay connected, collaborate, and learn continue to exert pressure on us. Participation on professional forums can provide educators with possibilities to rearrange their time while remaining intellectually and professionally active. Attendees of the initial sessions will be given a working knowledge and skill set for joining and participating on AACE forums. More electronic forums for educators are available and it is increasingly important to join and participate in on-line forums.

A follow-up session will be offered for initial workshop participants and on-line forum leaders. Once the skills and on-line protocols are mastered one may wish to moderate or lead an on-line conference. This presentation will provide attendees with handouts and follow-up support for participating on AACE forums.

Objectives
This presentation has two main objectives. First, this session will provide skill and knowledge for novices who desire to participate in on-line communities. Second, leaders and moderators will be provided with an understanding of techniques and responsibilities of their role as a leader of on-line communities. Follow-up on-line opportunities will be offered to all attendees of these sessions.

Intended Audience
There is no experience requirement for attendees for either of the initial sessions. This presentation is designed to provide individuals with the requisite skills and knowledge to participate in AACE on-line forums. There are also no prerequisites for participation in the either initial sessions.

Attendees to the second follow-up session should have attended the first session or been designated as moderators or vice presidents of AACE affiliated forums. Other forum moderators or leaders may attend the follow-up session.

Proposed length
Two 1- hour beginning sessions beginning and mid conference.

Topical outline of the content

Note Well: This panel will primarily focus on AACE sponsored forum participation. Discussion of other on-line applications will be presented only if time allows and in response to audience questions.

Initial sessions for participants
- Different kinds of educational forums
- Why join an on-line educational forum
- Unique aspects of AACE forums
- Discussion of hand out materials
  - How to join AACE forums
  - Special considerations related to forums
  - Potential embarrassing situations to be avoided
- Where to find support

Follow-up session for leaders
- The forum leader's mission –

making the community work

Making the experience one that is enjoyable and useful

Anticipating and resolution of forum member needs

Selection of key participants

Humanizing on-line experiences

Getting support fast and when you need it

Instructor's qualifications

Roger Carlsen supervises or has developed approximately 100 on-line fora and conferences using various on-line products. Among his current duties are graduate educational technology advisor at Wright State University in Dayton, OH. He currently serves as moderator for Association for the Advancement of Computers in Education (AACE) announcements, moderator for Educational Technology Review, and supports on-line forums for the Society for Information Technology in Education (SITE).

His current has teaching responsibilities that include graduate courses in telecommunications, on-line education, and distance education. This academic year he is scheduled to provide in-service to 54 school districts. During the past 3 years he has prepared or supervised approximately 400 educational or corporate web sites. Since 1984 Roger Carlsen has served as an officer of 3 technology corporations.

Preparing Technology Proficient Teachers

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Abstract: This paper presents initial findings of a U.S. Department of Education – Preparing Tomorrow's Teachers to Use Technology grant at a Midwestern university. The grant seeks to create models of technology integration in which a university faculty member and a K-12 teacher are paired together to create meaningful uses of technology in university content and/or education courses as well as in the K-12 classroom. Preservice teachers will be given opportunities to see examples of and to practice technology integration in the K-12 classrooms of participant K-12 teachers.

Introduction

As the United States enters the 21st Century, teacher preparation programs across the nation are assessing their capacity to adequately prepare new teachers to embrace the use of technology in the education of young people who will live in a global, information-based society. In investigating the status quo, recent studies have produced somewhat disheartening data. Relatively few teachers (20%) report feeling well prepared to integrate technology into classroom instruction (International Society for Technology in Education, 1999; National Center for Educational Statistics, 1999 January). Although technologies are increasingly available in K-12 schools, teacher professional development both preservice and inservice has not kept pace (International Society for Technology in Education, 1999). With the estimated need for 2.2 million new teachers over the next few years, it is vital that teacher preparation programs answer the call for change.

Studies have documented improvement in the amount and quality of course work in educational computing but have recognized that one required class is inadequate to prepare teachers to use technology effectively in the teaching/learning process (Hunt, 1994; Strudler, 1991; Wetzel, 1993). In addition to computing courses, it is recommended that preservice teachers need to observe appropriate modeling throughout their university course work (Kariuki, Franklin and Duran, 2001; Franklin 1999; Huang, 1994; Hunt, 1994; Gunn, 1991; Novak and Berger, 1991; O'Bannon, Matthew, and Thomas 1998; Strudler, 1991; Wetzel, 1993). Teacher education faculty need to serve as role models; their uses of, and attitudes towards, technology in the classroom will strongly influence the implementation of the technology by preservice teachers (Kariuki, Franklin and Duran, 2001; Franklin 1999; Barker, Helm, and Taylor, 1995; Huang, 1994; Handler and Marshall, 1992). Some researchers have even indicated that until faculty members participate at their own comfort level and use technology, the students they teach may fall behind in the 21st century (Mims and McKenzie, 1995).

Ohio University, located in the heart of Ohio Appalachia, is a major educational institution serving the southeast quadrant of Ohio. There are five regional campuses located throughout the region, in addition to the main campus in Athens. The College of Education accredited by the National Council for Accreditation of Teacher Education (NCATE), graduates approximately 600 undergraduate students per year who typically seek employment in Ohio schools. The University and the College had exerted some effort to entice faculty to use technology in the teaching/learning process. However, inroads had been minor. Students experienced somewhat random exposure to models of using technology in the teaching/learning process in their content and education classes. In general, faculty members had the technological knowledge and skills comparable to that of students completing the technology course. Furthermore, in field and student teaching experiences, students viewed only scattered examples of technology use by practicing teachers in spite of statewide efforts to infuse technology into the education of all P-12 students in Ohio.

Supported by the Ohio Legislature, SchoolNet, a statewide technology project, has encouraged and supported public school improvement efforts in the state by facilitating the installation and use of computer and network technology in Ohio's public schools. Complementary to the SchoolNet initiative, SchoolNet Plus provided districts at least one interactive computer workstation for every five K-4 students. However, in southeastern Ohio, where school districts are typically classified as poor/disadvantaged districts, the infusion of technology into the teaching/learning process has been progressing at a slow pace. Actual models of appropriate uses of technology have been scattered, at best.

In reviewing the situation described above, the Ohio University, College of Education identified the following needs with respect to technology use.

- The College of Education did not have a long-range, articulated technology plan focusing on the integration of technology in teaching and learning.
- Faculty members throughout the University only randomly modeled appropriate uses of technology in the teaching/learning process within content areas.
- Pre-service teachers had little opportunity to apply technology during field experiences.
- There was little communication among faculty who teach technology courses, faculty who provided content instruction, faculty who provided pedagogical instruction, and P-12 teachers who provide field and/or student teaching experiences.

The project activities are designed to improve teacher preparation programs at Ohio University through the infusion of technology into the teaching and learning. The project is a collaborative effort of the Colleges of Education, Health and Human Services, Arts and Sciences, the five regional campuses, and P-12 schools.

The Study

Data collection used a qualitative case study methodology in which graduate students and the project directors were assigned to content area groups composed of P-12 teachers, College of Education faculty, Arts and Science Faculty and Health and Human Services faculty. In the first year of the study, the groups were divided into the content areas of math, science, social studies and language arts. At least two P-12 teachers, two content area teachers, one College of Education methods teacher, an instructional technology graduate assistant and one projector director was assigned to each group. Data was collected from each group in the following manner:

1. University faculty responses to pre-project and post-project surveys were analyzed to determine changes in faculty perceptions about technology and self-assessment of skills in using technology. Faculty kept reflective journals of the uses of technology modeled in their teaching and responded to open-ended questions such as "How did your role as teacher change as you increased the use of technology in the teaching/learning process?"
2. Teachers, who participated in the revised courses, were given pre-project and post-surveys to determine changes in perceptions of the inclusion of technology in the teaching/learning process.
3. The instructional technology graduate assistants acted as mentors to their assigned group and provided technological support to the faculty. The instructional technology graduate students maintained journals concerning their mentoring of faculty and observational data throughout the year of the project. Tape recordings of meetings, minutes from meetings, graduate student field notes and observations as well as project director field notes, meeting notes and observational notes were triangulated to examine the outcomes of the project.

In addition all projects were submitted for review by each content group (math, science, social studies, and language arts) in which an evaluation rubric was used to determine if technology had been incorporated appropriately into each course syllabus and project. The faculty and P-12 teachers then field-tested the projects and course syllabus and a cycle of revision and review was completed a second time. When completed, the projects and course syllabus were placed on the web for the other content groups and the larger Department of Education: *Preparing Tomorrow's Teachers to Use Technology Grant* (PT3) to review.

Results

The *Preparing Technology Proficient Teachers* project provided faculty in Arts and Sciences, Health and Human Services and the College of Education opportunities to discuss a common question concerning "what teachers should know and be able to do when they leave colleges of education concerning content and technology". What was most interesting in this discussion was the common theme voiced by both the university faculty and K-12 teachers:

> *Teachers should look to their content standards and learned societies for guidance on what teachers should know and be able to do in both content areas and technology. These organizations provide a much more national and global view than a state organization. The people who make up the committees of these organizations often have a much wider range of experiences and education and typically are not politically motivated.*

Several K-12 teachers nodded agreement with the statement,

> *I never knew that university faculty worried about the same things that we [P-12] worried about. You guys have just as much trouble using the technology as we do!*

Some of the conversations about what "teachers should know and be able to do in the classroom" followed the line of classroom management and understanding how to discipline in the classroom. Most of the K-12 faculty indicated that the knowledge of content was not really a problem for the preservice teachers coming into their classrooms and that classroom management skills were more of a problem. The university faculty contributed that many of their students used PowerPoint presentations as part of their assignments so technology skills by students were increasing. Most university faculty felt that Internet searching and email skills were common practices by many preservice teachers. Both the university faculty and P-12 teachers reported that these technology skills were the result of the required technology course and experiences in P-12 due to SchoolNet funding.

Faculty and teachers were able to learn new technology skills that could be used to support the development of technology proficient preservice teachers and to model appropriate uses of technology in the Arts and Sciences content areas as well as the College of Education methods courses. One teacher stated the following at a presentation of "lessons learned":

> *I can't believe I learned so much in one year. I now have my courses on the web so students can access them at any time. I would have never been able to even think of doing this had it not been for this project.*

A university English faculty member stated,

> *I learned so much from the team members I had in my group from P-12. I saw the searching methods they used with their 6th graders and was amazed! I even borrowed a few ideas for my own literature class from them. And...we are creating an e-pal correspondence between my university students and the student teacher's class.*

The university faculty had an opportunity to use an instructional technology graduate assistant to help them learn new technology skills and to work with the development of new technology-enriched syllabi. University faculty members who participated in the project redesigned methods courses to include models of using technology in meaningful and appropriate ways in the teaching of mathematics, science, social studies, and language arts.

Conclusions

The P-12 teachers presented a wealth of insight into the current status of classroom teaching and technology use that was often unknown to the content faculty in Arts and Sciences and Health and Human Services. P-12 teachers, Arts and Sciences, Health and Human Services and College of Education methods faculty reviewed the content standards for each content area and the *NETS for Teachers* developed by ISTE. The ISTE standards were basically unknown to all participants before the project began and an evaluation of technology skills with respect to the *NETS* provided the participants with a review of their own skills with respect to the *NETS for Teachers.* P-12 teachers who participated in the project modeled the use technology in meaningful and appropriate ways in the teaching of mathematics, science, social studies, and language arts when preservice teachers are present in their classrooms as field students or student teachers.

A final outcome of project participants will be to develop an articulated plan to infuse technology into the teacher preparation programs at Ohio University, including common content courses as well as education courses.

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The Human Cognitive Functions and the Cyberspace: a Brazilian Point of View

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Abstract: This paper focus on questions related to the human cognitive after the appearance of cybernetic technology. Carried out by well-known professors of Education, it intends to consolidate an urgent need to deeply investigate the human cognitive functions that generate the learning in this new economical, political and social scenery around the world. A scenery created by the new relations within the knowledge, not only capable of broadening and changing one's way of thinking, but also capable of leaving one at his/her own luck and out of the process.

Facing the new paradigm of information/knowledge technologies, represented by the cyberspace involving the internet itself, the distance learning, the On-line learning, among others, we are once more going through a moment of big and meaningful changes. Changes that directly interfere/affect our behavior, the way we see the world, our relationships, our learning and therefore, our survival.

My questions as a University Teacher of the teacher training courses at Vale do Rio dos Sinos University (UNISINOS South of Brazil), refer to the reflections we need to do regarding the simple access to the information technology, that in the brazilian reality, does not guarantee a place in this scenery that appears. It is necessary to learn how to read it, to be able to integrate yourself, or re-create it.

Historically we know that certain events, phenomena of social-economical-technological order, promote the knowledge path that the humanity is facing at this moment. The old times metaphysics that was carried to the middle ages, did not correspond to the wishes of the new Man that was appearing, so the rationality did it. If the reason as the space for and to a change is the order, the new possibility of uniting the knowledge, being then ontology and the passive contemplation become excluded elements of the way the Man thinks and acts. Those transitions have always brought elements of exclusion being those generated by option or lack of conditions for the change. With the new technological paradigm that was born, we are again facing the fact that someone will be left out!

With the new technological paradigm that was born, we are again facing the fact that someone will be left out! But the issue is that today, even though we are not able to deal with a certain predictability of the facts, we are more aware of the existence of the changing process that we are going through. We can also conclude that the exclusion generated by the technology management nowadays will cause a deeper and inevitable impact than the changes of the past. Now, we can count on the speed the events happen, an element that before was not relevant in the process. If in the past we had centuries, years to establish a new order as well as time to adapt, nowadays this order changes every minute. " At every minute gone, new people access the internet, new computers are connected, new data is fed into the web. The more the cyberspace expands, the more universal it becomes, and the least united the information world becomes (...). This event is effectively changing our society life condition. However, we are talking about an unknown universal that intends to remain like that, because each new knot in constant expansion in the web can become a producer or a sender of new unpredictable information. And it can also reorganize part of the global conectivity by itself." (Levy, Pierre; 1998, p.1)

During almost all our philosophical studies, we have searched the control of knowledge, the control of wisdom. If before being UNIQUE was a possibility, now with "Descartes" the idea of fragmenting is better for controlling. And now that the control itself, not matter the choice, is not possible anymore because the fact that the knowledge is universal objects directly to the unification? What do we do?

We are facing a new paradox. Everything we have done so far was to better control/dominate, but now, the way of thinking changes.

This made me reflect about how we teachers of Universities facing this situation of many alterations, are developing with our students, cognitive functions such as memory, imagination, perception, comprehension, and logical thinking.

Are we providing knowledge to some, very few, in a politics of cognitive segregation? Or are we really preparing people to continue this process of knowledge management that is appearing?

About the Web – Cyberspace

For this type of analysis we first need to see the world after cyberspace. If the knowledge of frontiers, of cultures and from people finished then the possibility of relations became infinite. Then new information, new styles of thinking and the knowledge of simulations that do not belong neither to the logical deduction nor to the induction from the experience appear. (Levy; 1998).

If the individuality of the people and the knowledge gave shape to an era before, nowadays the collectivity and cooperation come naturally. What's more, the job market itself does not look for professionals who hold information or that simply execute their tasks anymore. The job offers in our days are for people who change information into knowledge; for people who take advantage of different resources and people to generate learning; for people who communicate using all the languages; for people who administrate their space and time themselves, we are talking about the entrepreneur.

But this person is not born ready, not even adapt easily to this new profile because of the individualist structure promoted by our educational system. This change is a social-educational process.

In this Digital Era, the Knowledge can not be mistaken by information. Using the Internet as a place of only bibliographical searches, or using CD roms, electronic books, and visiting sites as mere observers is a way of looking the paradigm today with the eyes of the metaphysics of the past. (Ferreiro, E.: 2001)

The information itself does not have characteristics of days before. A sender can be the addressee, a mediator, the end or the middle of a message, and from this point everything can start again with another order. This is what Roy Ascott defined as a flood, a flood of information. (In: LEVY; 1998)

The WEB gives the information/knowledge a new, atypical, collective, not temporal meaning, different from everything we have known so far. Everything has been changed forever, the language, coding and decoding signals and symbols. For instance, we take the reading in the Occident. Done and interpreted structurally from the left side to the right side, this reading gets a new dimension now, the depth. The Hypertexts do not allow us to only read in the two-dimensional plan. Either we get in the universe of hyperlinks or we will not be able to decode the messages interconnected.

If the hypertext generates a new structure of textual comprehension, how can we develop processes of learning and teaching that can be capable of naturally originate this thinking ? Perhaps a possible answer can be found in the exercises with estereograms[1], I mean, structures of vision in depth from the 90's; perhaps not!... Another aspect born from this new diagram and of vital importance is to establish the collectivity as a tool to interpret new knowledge. The knowledge net, the collective intelligence, the interactivity, represent the arrival of cooperation as well as a way toward the inter-culture or at least, the perception of numerous other cultures, values and thoughts. (Barrueco, A. 1992-1993)

Through this point of view the nowadays teacher can not repeat the models of yesterday. (Peters, O.: 2001). If before the consequences of these acts caused this outdated knowledge to spread, nowadays it causes complete exclusion.

"It is obvious that one of the main intentions of Education is to prepare the individual to acquire the best possible conditions to his/her adult life. And this acquisition happens when this individual is capable of acting freely and with responsibility and when he/she has access to most of the goods and economical and cultural values (...)" (Barrueco,A 1992-1993, p.97)

Thinking and acting under the new paradigm of information/knowledge, is not only thinking about the development of the knowledge, but also about the development of the new Man that is coming. Those traces of a split Man, of disconnected devices, of reason and emotion as different departments of their context, will soon be over.

The human development needs to be seen as an original and inseparable group whose unit is made of contrasts and conflicts, subjected to innovations and expanding. (Wallon, 1979).

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[1] estereograms structures of vision in depth; three-dimensional vision developed in the 90's. (PINKER, S. 1999)

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About the Human Cognition

The first aspect of the need of a thorough investigation about the influence of technology in our lives, mainly in the way we think, can be found in one of the Cognitive Science Definitions by Michel Imbert In Andler (1998; p55). This definition refers to the study of human intelligence from its formal and biological structure to its psychological, anthropological and linguistic expressions. And thus, it can only be understood taking into account an inter-relation between the sciences that study the brain such as, psychology, computer science, anthropology, linguistics and the philosophy among others. With this definition we are once more facing the problem of revealing how our cognitive functions (affect) and are affected by the new representation of information that technology offers. Even the place where the investigation•is held does not belong to one or another area of knowledge, but it belongs to its connections, considering multiple dimensions as the time, history, culture, neural nets, psyche.

It will not be enough for the teachers to know about the cognitive functions development in the past, not even analyze them with the same tools, the same knowledge and hypothesis. The memory, the imagination, the logical thinking, the perception, the comprehension will have to be structured again so that they will be able to interpret and create the new phenomena of the knowledge. It is not a privilege of functionalists and dual philosophies or even of the neurology to know about the mind and the Human Brain. More than never we, teachers, should try to unravel the phenomena of this relationship as a matter of survival (social Darwinism), ours and of our students.

One of the questions I ask myself when I try to work with the cognitive functions of my students during a cybernetic path is: - Do you think that with the Web, the information and the accesses have an intention of self-conducting and with this, conduct their own cognitive functions? I do not believe in this hypotheses very much but this would mean abandon all our History and rely on the lack of knowledge/neutrality. This would re-affirm the social segregation already imposed by the several languages used in the internet. That is why there is an emergent necessity of getting to know our cognitive process better.

The perception is also an element affected by the technological process. The truth is not unique, it is of different kinds. The truth depends on how the person looks at anything. If the mind is the brain or mind is part of the brain.... the crucial point here is that, Putnam (1970) as well as Nagel (1995) (In: Teixeira, 2000) and Chalmers (1996) have as their aim to make the Man worry about getting to know himself to better know.

The Cyberspace take us towards pluralists perceptions of the representation of meanings. The representations allow the meaning, I mean, a perceived relationship network that give meaning to what is lived. The pluralism comes before the sense of the meanings, therefore the comprehension of the plural is not to look for the truth but try to promote the syntheses of the dialectic , the one that results from the theses and anti-theses in a chaos situation; philosophical chaos.

"The social world is every day formed and designed because of a system of meanings, and these meanings exist, once formed, represented by what we call effective imaginary (or the imaginary). (...) However, there is a previous thing in the man, something that is not there to represent another thing, something that is before "operative condition of all previous representations, but that already exists in the representative mode" (Castoriadis, 1982 p.177 and p.172)

If this plurality of meanings is established as the new communication process, once more, we, teachers, are called for this awakening. We have the role of expanding the human capabilities, so that the people can intervene in the formation of their own subjectivities and also being able to act with power. (Giroux and Simon; 1994). The inter-subjectivity and the group of inter-subjectivities will be necessary fundaments for the new knowledge relationships.(Berger & Luckmann, 1985). When we deny the studies of the mind, be it in the Neurology, in the Reductionism or in the Functionalism we are moving a cycle of rationalist blindness. We know the problem, we just do not want to deal with it. At the moment we get over the new destinies of the human congnition facing the new information technologies, we are denying our existence in this planet. If before Man was blind and even though survived, nowadays, at every minute, we are targets of the past, we are just memory of the future. We are excluded by the criation. It is a good idea to get to know our brain. It means to create a new identity, create new relationships, to get free from the positivist, rationalist and individualist traditions. It means to create, maybe, a new theory about the Mind in its several different social-educational contexts and therefore, the beginning of a new History.

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Revisiting Schools: A Curriculum Check-up

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Abstract: The Clinton administration sought to assure that every public school would become connected to the Internet. (Oliva, 2001) This meant that curriculum in the schools would change all over the nation. Students would be able to surf the web, chatter with newfound friends around the world, play video games connected to class assignments and much more. Glenn (1999, p.16) reported that there were several essential aspects of technology that educators should consider incorporating in school, among them: up-to-date technology to build management systems that can track individual student progress, intelligently developed software to provide students with real-world experiences not possible in the traditional school, 21st century technology-based assessment tools, and telecommunication technology that provides access to multiple-tiered digital libraries. Glenn's report signified how important technology needs to be integrated into the public school curriculum. This paper is a pilot study of where some public schools stand in the scheme of technology integration into the curriculum.

Introduction

Olivia (2001 p. 318) said that schools have only scratched the surface of the computer-assisted instruction and the use of the Internet as an instructional tool. The U.S. Census Bureau reported that accessibility to computers in the schools increased between 1984 - 1985. The report showed 63.5 students per computer and between 1996-1997 reported 7.3 students per computer (Market Data Retrieval 1997, p. 171). Another report stated that the percentage of public schools with Internet access jumped from thirty-five percent in 1994 to seventy-eight percent in 1997 (National Center for Educational Statistics 1998, p.40). Does this mean that technology has been integrated into the curriculum?

This pilot study investigated how has technology has been integrated into the curriculum by answering the following questions:

What technology is available for use by students and teachers on the public school campus?
How do teachers perceive technology integration within their curriculum area?
Who is responsible for the technology effort in the school?
What kind of assistance has enabled teachers to meet society's technological need?
In addition to the answers to these questions, the researchers will make recommendations based on the results of the study. This paper gives insight into how this challenge is being met in accomplishing the nation's goal, "going beyond technology literacy".

The Study

The target population of this investigation was 49 graduate students who were teaching in the k-12 grades in the public school. They were enrolled in technology or curriculum courses at a regional university for the fall semester 2001. The data collection for this pilot study was done at the end of the semester. The procedure for collecting the data began with three instructors passing out a survey form for graduate students to fill in after they had completed technology or curriculum courses. The survey was divided into five sections. Some of the variables involved in the study were grade level, subject, and years taught in the public school; availability and use by teachers and assistance from the administration; and the connection between class and computer activities.

Findings

Section A contained demographics of the teachers, which include grade level taught, subject, years teaching and size of school district. The results showed that there were 16 elementary, 10 middle school, and 23 high school teachers. The subjects taught included the following: math, Spanish, Web Mastering, all subjects, science, English, technology, career and computer investigation, computer application, keyboarding, history, reading, business, writing, theater, physical education, biology, physics, journalism, industrial technology, sociology, debate, English as a Second Language and criminal justice. The average number of years taught was 7.57 years. In this number teacher's experience ranged from one to twenty-eight years, and worked in small to large school districts.

Section B focused on the availability of computers used by students. The survey sought answers to questions about the location of the computers, Internet connections and technology usage. The results showed that 43 of the students said that they had computers available to them in the classroom; 47 had availability in computer labs; and 42 had availability in the library. Forty-five had Internet connection in the classroom; 45 responded that they had connections in the computer lab; and 42 had connection in the library. The last question in this category asked how the technology was used. The chart shows how the computers were used.

Computer Usage

How used	Drill & Practice	Problem Solving	Simulation	Tutorial	Games	Assigned Lessons
Number of student surveys (49)	42	36	31	40	32	41

* Because students could mark more than one time in the different categories, the categories equal one hundred percent.

Table n: description

The chart shows that of the 49 teachers, 42 used the computers for drill and practice; and 41 responded that they used technology for specific assigned lessons. In all of the areas teachers are using the computers to help students practice, enhance their thinking skills or create assignments.

In Section C, the question of how is the use of technology integrated into the curriculum the following responses were recorded:

"In algebra, we use the classworks gold for extensions, drill and practice and remediation, and we also use algeblaster, and the Internet for projects. As a teacher I use the projector to present lessons. We also use the graphing calculator on a regular basis."

"I use different power point presentation with my Spanish lessons. I also send out lesson plans and activities via e-mail for the teachers."

"I use Internet lessons for each Science chapter. Usually these involve research, then tutorials and games are available for leftover time (or at home)"

" I use many math games sites to remediate low students. I use Internet sites to expand on the information in science, social studies... Occasional I use it for collaborative projects. I also use many Internet sites for lesson plans, activities, and teaching ideas."

"Students in my classroom practice phonics skills on the Buggles each week. They do very limited research because of the reading level. They check the weather daily for our math meeting. Sites are book marked that pertain to our topic, periodically; and we allow the students to explore that particular site, such as "The American Flag" and a "Betsy Ross" site. Students also use the computers for Accelerated Reader Tests and to practice their keyboard skills. I find it hard to integrate technology on the second grade level from the web."

To the second question in Section C, who is responsible for the technology being integrated into the curriculum, the following responses were listed: of the graduate students most felt that the teacher was responsible for designing lessons that integrated technology; implementation must be done by the teacher; modeling effective use of technology is and should be done by the teacher and technology coordinator; training, support and computer maintenance should come from the administration and it does.

Section D of the survey focused on assistance through Technology Application TEKS standards, district professional development activities, regional service center activities, online resources and other professional development activities. It was recorded that 38 of the respondents felt they received help from the Technology Application TEKS standards; 42 received help through the district; and 33 received help from regional service centers. Thirty-nine received online assistance, and 13 received helped from other sources.

Section E focused on the number of computers in the classroom and lab, how they are used, where students do their assignments (lab, classroom, library, or home), how often and how long. The final questions focused on the connection between classroom and lab activities, and campus and district administration contributions to technology integration. Respondents said that they had computers in the classroom. The average computers in the classroom was 6.98; and they did the following activities: projects supported by the internet, word processor, classworks gold, algeblaster, web information, interactive web sites, web creation, teacher administrative duties (grades, attendance, memos, announcements, email etc.), tutorial or drill practice skills, newspaper productions, power point presentations, art books, classroom instruction, content integration, lectures and notes for absent students, incomplete work in the lab, and as a reward for students. Of the 49 graduate students, 32 take them to a computer lab. The least amount of days students spent in the lab ranged from once a month to a daily occurrence. The amount of time they worked in the computer lab ranged from 30 to 90 minutes. Activities done in the lab were: accelerated reading test, state practice test, internet activities, accelerated math test, projects word processing, power point projects, research, webquest, quizzes, guided search activities, virtual field trips, math, keyboard drills, grammar tutorials, KidPix, dictionaries, informational CD Roms, power point presentations, class assignments, fitness spread sheets and interactive lessons. It appears that most students work on assignments in class or in the lab. Fewer numbers work on them in the library or at home. If they do not have access to the classroom or lab they probably completed assignments in the library or home. Then the connection between lab and class work is closely related. The lab supplements or extends, reinforces, or follows up on classroom activities. The administration's contribution to technology was to provide hardware and professional development, maintain equipment, reward incentives for participating in technology training, and continue to apply and receive grant money for laptops in an attempt to stay abreast.

Conclusions

The survey showed that technology was available to teachers in three different locations: classrooms, computer labs or libraries. More technology usage could come through more computers being placed in the classroom. A computer (laptop for each child) would greatly enhance instruction. Teachers do perceive that they are integrating more technology into their curriculum, and they feel that they are responsible for meeting state technology standards. Assistance to teachers comes from district and campus technology coordinators, administrators and regional service centers in the form of professional development.

The public school is trying to meet the challenge. Universities, businesses and communities need to provide support by partnering, and obtaining grants, so that more computers can be placed in the classroom for student usage. Public school district need to provide professional development activities on a continuous basis to make sure that teachers stay " up-to-date " with the world.

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Becoming Proficient in Using Technology in Teaching: Stages of Acquisition from Novice to Expert User

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Abstract: This presentation examines models that have been devised to explain how teachers acquire and become proficient in teaching with technology. One characteristic common to all models is that teachers progress in *stages* from novice to expert users. Hypothesizing the existence of stages predisposes one to: a) describe the characteristics of each stage, b) develop methods to accurately pinpoint one's stage of development, c) study progression from one stage to another, d) determine if progress may be accelerated through direct intervention and, e) apply the theory and research findings that result from one's hypothesis and investigations in designing effective learning experiences for beginning and experienced teachers. The validity and utility of stage theory models of technology acquisition and use are examined and implications for both research and practice are discussed.

Society places a premium on preparing a new generation of students who will "... become literate, self-directed learners, problem-solvers, and productive members of a technology-oriented society" (Utah State Office of Education, n.d., para 2). Teachers who can integrate technology into the teaching/learning process are viewed as being essential to achieve this goal. The general lack of technology expertise by teachers has been the subject of numerous national reports (Market Data Retrieval, 2000; National Center for Education Statistics (NCES), 2000) and repeated calls to strengthen the preparation of teachers in this area.

Indications are that computer use is increasing among American teachers. Between 1998 and 2000 the percentage of schools reporting that the majority of their teachers used computers for planning and/or instruction increased from 47% to 76%. Similarly, the percentage of schools reporting that the majority of their teachers used the Internet for instruction increased from 39% to 77% (unpublished Market Data Retrieval data as cited in Myers, 2001). While teachers' use of technology in schools is rising (Myers, 2001) and their skill levels are improving "...only 8% of public schools in 2000 report that the majority (50% or more) of their teachers have advanced technology expertise. This fact confirms that teachers need additional training to get their skills to a more acceptable level, especially in the area of technology integration into the curriculum" (Piazza, 2001, para 3). Teachers themselves recognize the need for more technology-related professional development. In a recent national study, 82% of teachers cited the lack of time allocated for training, practicing and planning as a major barrier to using technology in teaching (NCES, 2000). In our zeal to accelerate teachers' proficiency in using technology, renewed emphasis is being placed on studying the development of technology acquisition and use among teachers.

Several models have been devised to explain how teachers develop expertise in integrating technology into teaching (Hopper and Rieber 1995; Mandinach and Cline, 1992; Rieber and Welliver 1989; Rogers, 1999; and Sandhotz, Ringstaff and Dwyer, 1997). "Many of these were based on teacher concerns about innovations involving the use of computers in the classroom, often referred to as concerns-based models" (Newhouse, 2001). According to Byrom (1998), Everett Rogers' more general *Diffusion of Innovations* (1983) model may also help to explain the development of teacher expertise in using technology.

While the various models differ in some respects, one characteristic common to all is that teachers progress in *stages* from novice to expert users. The notion of stages is perhaps the most compelling feature of the models because merely positing their existence prompts one to ask a series of questions, including: What are the promises and pitfalls associated with proposing a continuum of stages from novice to expert user of technology? What teaching behaviors are thought to be indicative of each stage of development? Are valid and reliable assessment devices available to assess teachers' stages of development? What strategies have been employed to help teachers progress along the path from beginning to experienced users of technology? How successful have these efforts been? What are the implications, for both research and practice, in adopting the view that teachers progress in stages from novice to expert users of technology?

The presentation provides a framework for examining the development of teacher expertise in incorporating technology into teaching. The intent is to critically examine esearch in this area and stimulate discussion regarding the validity, utility, and practical implications of these models for future research and for developing effective pre-service and in-service experiences for teachers. An attempt is also made to relate research on the development and use of technology by teachers to the broader literature on the diffusion of innovations.

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Online Challenge: Teaching Teachers to Share the New Hi-Tech Wealth in the Classroom

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Abstract:
The multimedia collaborative project with schools (MMP) was designed to increase teacher skills in K-12 education. The project goal was to provide Morehead State University teacher education candidates with more realistic field experience in using technology to enhance learning among K-12 students. Students visited assigned schools and the assigned teacher at least six times during the semester. During the six visits, they planned a unit plan with the assigned teacher and taught, or assisted in teaching, the unit plan and evaluated student learning from the unit plan. Teachers were assigned based on student certification area. Although a secondary education class, students may have been assigned to an elementary teacher if their certification included those grade levels. This paper reflects some requirements of students for the MMP and self-reported data on use of technology in the classroom.

Introduction to the MMP

The Multimedia Project is an active learning service project in the public schools. Pre-service teachers participate in three hours of observation, then twelve or more hours participation with a specified classroom teacher. The students and teachers in this study were chosen on a volunteer basis. Teachers in the public schools were not compensated beyond the usual "student observation rate." Students received no compensation, but they gained invaluable experience working with technology in the public schools. The following were requirements for each visit. This ensured successful planning, delivery, and evaluation of a unit plan.

First Visit: Observe the teacher and record the answers to the questions from syllabus under the "multimedia project" section.

Second Visit: Participate in teacher-directed activities this visit. Teacher-directed activities are those designed by the teacher with students following direction in some way. Work with students in a one-to-one situation so that you can get to know them better. Grade papers from assignments that the teacher has made! Begin discussion with the teacher about the lesson you all would like to teach with technology.

Each visit from this point forward requires an email to Dr. Lennex. You must include information from your teacher, such as comments, or suggestions, to demonstrate the collaborative nature of the project. You should write the information requested in Word and either attach it or copy and paste it to Dr. Lennex. I prefer copy and paste. Can't be too careful with viruses! ☺ In the subject line of the email, title this "Visit Two." If you are working with a partner from EDSE 312, please send only one email with your partner CC'd (copied). I expect you to take turns sending the emails.

In your email, due by the following Sunday, midnight, detail the following information: 1) behavior of the students in the classroom- note any having IEP's and what must be done for reasonable accommodation in using technology, 2) possible considerations for using technology in this classroom such as software that is approved or existence of technology that is used by students, 3) the topic for your collaborative unit plan that will be taught using technology in this classroom.

Visit Three: Review software in the classroom applicable for the unit being taught. You may need to check out the software or equipment and bring it into the classroom. Please make sure to test this in the classroom on each computer being used. Note any bugs or malfunctions with the technology.

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In your email, titled "Visit Three," due by the following Sunday, midnight, detail the following information: 1) specific goals for your unit plan to be taught in this classroom, 2) specific objectives for your unit plan, 3) length of the unit plan in days, 4) Location of technology – software or hardware - to be used in the lessons.

Visit Four: Obtain from your teacher a scoring guide (or several if the differ among units) that could be used as a sample for your unit plan. Grade student open response papers along with your teacher or as directed from your teacher. Be sure to use a scoring guide! Compare your scores with the teacher based on their scoring guide standards. How did you differ? Think about "what would Piaget do?"

In your email, titled "Visit Four," due by the following Sunday, midnight, detail the following information: 1) Specific procedures for each day of the unit plan to be taught in the classroom, 2) a SIMPLE scoring guide that may be used to evaluate a student's learning with the technology used in the lesson, 3) evidence that you have reserved the technology to be used in the classroom and a back-up plan in case the technology should become unavailable or fail.

Visit Five: Test your teaching "withitness" by teaching a small lesson with students. This can be a group activity or a whole group lesson. It may designed by the teacher.
In your email, titled "Visit Five," due by the following Sunday, midnight, detail the following information: 1) complete unit plan outline with all components required for each day's lesson plan. This may be a draft version.

Visit Six: Finish teaching and evaluate the final lesson in your unit plan for the multimedia collaborative project.

Comments on the MMP

Commentary on the project was very positive from both teachers and MSU students. Students had been somewhat apprehensive in using expensive equipment with public school students. Several stated that they did not feel comfortable allowing young children to use videocameras or laptop computers. In most cases, once the teaching unit was settled upon, students were using computers and equipment in the classroom. One of the best examples of use of technology occurred in a 4th grade classroom, an art student, who professed technology insecurity, used a videocamera and iBook for editing of a student made movie. The student was very surprised that public school children were so careful of the equipment and that they had made such a fantastic product. The entire unit plan taught creation of drawings for cartoons using Microsoft Word. The 4th grade students then made a movie of themselves practicing for a play. They edited the video in order to see how movies capture still frames to produce motion, just like a cartoon! The MSU art student in her comments on the project was not only pleased with student learning but also very happy with the professionalism and trust given to her by MSU for using the equipment.

Prior to the project, MSU students were asked to respond to this question: I can appropriately use technology to enhance student learning in the classroom. They (N=35) reported as 4 novice, 24 apprentice, 4 proficient, and 2 distinguished. The post-survey (N=28) indicated 11 proficient and 16 distinguished. When asked in the pre-survey if they could use a Windows operating system, 13 reported as proficient; the post-survey showed 22 as proficient. Most interesting is the increase in students claiming knowledge of Macintosh operating systems. Eastern Kentucky is almost entirely a PC supported school area and the MSU campus relies nearly totally on PC's. The pre-survey indicated 5 novice, 16 apprentice, 8 proficient, and 4 distinguished. The post-survey reported 2 as novice, 8 apprentice, 10 proficient, and 6 distinguished. Yes, I am a Mac fan and require their use in my classes. It is safe to say that students displayed a gain in perceived proficiency with technology.

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Using Technology to Improve Instructional Planning

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Abstact. Lesson planning is considered a critical but complex task to attain effective instruction. The traditional paper-based approach was found to be cumbersome and consequently detrimental in the willingness and effectiveness of teachers' lesson planning. A Web-based lesson planning system combining instructional planning and calendaring functions to support Missouri's education reforms was in the process of development and testing. Early usability tests proved the system to be positive in helping Missouri teachers plan their instruction. Some design issues were identified.

Introduction

The success of Missouri's education reforms, to improve student performance as measured by the Missouri Assessment Program (MAP), will require new and different teaching and learning strategies that align curriculum and state standards using inquiry-based instructional strategies and infusing instructional technologies. Successful teaching and learning does not occur by chance. It relies on careful planning of instruction. Since lesson planning is considered to be critical to the success or failure of teaching and student learning, it is vital that teachers are competent in planning daily lessons that support Missouri's education reforms.

Lesson planning is an essential but complex task (Borko & Livingston, 1989; Doyle & Holm, 1998; Johnson, 2000; Ornstein, 1997). Various theoretical models were developed to help teachers plan lessons (Eisner, 1967; MacDonald, 1965; Tyler, 1950; Yinger, 1980). While numerous studies exist to discuss lesson planning and its effects, the research on the effect of technology-based lesson planning systems is conspicuously lacking.

The use of technology to support lesson planning is not new. Several systems such as Computer-Prompted Instructional Planning System and Lesson Plan Maker appeared shortly after personal computers gained acceptance in early 1980s. Several studies have showed the positive effect of using personal computers to support lesson planning. Today, the advancement and prevalence of technology in schools makes it a very viable option for teachers to utilize in planning, sharing, and communicating instructional information. In particular, the Web allows teachers to create and access instructional plans without time and space boundaries. However, a search revealed that a Web-based lesson planning system combining instructional planning and calendaring functions to support Missouri's education reforms does not exist.

Issues

While Missouri has undertaken a State initiative to support Missouri teachers as they integrate multimedia technology into inquiry-based, student-centered instructional practices (http://emints.more.net), most teachers are still using pencil and paper to do lesson planning. Major drawbacks of this paper-based lesson planning include:

- The process is very labor-intensive and cognitively arduous. The task becomes perfunctory to many teachers. They feel obligated to write out lesson plans only because it is required by the administration.
- There are no systematic prompts or built-in links to information that can guide the teachers' lesson planning to focus on Missouri's education reforms.
- Lesson plans are not accessible to colleagues or school administrators unless special requests are made. Consequently, sharing instructional information among teachers is difficult.
- Parents have no access to lesson plans and, as a result, must rely on other methods to know what their children are learning on a daily basis.
- It is difficult to modify the contents of lesson plans once they are written on paper.
- Paper is not very durable and thus, valuable instructional information can be easily damaged.

Implementation and Preliminary Results

To help resolve these issues in lesson planning, a Web-based lesson planning system is under development with "teacher friendly" tools. The objectives of the system are threefold. First, it streamlines the lesson planning process to align with curriculum and Missouri standards and provides guidance with checklist functions to help teachers focus on addressing Missouri's education reforms. Second, it preserves valuable lesson plans developed by teachers for dissemination and facilitates the sharing of lesson planning knowledge and skills among teachers. Third, it promotes better lesson planning results through sharing and collaboration and enhances communication between parents and schools, thus increasing parental involvement in their children's education.

This Web-based lesson planning system is a work in progress; consequently, only formative evaluation is available. To date, a preliminary working system developed in Lotus Domino has gone through several rounds of prototyping and usability testing to collect user feedback. Early indicators suggest the system will be particularly helpful in the areas of:

- searching and adapting existing lesson plans for other uses,
- communicating instructional plans with other teachers and students, and
- developing lesson plans to meet Missouri academic standards.
- User feedback also reveals several issues that need to be resolved before the objectives of the system can be fully realized. Among them, the following two are most critical:
- The system has to be flexible to accommodate different instructional needs and processes of schools and teachers.
- Other non-technical arrangements such as training and support have to be in place to motivate teachers to use the system and to share their instructional plans.

Conclusion and future research

Preparing teachers for technology integration in their instruction and enhancing teachers' instructional quality are two important endeavors to advance K-12 education reforms. This initial phase of this project is to develop, implement, and pilot test the lesson planning functions. Later phases will include additional functions to support communication with parents via the Web and to scale-up the lesson planning model for statewide access and use, and to disseminate to a national audience. From a research perspective, this project will lead to a better understanding of:

1. How teachers plan instruction using technology?
2. How teachers share instructional information through technology, how technology can assist with instructional planning?
3. How the Web can serve as a communication means between parents and schools?

The on-going process of building the lesson planning system and preserving instructional plans in a sharable library enables teachers to better plan their instruction and share their instructional materials. As the system matures and the content grows, it will have the potential of improving instructional planning process and products of Missouri teachers and thereby advancing the entire K-12 education enterprise at Missouri.

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Enthusing Teachers About Infusing Technology: Increasing Teachers' Use of Technology in the Classroom

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Abstract

For the past decade, our schools have rushed to put computers in the classroom, in preparation for the 21st Century. Millions have been spent as the ratio of students to computers decreased from 125:1 to less than 6:1 in the state of Tennessee alone (Education Week, 1999). Internet connections increased, as school after school gained access to the Information Superhighway. No one offered a dissenting opinion when broad educational statements were made about the new Information Age replacing the Industrial Age, or about the need for technology in the classroom. And now that those computers are in the classroom, how are they being used?

Those struggling the most with this new technology seem to be today's inservice teachers – all 2.8 million educators in kindergarten through 12th grade – who lack the skills, background, and opportunity to use technology as they should. A call was issued by the Office of Technology Assessment report (1995) for the technology training of teachers to become a national priority. For preservice teachers, technology training did become a priority of sorts: most all teacher education programs now require at least one course in technology in their degree program, some require two.

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However, is it possible that only one or two 16-week undergraduate classes, primarily stressing computer competencies, are sufficient to ensure that once the students graduate from the university and find themselves in a classroom they will know how to integrate technology into the curriculum?

Of all the possible barriers to technology use, one that we certainly should address is the lack of adequate training to use technology effectively. Though most inservice teachers see the value of technology, and though most claim at least a novice-level of computer literacy, few are truly prepared to use technology resources in a classroom. Most of the instruction preservice teachers receive is *about* technology, rather than providing experiences in using and integrating technology into the curriculum. Therefore, when they transition from preservice to inservice teachers, in charge of their own classroom, they feel ill-prepared to make use of a technologically-enriched classroom.

Studies have shown that stand-alone technology courses, such as those taught in most teacher education programs, only develop basic computer literacy skills and do not prepare educators to use instructional technology in the classroom. A survey was completed by 168 teachers within a county school system to assess classroom uses of technology, dividing uses into classroom management (using such skills as taught in literacy courses) and instructional technology (infusion of the technology into the curriculum). Results supported the hypothesis, showing that most teachers were using classroom computers only for management tasks. Strategies for increasing the instructional use of computers in the classroom are discussed.

National SMETE Digital Library for Teachers: Process, Promise, Progress

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Abstract: The emerging National Science Math Engineering and Technology (SMET) Education Digital Library, which is being constructed by a variety of educational institutions, is an "online network of learning environments and resources for SMET education at all levels" (NSF, 2000). It is envisioned as a premier portal to a rich array of current and future high-quality educational content and services, and a forum where resource users may become resource providers. Technical, social, and economic issues involved in developing the library are reviewed, with emphasis on implications for teacher education and instructional support.

Introduction

The National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL) is an educational vision and goal with initial funding from the National Science Foundation (NSF)—a vision that is different from any existing library today. Formal and informal partnerships and projects among universities, K-12 entities, professional associations, government agencies, non-profit organizations, and corporations are part of the Library's realization. When the NSDL opens its virtual doors in Fall 2002, it will be the culmination of over a decade of research and collaboration among librarians, technologists, and educators in the public and private sectors (Wattenberg, 1998).

The NSDL will serve not only as a "gateway to a rich array of current and future high-quality educational content and services," (NSF, 2000), but also it will encourage users to engage with and to create resources. Recommendations for a national digital library for science, mathematics, engineering, and technology education (SMETE) have focused on the need to define and interconnect user communities, establish subject-specific and interdisciplinary collections and services, and develop tools that focus on learning and teaching needs. This paper is a review of the vision, history, current progress on organization and technical infrastructure, and the potential for new avenues in teacher support and education.

The Internet Paradox: Is More Less?

With the rapid growth of the Internet, education has augmented access to information and resources and increased opportunities for collaboration and community building. Yet, these benefits have also proven to be problematic. The Internet can be a powerful resource to improve teaching and learning because of the wealth of freely available information resources and tools, but it too often overloads the user. The high-quality content educators seek can be difficult and time consuming to locate despite the increase in sites that attempt to provide searchable, usable materials for teachers and students. Further, challenges related to intellectual property have hindered creators from contributing quality materials and establishing economic models for the sustainability of content and services.

Clearly, current models for searching and archiving materials are inadequate to meet educator expectations and requirements. As a result, digital library development must go beyond simply producing another site with selected links on specific topics. Critical barriers for digital libraries today are as much human issues as technological ones. Even when good collections are developed, getting them known and used remains problematic in this age of Internet information overload (Zia, 2001). Further, when confronted by the overwhelming amount of content, learners may not have the experience or basic knowledge to evaluate and use the resources.

While the Internet contains an incredible diversity of resources, it also offers the potential to combine authoritative collection development with highly sophisticated tools that can enhance research efficiency and provide scaffolded support for learners. An interactive and personalized research environment can unleash the power of digital information and improve information analysis, synthesis, and application (Scribner, 2000). The NSDL has the potential to encourage and support inquiry-driven, collaborative learning while incorporating distributed architecture to provide stability, reliability, and smooth interoperability. At last, the NSDL has the possibility of allowing pre-service and in-service teachers to bring innovative tools and practices into their classroom in a supported and effective manner.

While concerns about organization, access, economics, and educational applications are well documented, the technological barriers to achieving a new Internet paradigm are less clear-cut. In the case of the emerging NSDL, questions have been raised about the extent to which existing protocols and applications could be recombined to achieve technical objectives and the identification of gaps that will require new development. To some degree, the Library's debut is premised on the concept that given the right funding and organizational structure, technical solutions are either in existence but not yet well placed for optimal use and interoperability or can be developed within known frameworks in a relatively short timeframe.

A Virtual Library Vision

While numerous projects have explored the digital library paradigm, no project has yet met the potential imagined for such an enterprise. A prime consideration in building digital libraries is meeting users' unique needs. Therefore, the NSDL will have to provide value-added services that enhance the user experience; users must have a compelling reason to visit the Library rather than to use public search engines.

A 1997 National Research Council digital libraries workshop (NRC, 1998) raised important issues for in-service and pre-service teachers: faculty want to change their methods of teaching but have no single point of contact to search for useful ideas and journals often do not discuss what techniques failed in the classroom. Reform efforts need an easily accessible and searchable source of programs and resources that have been used successfully and have been evaluated for effectiveness.

The Library will have many resources and services beyond traditional books and journals, including non-textual sources, lesson plans, curriculum guidelines, and tutorials. "Beyond providing traditional library functions such as the intelligent retrieval of relevant information, indexing and online annotation of resources, and archiving of materials, the digital library will also enable users to access virtual collaborative work areas, hands-on laboratory experiences, tools for analysis and visualization, remote instruments, large databases of real-time or archived data, simulated or virtual environments, and other new capabilities as they emerge" (NSF, 2000).

The NSDL intends to support pre-service and practicing teachers through its commitment to assuring resource quality, supporting contextual learning, fostering critical literacy skills, acknowledging access inequities, and advancing scientific understanding. The Library will not enforce clear bounds between users and contributors and will encourage active sharing and community building among participants. Educators will have the ability to access a broad range of learning objects and to utilize tools that allow those objects to be repurposed for classroom application. Of course, issues of sustainability and intellectual property will need to be addressed. As a result, all stakeholders are expected to be active participants in the Library's development and future success.

While NSDL's focus is on SMET education content, services, infrastructure, and community, the tools and techniques that are developed and tested in this program will apply to other virtual library development. The NSF effort is seen as a prototype that can lead to further deployment in fields such as medicine, humanities, and social sciences. In addition, NSF is developing international linkages that have the potential to create global resources for SMET education.

Progress and Achievements

The NSDL efforts began in 2000 with projects focused on development and deployment rather than basic research. Projects are grouped into four tracks: Core Integration, Collections, Services, and Targeted Research. Universities and professional societies lead most efforts with nascent private sector and publisher involvement. All projects represent more than one institution and many have K-12 linkages. Project abstracts and links to project sites can be found at http://www.nsdl.nsf.gov/.

Core Integration projects are designed to provide management and coordination, technical infrastructure, standards and requirements for participation, and outreach to providers and users. Collections projects are those which focus on content, generally within a specific discipline or coherent theme. These projects are also focused on content use issues like discovery and access modes, classification and cataloging, acquisitions, and referencing. Collections may include non-textual resources, such as data sets, analysis software, visualization tools, or reviewed commentary. Initial Service projects are focused areas that content providers will need to integrate their materials rather than direct user support or evaluation. Services include learning systems that tap digital content, metadata translation, quality and peer review, content identification systems, and mechanisms for categorizing and searching non-textual resources.

Key organizational concepts that guide NSDL progress are its distributed nature, the need for active governance that involves all stakeholders beyond grantees, a variable collections structure that includes those following prescribed requirements, harvested through targeted selection, and gathered with smart agents. The NSDL also prioritizes the development of a technical in frastructure that will support multiple portals for entry, and the use of multiple metadata standards to meet the diverse needs of the different disciplines and users.

Future Challenges and Considerations

How will the NSDL differentiate itself from other Internet services or resources? What participation incentives will be sufficient to bring all stakeholders to the table through grant programs? The NSDL will need to consider a distinctive program for intellectual property rights, support and training for users and contributors, a way for organizations to maintain individual identity while benefiting from collective branding, professional recognition for individual participation, and evolution of NSF programs and policies that will bring together this large community and rich potential.

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How to Successfully Implement Change — Build It and They Will Come

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Rogers (1995) and Light (1998) have described the diffusion of innovation according to series of transformational stages. After early adopters successfully integrate new technology in their teaching and research activities (largely on their own), the institution is often faced with pressure to bring the masses of faculty and staff to the innovative approaches adopted by the risk-takers. The diffusion of technology innovation at the University of Missouri-St. Louis (UMSL) has occurred in a textbook like fashion, with a few exceptions. These exceptions, successes, and proposed recommendations learned from this process will be discussed in this paper.

The University of Missouri-St. Louis is a typical urban campus serving more commuter than residential students, utilizing a high percentage of adjunct faculty, and a history of telecommunicating both programs and distinct courses to remote sites. Lessons learned from these experiences prepared campus technology administrators to identify potential barriers to moving courses online. Beginning in the mid 1990's campus innovators had integrated online content into their courses utilizing a variety of means to accomplish their goals. These innovators increasingly wanted to do more, and campus technology administrators were faced with providing more and more support to a myriad of hardware and software needs as resources and technology personnel were diminishing. Standardizing campus technology hardware and software was the first step, while identifying and adopting one Web Course Management System to be used campus-wide was the next. Change agents, in both the administration and faculty, recognized the need to identify potential sources of power (innovators and visionaries), and to use these relationships to move the campus forward. These change agents recognized that by sharing their visions, power, and influence the campus, and its students, would all benefit.

Cummins and Worley (2001) delineate the critical change stages as motivating change, creating a vision, developing political support, managing the transition and sustaining momentum. UMSL began motivating institutional change in the mid-1990's by instituting a plan to provide desktop systems for faculty and staff, and systematically replacing them every four years (replacement has since accelerated to every three years). Faculty and staff choose from one of the standard (PC or Mac) systems, with the option of the unit paying for additional features beyond the standard system. Two years later, Information Technology Services (ITS) identified standard platforms and software the campus would support. In 2000, one Web Course Management System was adopted campus-wide to further standardize the technology on campus. This enabled the campus to concentrate its resources and develop expertise in specific technologies, and this has led to further standardization of needs and support. These processes helped shape an institutional culture oriented towards change. Resistance was managed by providing faculty and staff with new hardware and resident software support specialists. By committing resources to the vision and putting structures in place to support the transition, this process additionally reflects Cummins and Worley's fourth stage, managing transition. Cummins and Worley's second stage, creating a vision, emerged as key innovators and stakeholders worked to communicate their ideas to the campus community. However, this vision was not adequately articulated campus-wide due to a lack of consistent and clearly defined technology terminology. These barriers in communication led to confusion as to where the campus was headed, and how proposed changes fit into the mission of a land-grant institution. As with any higher education institution, resistance is often articulated in comparing new practices to "traditional practices." Key innovators and stakeholders are now in the process of influencing other stakeholders on campus via a well-planned and orchestrated process of providing instruction, in-mass or on demand, and involving all who wish to participate in monthly "conversations" on how to utilize available technology to improve and/or enhance instruction and to further engage the student in learning.

What we did right was to first standardized hardware and software to maximize limited residential technology support. Second, we adopted one Web Course Management System and put faculty support services in place. Those support services have expanded as additional faculty and students adopted the change to web-assisted course development. Additional right moves include:

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- Unilateral creation of all courses in the web course management system, and populating these courses with students and faculty;
- Ongoing orientation, problem solving and support for faculty;
- An organized effort aimed at providing new and adjunct faculty with access to online technology;
- Help documents and orientation for students (web-based and on site); and
- Focus on teaching implications and enhancements while integrating technology.

The University of Missouri-St. Louis has followed a classic change process, and is creating desired change by following the advice of those change agents and researchers who have successfully led change. The adoption of the online technology has been dramatic and beyond expectations. The experiences on this campus can be used to facilitate change and encourage innovation on other campuses.

Digital Reality or Digital Insanity? The Lived Experience of Teachers in a Digital School District

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Interest in educational reform has reached new heights in recent years. Grappling with the problem of achieving large-scale reform educational reform has become the new challenge. There are many new examples of initiatives and corresponding lessons of change to be mined (Fullan, 1991). But much of the research on educational reform has neglected the human side of change. Little research has been done into educational change from the perspective of teachers who are simultaneously the subjects and objects of change (Nolan & Meister, 2000; Fullan, 1991).

People react to new experiences by attaching their own construction of reality to them regardless of the meaning assigned to them. Thus, the implementation of educational changes is never fully envisioned until the people in the particular situations attempt spell them out in use (Fullan, 1991). The purpose of this research is to provide in-depth stories on the lived experiences of public-school teachers who are engaged in a school restructuring effort intended to transform Spring Cove School District into the Digital School District. This rural school district in central Pennsylvania was recently awarded $4 million from the state in an attempt to become an integrated district that combines the Internet with the best emerging educational technologies.

The research will be yearlong study during which the researcher will spend considerable amounts of time living with six teachers. The goal will be to capture and portray as vividly as possible the teachers' experiences during the restructuring implementation and their attempts to make sense of their experience. In doing so, the researcher hopes to flesh out and give life to many concepts that are used to analyze and explain school change. The researcher also intends to highlight the critical role teacher's play in the change process.

In response to calls for research that will enable educators to achieve a deeper understanding of the meaning of educational change for teachers (Nolan & Meister, 2000), this study will be designed to describe and interpret how public school teachers define and make meaning of becoming 'Digital'. By focusing on the questions, what did these teachers experience? And, how did these teachers understand these experiences? This study is rooted in phenomenological inquiry, a form of interpretive inquiry that focuses on human perceptions.

Research in the phenomenological mode attempts to understand the meaning of events and interactions of ordinary people in particular situations (Bogdin & Bilken 1992). An effective way to study program implementation and educational change is to get detailed, descriptive information about what is happening (Patton, 1990). Since educational change and program implementation is characterized by a process of adaptation to local conditions, needs, and interests, the methods used will be open ended, discovery orientated, and capable of describing development processes and program changes. As linked to Patton's beliefs, this qualitative research case study is designed to describe the meaning the teachers attached to the change process of becoming a Digital School District.

The researchers interests, values, and experience with the research problem are a source of motivation for the study. Supervising preservice teachers in the school district for over two years, the researcher has experienced the change personally and witnessed the ways in which it was affecting teachers. Thus, the researcher has a vested interest in the outcomes, not that a certain outcome is expected, but that the interest generated from the researchers personal experience will keep them focused on the details of the inquiry.

The best way for us to know what others are experiencing is to find methods of data collection that allow was to devise procedures and strategies to consider experiences from the participants perspectives. Therefore the researcher will utilize fieldwork as the primary research instrument. In-depth interviewing, participation, and observation in the setting, document review and field notes, which are the fundamental methods that qualitative researchers rely on for gathering information will be used in this study (Marshall and Rossman, 1995).

The data will be analyzed through a process of systematically searching and arranging interview transcripts, field notes, documents and other materials to increase one's understanding of those data and present the discoveries to others (Bogdan & Biklen, 1992). The researcher will use a modified version of Straus and Corbin's (1990) coding procedures.

Through the eyes and the experience of teachers, the researcher intends to create and recreate a picture of how teachers make sense of and understand Spring Cove's school restructuring efforts to become a Digital School District. The overarching goal is to open a window in the realities of this major educational reform at the classroom level.

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Cyber-cerebration: Edge Happenings at Western Illinois University

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Less than six months ago, 25 colleagues gathered for a celebration. We were recruited for the Innovators in Teaching and Learning cadre, lured by the dangle of a wireless laptop and the desire to become edge users of technology. Today we again celebrate the modest, but steady diffusion that our team members have made. We've come to think with you about the strengths of our cross-disciplinary team, the formation of a community of learners, and the application of our new skills in our teaching.

Technology has had an impact on our lesson content, the thinking processes we employ with our students, and the products our students produce. The diversity of the cadre was one of its strengths. There were experienced distance teachers, newbies and converts in the group. We were united around the Blackboard course that gave structure to our development plan. Participation in the course gave us much need support in the earliest stages of our endeavor. Relevant readings were the focus of our discussion and served to re-focus our commitment to the project. After a particularly globe trotting summer, we are back in harness digesting Kurzweil's book, The Age of the Spiritual Machine (Kurzweil 1999). The futuristic scenarios spun out by this author lend further motivation to our work together.

Panel members will briefly share their story. You'll hear about electronic portfolios and website development, concept mapping in teacher education, on-line teaching and learning, and integrating technology and content standards with student products that include hotlists, treasure hunts, webquests, and desktop publishing. We'll document our learning and challenge participants to join the fun as part of their professional development.

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The Use of Laptops within the Gulf and Islamic Culture

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This paper describes the experiences of both students and faculty in a university for women in the Middle East which requires all students to purchase a laptop computer. It examines the benefits and drawbacks of laptop use within the Gulf and Islamic culture. The positive reaction of female students toward the use of laptops is compared with less successful uptake by female students in the West.

Consideration is given to how laptop use has impacted university planning. To what extent has the provision of laptops to students precluded other means of instruction? How can laptop use be regulated and standardized given the intrinsic freedom that laptops make possible? To what extent do societal pressures reduce the possibility for these young women to benefit from their laptops when away from the University Network and Intranet?

The impact of unexpected technical problems and the need for institutions to develop and implement integrated plans for change are discussed, as is the effect on faculty, who have to cope not only with a new workload created by the introduction of laptops but also with an unexpected new learning paradigm.

Communication in the Virtual Teaching and Learning Space

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Abstract
This research project addresses broadly the issue of whether the new media, being potentially interactive (and thus bridging teachers, students and other educational agents) may open new ways of teaching and learning, which are more adequate to contemporary life and the global society.

"Technology is the campfire around which nowadays we tell our stories."

Laurie Anderson, American artist and multimedia pioneer, chose the image of the campfire to drive our attention to the central role of technology in our society, shaping out collective views of the world and mediating human relations.
The university, as a social and cultural institution, could not be untouched by this phenomenon. In fact, there are many similarities between the mass media and the traditional teaching model. Both are marked by the separation between the main agents (producers/audience, teacher/student) of the communicative process.
New media, being potentially interactive, may help educators in their efforts to close the gap related above, creating new learning environments which are more "in sync" with post-modern society and culture.
More directly, it aims at identifying the degrees of teacher awareness and understanding of the communicative changes brought by the new interactive media such as the internet and its impact on the learning process as it happens at the Pontificia Universidade Catolica do Parana.
This project is part of the research being carried on by the research group Virtual Leaning Communities, itself part of the broader Theory and Practice of Higher Education project, linked to the Masters and Doctoral programmes at our institution.
Our university began to implement last year a new educational model, for all its 51 undergraduate majors, based upon "learning programs" developed jointly by teachers and students. This model leans heavily on problem-solving, investigative skills as well as on collaboration and tutoring.
Eureka is a collaborative learning environment, developed at our university, in cooperation with Siemens Corporation. As many other such environments, Eureka offers discussion forums, e-mail, chat room, scheduling, message board, repository, and other online and offline resources aimed at facilitating collaboration and learning. At the end of academic year 2000, there were more than 20.000 Eureka registered users, of a 26.000 (staff and students) academic population.
Eureka`s 850 virtual rooms are our research universe. They are the environment in which the central issue of the use of new technologies as support for educational changes can be addressed. We will follow the tutors from the moment they open their virtual rooms until the end of the academic year, looking into the ways they communicate with their students in this environment, the tools they use and how they use them, the ways the students react to stimuli and how they start and keep their own forms of collaboration and communicative exchange.
So far we have been able to identify a close resemblance between the way mass media mediates communication and the way traditional teaching happens.
We want now to find out whether new media can be associated with a new learning paradigm: a student-centered, problem-based, research-oriented, knowledge-building model, where collaboration and interaction are essential.

Mass-Media and Traditional Teaching Common Characteristics.

Centralized control: messages (content and form) are constructed by the few who control the medium
One-way communication: messages travel in one direction only, from those who control the medium to those who receive them
Prevalence of "cold" media prevail: as defined by MacLuhan, the more finished the message is, the less space the medium leaves to the spectator, the colder the medium
The spectator: from the Latin *expectare* (to be there, just watching); spectators/students are expected to sit quite and listen/watch, without interfering with the production of messages.
Linearity: messages built along a pre-defined, pre-built sequence, in a linear flow with its own temporality, independent from the spectator, who cannot alter this direction or speed, nor choose alternative ways.

New interactive media characteristics

Decentralization: one the main characteristics of the internet, the first big media without owners and central controllers, opened to all
Two-way communication: information flows in multiple directions, allowing new communicative exchanges
Interactivity: hot media prevails (if we take the potential for interaction in its fullest sense).
The "users": so new that there isn't a good word for it, these new spectators refuse to "just watch"; they want to participate, to interact, to wet their hands in the ocean of information, to manipulate messages and create new meanings
Multimedia: more than just a new audiovisual medium, multimedia is opening a universe of multiple stimuli
Non-linearity: the wide use of "water metaphors" (to navigate, to surf, to dive...) to describe user movements in the information "ocean" reveal the non-linear structure of the new media; one can move in the surface, or dive into depths never made possible by linear media

New media and contemporary education

As we develop and spread new tools around campus, new forms of communication between teachers and students can take place. New tools, however, are not enough to make a difference. It is the attitude of the learning agents that counts more.
If we want to depart from traditional, informative teaching, and move towards new directions for learning, we must try to establish new communication spaces and to develop new communication skills, alongside with the ones we are familiar with (at least as consumers of media products).
That is the challenge for nowadays educators. New forms of teaching and learning surely will employ new technologies and resources, more interactive and flexible. On the other hand, educators must change their views and attitudes accordingly. It is imperative that we find a common ground upon which true, rich communication exchanges with our students can occur.
Learning can and must be a joyful, stimulating activity.
The university (and the school as well), as a communicative space, must go beyond the model based on the mass media, reaching for the new digital, interactive communication - if education is to keep on being significative and important to students and to society.

Sustaining Technology Integration: Lessons Learned

Sean Smith, University of Kansas, US
Joseph O'Brien, University of Kansas, US
Steven Smith, University of Kansas, US

This presentation will focus on the of one School of Education's effort to sustain technology integration across the preK-12 classroom environment. Having successfully integrated technology across several teacher preparation programs, project emphasis has turned towards creating and sustaining technology rich environments for appropriate student teaching and internship placements. Current efforts will be shared and idea and suggestions will be discussed amongst participants.

Teacher education students are capable of serving as significant players in the effort to integrate instructional technology into programs. While the students though become more competent and frequent users of instructional technology, they encountered some of the implementation barriers identified by National Council for the Accreditation of Teacher Education (2000) and the Office of Technology Assessment (1995) as they move into classroom settings. One student, for example, ran afoul of the traditional classroom operation when he attempted to use instructional technology during his student teaching. This suggests that addressing one implementation barrier, teacher training, in isolation runs the risk of failure in the long run. More importantly, this does a disservice to the teacher education student. Marcinkiewiez (1996) reported that while student teachers possessed high expectations about the use of instructional technology in their future classroom, their first year of teaching dramatically lowered these expectations. The challenge facing us not only is how to better prepare our students to use the technology, but also how to work with K-12 educators on the implementation barriers unique to their setting.

This demonstration/poster seeks to identify the challenges faced in sustaining technology use across student internship as well as student teaching experiences. In cooperation with Professional Development Schools, this PT3 Project (Learning Generations) is currently developing ways to enhance preservice teacher education students use of technology during their critical teaching development experiences.

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Why should we motivate teachers to use instructional technology in their teaching process?

Panel discussion prepared by Dr Armand St-Pierre

Learners are moving from a traditional educational environment into an open learning society where they can learn anywhere anytime. They are brought up in a multimedia and technology environment where new media are available to promote learning outcomes. More learners are connected on a daily basis to the Internet and they have the opportunities to surf virtual libraries and electronic journals to enhance learning outcomes. The web offers a rich platform of educational contents. The use of information technology could help to support new ways of collaborative learning, electronic communication, and independent learning. Research shows that conservative institutions entering into an information and communication age still emphasize the university professor as the classic information-giver, while nowadays several research studies advocate a collaborative learning environment where the professor becomes a mentor to his/her students.

The author of this article believes that Web media and technology should be used simultaneously in the teaching and learning processes, i.e. there should be equilibrium between the left-hand side (teaching) and the right-hand side (learning) of the equation with respect to the uses of Web resources in the curriculum. If the professors were using Web media in the delivery of course contents, the students should be learning how to integrate these tools into their learning process and vice versa. The technological delivery platform for the curriculum is ineffective if the students are frequent users of Web resources and technology in their learning process; whereas, professors do not know how to integrate these media into their teaching process. Based on the author's experience in using technology in teaching for several years, the author firmly believes that Web media and technology had to be in equilibrium if the institution wants to effectively deliver the curriculum. In fact, empirical results of different surveys done by the author corroborate the theoretical justification for using Web resources and media in the teaching and learning processes.

The goal of this panel is to discuss the pros and cons why any school, college, and university should introduce in an efficient and effective ways instructional technology in their teaching process. Some of the issues to be discussed could be: what is the tradeoff between increase in student learning with traditional methods versus time invested in learning new technology—Is it worth the effort? Technology integration takes valuable time and effort .... Are we willing to do it?

Participants from the floor will have the opportunity to present their experiences with respect to this topic. A summary of key factors will be presented at the end of the panel discussion to help participants to introduce technological media in their educational environment.

BE THE TECHNOLOGY: REDEFINING TECHNOLOGY INTEGRATION IN CLASSROOMS

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Abstract: One way to better understand the difficult instructional issues associated with the integration of computer technology in classrooms is to analyze the teaching practices of teachers using technology in classrooms. We established a set of technology standards and educational best practices to describe how teachers use technology for teaching and learning in the classroom. We learned that technology integration is more than just using and operating computer hardware and software. By establishing technology standards and associating specific educational best practices to the standards, teachers were able to progress from using the technology to *being the technology.*

The goal of transforming teaching and learning by increasing access to and use of technology in schools and classrooms has been near the top of most educational reform agendas since the early 1980s (Cuban, 2001). We launched a technology professional development initiative in a school district with the hope of revolutionizing classroom teaching practices and preparing a new generation of learners for a 21st century workplace driven by the acquisition and manipulation of information. Our model was based on a set of technology standards and indicators that clearly described the educational best practices for teaching and learning with technology. For technology to transform teaching and learning in the classroom we knew it required more than teachers just using technology—we wanted teachers to *be the technology*!

The technology standards on which our technology professional development model was established were formulated by synthesizing national, state, and local technology standards and then identifying educational best practices that supported these standards within the local context. We discovered in our literature review that although many reasonable and appropriate technology standards for teachers exist, these standards were are often stated in abstract or general terms. Additionally, since there was a high degree of variability in educational beliefs, technological availability, and state and community expectations, technology integration should be locally defined, using available research models and national standards as a foundation (Pierson, 2001). To support and reinforce this *be the technology* professional development model, we devised a set of performance assessments whereby teachers could demonstrate various levels of proficiency in technology integration and receive financial incentives.

To appraise our accomplishments, we undertook a process to evaluate the technology integration practices of teachers before and during this initiative. Although several models or strategies have been employed by educational researchers and practitioners to provide a systematic approach for determining the quality of innovation implementation, the Concerns-Based Adoption Model (CBAM) (Hall, Wallace & Dossett, 1973) fit our evaluation requirements because it emphasized change as a developmental process experienced by individuals implementing innovations within an organizational context. Over time CBAM has evolved into a comprehensive systemic change model that allowed change investigators and facilitators to understand organizational change from the point of view of the persons affected by the change (Surry, 1997).

CBAM is based on the assumption that change is best understood when it is expressed in functional terms—what persons actually do who are involved in the change. Since change involves developmental growth, the focus of facilitation is with individuals, innovations, and the context (Hord & Huling-Austin, 1987). CBAM provides for the development of diagnostic tools based on the design of the innovation being evaluated and the operational patterns of those using the innovation. One of these tools is the Innovation Configuration Matrix or Map (ICM). The ICM delineates an innovation in the form of a two-dimensional matrix along a scale that renders closer approximations of conceptualized implementation or use along one dimension of the matrix and the various configuration components along the other dimension of the matrix. Rather than being a static measure, the ICM has a procedural definition that allows an innovation configuration to be designed relatively easily for a specific instructional innovation. Thus, we formulated an ICM based on the technology standards and indicators of our professional development model to evaluate the quality of technology integration among teachers in the school district.

METHODS

Instrumentation

An instrument for analysis of technology integration and implementation in classrooms was developed. This instrument, the *Technology Standards Integration Configuration Matrix* (*TSICM*) was based on a consensus-building process that followed a procedure developed by Heck, Steigelbauer, Hall, and Loucks. (1981) and used previously by the researcher (Mills & Ragan, 2000). Relevant national, state, and local technology standards were reviewed and evaluated by the researcher in conjunction with the district technology committee and technology coordinator. The committee agreed upon 18 technology integration standards that were appropriate for the school district. Technology integration standards were organized into three skill sets or phases: Using and Operating Technology in the Classroom (Standards 1-6), Facilitating and Managing Classroom Technology (Standards 7-12), and Technology Integration (Standards 13-18). Each successive phase was intended to identify a set of instructional strategies that exemplified a more appropriate application of technology or a higher quality of technology integration into classroom instruction and learning.

Each technology standard was established as a component of the *TSICM* and then variations for each component were identified. Variations for each component consisted of discrete categorizations of technology implementation for the corresponding component. Component variations were designed to represent educational best practices along a continuum from unacceptable use to ideal use. The component variations were refined by the technology committee to reflect the actual practices of teachers using computer technology in classrooms. The components and component variations were organized into matrix comprised of four variations for each of the 18 components with each successive variation indicating a level of use representing a closer approximation of ideal or appropriate educational use. The *TSICM* was deployed as a paper- and Web-based checklist.

Data Collection

The school district used in this study was located in a small town in a Midwestern state. The school district had a total enrollment of almost 2,200 students in grades K-12 with 147 certified teachers. Computer technology was used in all the schools in the district. All schools except the high school had computer labs and all teachers had classroom computers.

The school district had made a substantial investment in computer technology and was beginning a district-wide technology professional development initiative. To collect data regarding computer technology implementation occurring among teachers, all teachers at all grade levels were provided with a paper version of the *TSICM* checklist and the option to complete a Web-based version of the *TSICM* checklist on the school district Web site. The checklist was designed in a multiple-choice format in which respondents could select more than one response for each *TSICM* component.

Data collection occurred at both the start and end of a school year. A usable TSICM was completed by 70 teachers at the start of the school year and 84 teachers at the end of the school year. 57 teachers completed both the start and end of year administration of the *TSICM*.

Data Analysis

The rubric for rating teacher responses on the checklist was to rate to the highest level of use for each component on the checklist. The responses to the *TSICM* checklist were analyzed by cluster analysis to identify relatively homogenous groups of cases based on the *TSICM* components. Discriminant analysis (DA) was then used to assess the adequacy of the groupings from the cluster analysis by using the *TSICM* implementation components as predictor variables. A step-wise methodology was used to enter variables into the discriminant functions. One-way analysis of variance was used to determine if the component attributes of each group were statistically significant. Comparisons were made between the start and end of year data collections using a paired-samples *t*-test. Descriptive statistics for the data collections are provided in Table 1.

TECHNOLOGY STANDARD	Start of Year Administration (N=70)			End of Year Administration (N=84)		
	SUM	MEAN	STD. DEV.	SUM	MEAN	STD. DEV.
1. Operate common technology input devices.	217	3.10	.82	313	3.73	.73
2. Perform basic file management tasks.	206	2.94	1.11	316	3.76	.63
3. Apply trouble-shooting strategies and install software.	226	3.23	.87	318	3.79	.70
4. Use software productivity tools.	182	2.60	1.34	297	3.54	1.01
5. Use technology to communicate and collaborate.	228	3.26	.72	316	3.76	.59
6. Use technology to collect data and perform research.	188	2.69	1.10	286	3.40	.95
7. Model responsible use of technology.	174	2.49	1.42	274	3.26	1.13
8. Facilitate regular student use of computer technology.	208	2.97	1.45	257	3.06	1.43
9. Conduct learning activities using computer technology.	187	2.67	1.43	234	2.79	1.46
10. Select appropriate technology resources for classroom use.	83	1.19	1.33	194	2.31	1.69
11. Evaluate the validity of data collected using technology.	22	.31	.91	93	1.11	1.69
12. Use technology to present classroom instruction.	154	2.20	1.16	235	2.80	1.23
13. Integrate technology-based learning experiences into classroom instruction.	138	1.97	1.43	207	2.46	1.48
14. Use computer technology for problem-solving and critical thinking.	118	1.69	1.48	199	2.37	1.48
15. Use technology to facilitate individualized/cooperative learning experiences.	94	1.34	1.39	157	1.87	1.40
16. Assess student use of technology using multiple methods of evaluation.	66	.94	1.57	91	1.08	1.53
17. Develop and maintain electronic student portfolios.	23	.33	.88	48	.57	1.01
18. Use computer technology to maintain and analyze student performance.	136	1.94	1.23	224	2.67	1.08

Table 1. Descriptive Statistics for Start and End of Year Administration of TSICM.

RESULTS

Beginning of Year Data Collection

Since the initial cluster centers and the number of dominant patterns were unknown, cluster analysis was performed on the first administration of the *TSICM* using all 18 technology standards or components of the *TSICM* and incrementing the number of clusters until a reasonable model was obtained. The cluster analysis was run for 2, 3, 4, and 5 clusters before a reasonable model was selected. A reasonable model occurred with the number of clusters set at 3. When the number of clusters was set at 3, the number of cases in Group 1 was 21, Group 2 was 33, and Group 3 was 16. In order to make comparisons between the start and end of year data, this same grouping model (3 clusters/groups) was used for analysis of the end of year data collection.

In order to assess the adequacy of the classification of implementation pattern groups derived from the cluster analysis, a Discriminant Analysis (DA) was performed. The 18 *TSICM* components were used to separate the groups into the discriminant functions. As a result of this procedure 97% of the cases or 68 of 70 cases were correctly classified. The DA reclassified 1 case in Group 2 for Group 3 and 1 case in Group 3 for Group 2.

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The *TSICM* components were entered into the DA using a stepwise model in order to discard variables that were weakly related to group distinctions. Based on the discriminant coefficients, Component 13—Integrate Technology-based Learning Experiences into Classroom Instruction made the most important contribution to Function 1 and Component 8—Facilitate Regular Student Use of Computer Technology made the most important contribution to Function 2. Teachers identified with Group 1 (Technology Operators) were characterized by low or inverse relationships to Functions 1 and 2, Group 2 (Technology Facilitators) by high Function 2, and Group 3 (Technology Integrators) by high Function 1.

End of Year Data Collection

A cluster analysis was performed on the end of year data collection with the number of clusters set at 3 to compare with the clusters from the first of year data collection. With the number of clusters set at 3, the number of cases in Group 1 was 35, Group 2 was 18, and Group 3 was 31. The DA was repeated for the end of year data collection of the *TSCIM* and as a result of this procedure 92% of the cases or 77 of 84 cases were correctly classified. The DA reclassified 1 case in Group 1 for Group 2 and 6 cases in Group 3 for Group 1. Based on the discriminant coefficients, Component 9—Conduct Learning Activities using Computer Technology made the most important contribution to Function 1 while Component 1—Operate Common Technology Input Devices made the most important contribution to Function 2. Teachers identified with Group 1 (Expert Technology Users/Operators) were characterized by high Function 2, Group 2 (Beginning Technology Users/Operators) by low or inverse relationships to Functions 1 and 2, and Group 3 (Technology Facilitators) by high Function 1.

Paired samples correlations for each of components of the *TSICM* (technology standards) were computed for matched cases on the start and end of year administrations of the *TSICM*. Almost all components of the *TSICM* indicated significant differences on the *t*-test ($p<.05$) between the start and end of year administrations. Additionally, paired samples correlations were computed when *TSICM* components were grouped by skill set or phase and significant differences on the *t*-test ($p<.05$) were indicated for all three phases.

CONCLUSIONS

When we examined only the start of year data collection for this population of teachers, we discovered that proficiency in the use and operations of computer technology (Phase 1 standards) was not necessarily a distinguishing attribute of high quality technology integration. In other words, there was pervasive use of computers by teachers in preparing for instruction, but limited use of computers by teachers for delivering instruction. This finding had relevance for the provision of future technology professional development activities. These results clearly demonstrated that technology training activities needed to focus more on instructional strategies and methods to integrate technology in the classroom than entirely on activities to increase skills in the operation of computer hardware and use of software applications.

By the end of the school year, the characteristics that delineated differences among the teachers in technology integration was more sharply defined by teachers who were beginning or expert operators of computer technology and those who were facilitators and managers of classroom technology. Thus, there was a clear progression among the teachers from technology operations to technology facilitation—from using the technology to *being the technology*.

While the technology professional development program at the school did not make technology integrators out of all participants, it clearly accommodated reasonable growth and advancement in the technology integration skills of the participants. When we considered only those teachers for whom we had both start and end of year data, a significant pattern of growth across technology standards and at all skill levels was indicated. This observation suggests that when educational best practices for teaching and learning with technology are clearly defined and established, the professional skills of teachers will begin to exemplify the stated expectations.

We have learned from this study that classroom technology integration was not so much about the quantity of teacher interactions with technology, but rather it was about the quality of teacher interactions with technology. When teacher interactions with technology were accompanied by expert teaching practices and related to curriculum objectives, the quality of technology integration was increased.

Over time we have refined our technology integration professional development model to include more powerful technology integration strategies in classrooms beyond that of computer technology use and operations. We have learned that through the establishment of a well-defined set of technology standards and corresponding best practice indicators, higher levels of technology integration in classrooms can be identified and achieved.

Consequently, the potential for improving and enhancing teaching and learning in the classroom is increased when teachers know how to use and then actually use all the tools at their disposal,

IMPORTANCE OF THE STUDY

Although many school districts have established benchmarks or standards for the integration of technology in classrooms, no model or methodology exists for substantiating technology standards with actual classroom practices. The *TSICM* represents a flexible and adaptable approach to the evaluation of technology integration in classrooms because the *TSICM* components reflect a set of widely-used standards that can be contextualized.

A methodology to provide comprehensive and continuous analysis of technology implementation is needed to sustain high levels of use and integration of computer technology in classrooms. This study demonstrated that the *TSICM* was an effective tool to determine technology integration in classrooms, to reveal the technology integration characteristics of teachers integrating technology in classrooms, and to distinguish appropriate technology training themes that focus on specific technology standards.

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Handhelds: Important Technology for Classrooms and Educators

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Abstract: Handheld computers, such as Palms and Visors, are quickly becoming a common tool in the business world and this innovation has much potential to be used in education. This paper will focus on the initial integration of handhelds in a college of education. Activities include the training of faculty, administration, and staff, integration into undergraduate and graduate courses, researching of elementary, middle school and high school students' use of the devices, and the development of applications to be used in teacher and student teacher observations. In addition, the paper will highlight reasons educators should be learning to use handhelds, why educators need to develop effective ways to use handhelds in their classrooms, and why these devices should be integrated into the teacher preparations curriculum. Also, important issues that need to be discussed when implementing this new innovation will be addressed.

Introduction

Handheld computers (Palms, Visors, PocketPCs, etc.) are just beginning to be used in classrooms around the country, paralleling the acceptance of these devices in the U.S. business world. The uses and applications are usually different; business people use the handheld as an organizer and personal data center, and educators use the technology for such applications as writing, visualizing, data collection, data manipulations, and simulations. These devices have much potential for helping students learn and produce.

The College of Education at the University of Nebraska at Omaha is focusing on effective uses of handhelds in the learning process and is designated as a Palm Research Hub. Several faculty members are actively developing curricular ideas and researching P12 applications of handhelds in Nebraska classrooms as well as developing curriculum activities for its own teacher education courses. This paper will outline the rationale for using handhelds in schools and document five projects in Omaha area schools.

Handheld Use in Schools: Why, When and How

Why Use Handhelds in Schools

Before using any tool or innovation in schools, educators need to identify reasons the new innovation should be used. There are several reasons that handheld computers are a logical choice for schools and classrooms.

1. Handhelds are becoming a widely used technology in the "real" world. More and more business people are finding these devices to be an integral part of their work world. Many companies have made the handheld a

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tool used for scheduling, addresses, to-do lists, and document exchanges. It makes sense that if many adults are using handhelds, educators need to investigate whether these devices will help our students learn and produce.

2. Constant and consistent access to handhelds for students can have a positive effect on their learning. The impact of computers in schools has been disappointing to many. One of the reasons for this is the limited use by students. In a 2001 survey [http://www.snapshotsurvey.com] of Nebraska teachers, Topp, Soloway, and Norris found that 50% of the teacher-respondents have their students use computers for 15 minutes or less per week. If this is truly the case, no wonder there is disappointment in the impact of computers on student learning. But, the handheld computer may allow the student to have their "computer" with them at all times. The low cost of a handheld provides the opportunity for full time access for each student. And the small size of the handheld allows for easy portability. Students can pull their handheld out of their book bag or desk any time they need it.

3. The versatility of the handheld makes it an efficient learning tool. In addition to the date book, address book, etc. usually associated with handhelds, these devices are very versatile for creative teachers and students. Writing, creating animations, developing concept maps, drawing pictures, collecting data using probes, using spreadsheets, manipulating databases, reading documents, taking quizzes, and picture taking/editing, are all possible with most handhelds. In addition, much of the educational software is free to education.

4. The connectivity possibilities of the handhelds facilitates sharing and collaboration. Students can beam documents to each other, they can print their work, or they can sync their handheld to a computer. All three of these features provide the creative teacher with options that are important for a student-centered, active learning classroom.

How Can Handhelds be Used in Schools

As noted above, handhelds are versatile tools in schools. Many types of applications are now available, and many more are in the developmental process. The possible uses of handhelds are many. Some of the ways we have seen them used are: personal organization, writing, document reading, document sharing, simulations, data collection, visualizations, concept maps, database manipulation, spreadsheet tasks, calculating, assessing, and concept mapping. Also, teachers are using the handhelds for downloading documents from the web. With each visit to handheld-infused classrooms, we see more ways teachers are using these devices. It should be noted that the Center for Highly Interactive Computing in Education at the University of Michigan (http://www.handheld.hice-dev.org/) has developed several applications that are free to education. Many of the uses in the classrooms we are researching use these software applications.

When Should Handhelds be Used in Schools

The decision of when to use any innovation is very important for effective use and efficient learning. The guidelines for handhelds are similar to other learning tools. Handhelds should be used to help the student meet course objectives, whether it helps them learn faster, better, or transfer easier. Also these devices are effective in active learning situations, where students ask questions, gather information, analyze information, and share results. The tasks should be meaningful and connected to real world situations. And finally, the handhelds facilitate a collaborative learning environment. Students can share a document or parts of documents by beaming to each other, or they can upload or download documents to or from the web.

How are Handhelds being Used in Schools

Although the uses of handhelds are in an early stage in Omaha area schools, there are five teachers that are beginning to use handhelds with their students. Some have just begun the process and others are a few months into the project. Although it is too early to judge the impact of using handhelds, teachers are reporting successes with the devices. As the school year continues, we will be documenting the impact on the students, teachers, and schools.

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Watershed Study

King Science Center is an Omaha Public School District 4-8 science magnet school located in urban Omaha. In 7th grade science class, the students are currently involved in a local, long-term water quality ecological research study called "Watershed." Students are taught ecological interrelationships between biotic organisms, pH, dissolved oxygen, sunlight levels, and temperature. Students are then transported to several area lakes and the Missouri River to collect water quality data several times throughout the school year, thus enabling them to observe how seasonal changes affect abiotic and biotic water quality factors. Currently, all data is collected with individual test kits. The data is recorded on paper worksheets and graphed after returning to school. In this Palm project, handhelds with expansion modules and probeware will replace disposable test kits. Data will be collected on handhelds and returned to school for centralized analysis and incorporation into a single database. The data will be transferred during a technology applications class, then manipulated and graphed in math class, and subsequently analyzed in science class. In addition to the scientific aspect, some students will be assigned to document the field experience through digital photo expansion modules and descriptive essays, creating an interdisciplinary approach to the Watershed field experience.

Marketing and eCommerce - A Real World Simulation

At Omaha North High School, the handhelds will be used as an integral part of the current eClassroom initiative ("paperless classroom" with a 1-to-1 student to computer ratio using email as the primary communication tool). The seven marketing classes are already being taught "paperless." The handhelds, coupled with IntelliSync and other software, will extend the classroom beyond the school to mirror a real-world business environment. The handheld will become the "textbook," using web-based sources of information downloaded via AvantGo, groupware functions provided by GroupWise (mail, calendar, scheduling etc.) and other applications, both purchased and developed for our use by the South High portion of the proposal. The eClassroom is already a model for classroom instruction; the introduction of Palms pushes its development to a higher level, opening new and exciting possibilities for students.

Academy of Information Technology

The intent of the use of handhelds at Omaha Public School's South High School is to determine if high school programming students in the Academy of Information Technology can do the following:

1. Learn and develop software programs for the Palm OS system using CodeWarrior for the Palm OS
2. Interact with middle school teachers and students at King Science Center on issues and challenges of integrating the Palm into the science curriculum.
3. Utilize the potential of handhelds to increase student skills in computer technology.
4. Interact with North High School marketing students to market the innovative use and development of applications and integration of the Palm technology into the Academy of Information Technology curriculum.

6th Grade Math

An elementary teacher at Carriage Hills Elementary in the Papillion LaVista School District is using a classroom set of handhelds for her math classes. At this point, only free software is being used in order to keep costs to a minimum. Her handheld-infused curriculum is aligned with the NCTM Standards, and includes web page viewing, drawing, simulations, writing, calculating and drill. The handhelds are used by four different sets of students each day and are not used outside of the classroom.

5th Grade Self-Contained

- A handheld is provided for each student in one fifth grade section at Willowdale Elementary, Millard Public Schools. The students use "their" handheld all day and keep it with them each day. Also, a keyboard is provided for each student. The teacher uses the handhelds in all subject areas and has developed or revised many activities to include the handheld. This teacher makes extensive use of web page syncing and the students do some of the web page development of their own learning documents. An interesting aspect of this project is that two models of two different brands of handhelds are used and both Windows and Mac computers are used to sync the handhelds. We are beginning to learn advantages and disadvantages of each variable in this classroom.

Summary

Handhelds show much promise in helping students learn. As more and more teachers use handhelds in their classrooms, we will continue to add to our knowledge of the uses of these devices. Education colleges must keep informed and continue to learn about "best practices" in the use of these versatile tools. Also, education programs will need to infuse handhelds into their own curriculum so that they can model effective use of this new technology. By partnering with local schools, Colleges of Education have an opportunity to not only watch innovative teachers and practices, but also to contribute to the development of effective activities that will not only help teachers teach better, but more importantly, help learners learn better.

An Investigation of Traditional and Constructivist Models for Internet Training and Effects on Cognitive Gain

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Abstract: There has been an emerging body of literature on computer training and its impact on the use of computers, including the use of the Internet. Research has shown the two models of training – the Traditional Model and the Constructivist Model – each has a positive impact on students' achievements. These studies deal with topics such as math, science and geography, but not computers and the Internet. The results of the studies on the two training models are confounding. This current study determined which Internet training model – the Traditional Model or the Constructivist Model – could produce greater cognitive gain for pre-service teachers, as well as which model could produce greater positive changes in attitudes toward the use of the Internet. A nonequivalent control group pretest-posttest quasi-experimental design was used in this study. The participants of the study were exposed to alternative teaching strategies – the Traditional Model and the Constructivist Model of Internet training. A pre-and-post Achievement Test was administered to each group to assess the changes in the extent of learning. A Pre-service Teachers' Attitude Survey was administered to assess their attitudes toward the use of the Internet. In the analysis of data, the analysis of covariance, a t-test, two sample dependent means, and a t-test, two sample independent means were used. Results showed the Constructivist Model of Internet training produced a greater cognitive gain. After experiencing the Constructivist Model of Internet training, the pre-service teachers developed a more positive attitude toward the use of the Internet than before the training. After experiencing the Traditional Model of Internet training, the change of the pre-service teachers' attitudes toward a more positive direction was not statistically significant, but there was a shift toward a more positive direction. The study also showed that there were no significant differences in attitudes toward the use of the Internet between the two groups of pre-service teachers after experiencing either model of Internet training.

Introduction

This study investigated the impact of two training models, the Traditional Model and the Constructivist Model, on pre-service teachers' achievements and attitudes toward the use of the Internet. There has been an emerging body of literature on computer training and its impact on the use of computers that includes the Internet. Research has shown the two models of training – the Traditional Model and the Constructivist Model – each has a positive impact on students' achievement. These studies deal with topics such as math, science, and geography, but not computers and the Internet. These studies on the impact of the two training models are confounding. Some research favors the Traditional Model and other research favors the Constructivist Model. It is not known, however, which training model produces greater cognitive gain or which model brings forth more positive attitude changes. This study was based on the following hypotheses: 1) Pre-service teachers experiencing the Constructivist Model of Internet training will experience greater cognitive gain than pre-service teachers experiencing the Traditional Model of Internet training; 2) Pre-service teachers will experience a more positive attitude toward the use of the Internet after experiencing the Traditional Model of Internet training; 3) Pre-service teachers will experience a more positive attitude toward the use of the Internet after experiencing the Constructivist Model of Internet training; and 4) There are no significant differences between the two groups of pre-service teachers in their attitudes toward the use of the Internet after experiencing either model of Internet training.

The Design

A nonequivalent, quasi-experimental, pre-and-post survey design was used to study the effect of the Traditional and Constructivist training models on pre-service teachers' achievements. Pre-service

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teachers taking part in this study were divided into two groups – a control group experiencing the Traditional Model of training and an experimental group experiencing the Constructivist Model of training. The two models of training were carefully designed by the researcher to reflect the characteristics of each model. Distinctive teaching methods for each model were used. The Internet training focused on the Internet search engines, search strategies and applications of using search strategies to solve daily problems. The contents for the two training models were the same, with differences in the methods of instruction. After experiencing the Internet training, students took a Student Perceived Classroom Learning Environment Scale survey. Another similar survey, the Observer Perceived Classroom Learning Environment Scale survey, was filled out by two observers whosat in both models of the training class sessions three times: once before the Internet session, once during the Internet session and once after the Internet session. The purpose of the two surveys was to validate the methods used in the Internet training intervention, i. e., it measured the methods used in the training to determine if they contained the characteristics of the Traditional Model or the Constructivist Model. When the mean score of the survey for a training model is over 84, the model is a Constructivist Model and when the mean score of the survey is under 84, the model is a Traditional Model. Students also took a two-section Achievement Test before and after they experienced either model of training. The first part of the test was written according to the first objective – pre-service teachers will be able to list and describe the differences between common search engines and meta-search engines and differences in search results when different search strategies are used with 100% accuracy. The second part of the test was on the second objective – pre-service teachers will be able to use basic search strategies to locate information to solve daily problems with 100% accuracy. The pretest score for the Achievement Test was used as the covariant for the analysis of covariance to determine if there was a gain in the posttest score for pre-service teachers in the two training models and which group had a higher cognitive gain. The Survey of Pre-service Teachers' Attitudes toward the Use of the Internet gathered data of pre-service teachers' attitudes toward the use of the Internet. A t-test, two sample dependent means was used to analyze the attitude change before and after the training in each of the two model groups. A t-test, two sample independent means was used to compare the after training attitudes between the two model groups.

The Findings

To test the hypothesis that pre-service teachers experiencing the Constructivist Model of Internet training will experience greater cognitive gain than pre-service teachers experiencing the Traditional Model of Internet training, ANCOVA was used. The result of the analysis indicated that there was a significant difference between the posttest scores of the Traditional Model and the Constructivist Model. The mean score for the Constructivist Model was significantly higher than that for the Traditional Model. Besides, both of the Perceived Classroom Learning Environment Scale surveys indicated that each model of training was carried out according to its own characteristics. Data indicated that pre-service teachers experiencing the Constructivist Model of training developed a more positive attitude toward the use of the Internet after the training than before the training. After experiencing the Traditional Model of Internet training, the change of the pre-service teachers' attitudes toward the Internet was not statistically significant, but it did change toward a more positive direction. To analyze data for the fourth hypothesis, a poled difference in posttest scores were measured by using a t-test, two sample case, independent means. The data indicated that there were no significant differences in pre-service teachers' attitudes after experiencing either model of the Internet training. Further study could be conducted. Researchers could study the effects of different training models on pre-service teachers' cognitive gain, for example, compare the Traditional Model with a "mixed" model where both traditional and constructivist methods are used. Researchers could also study the effects of the training models on pre-service teachers' attitudes when they had a low positive attitude toward a subject matter.

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