Preparing Teachers to Integrate Technology into Multicultural Inner-City Classrooms

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Abstract

With the support of a Preparing Tomorrow's Teachers to Teach Technology (PT3) grant from the U.S. Department of Education, the authors — faculty members in a diverse urban state university — successfully used a training-of-trainers model to motivate and train its faculty to infuse technology into their methods classes. The model facilitated the collaborative efforts of faculty to produce technology-based lessons, implement them in their classes, and produce CD-ROMs that are case studies and tutorials for others.

Introduction

Technology has facilitated new ways of learning that impact the preparation of teachers. Unfortunately, it has created as many problems for teacher education as it has solved. Within the context created by the "No Child Left Behind" Act (2001), teacher educators need to prepare teaching candidates to address the standards-driven curriculum, as well as skills included in standardized assessments. In many schools, this has caused a paradigm shift in methodology, from constructivist strategies to more traditional techniques. While constructivism relied on representation, the new paradigm calls for direct, objective evidence of student achievement. On the Website (http://www.nochildleftbehind.gov/), prepared to enable parents to understand the implications or "No Child Left Behind," the U.S. Department of Education has described the goals of the act as containing "...the President's four basic education reform principles: stronger accountability for results, increased flexibility and local control, expanded options for parents, and an emphasis on teaching methods that have been proven to work." These methods are not clearly defined, other than to the extent that they are outcomes-based. The use of instructional technology has allowed students to construct knowledge through creative projects. Within this climate, the challenge is how to use technology to increase student achievement on both standardized tests and constructivist performance measures, using the principles of best instruction.

Several other major issues need to be considered, including limitations in resources (funding, space, personnel for training), attitudes towards technology in the classroom, as well as the resistance to change in learning environments. New and emerging technologies have created unlimited possibilities in reconfiguring our learning environments. Seymour Papert states in his speech at the 11th Colin Cherry Memorial Lecture on Communication on June 2, 1998, that the "complexities and dynamic possibilities of the modern world" are not compatible with the "top-down, centralized" structure of our current school system, based upon a 19th century model. He states further, "I think we live in a society in which a rapid and accelerating change in social life and the economy and the kind of work that people do is transforming the need for knowledge."

He explains that the technology may either be used to maintain the status quo, or to transform the system. He describes his vision of school in his paper with Gaston Caperton, "Vision for Education: The Caperton-Papert Platform," addressed to the Annual National Governors' Association Meeting in St. Louis in August, 1999, as "a place where students learn largely by working on projects that come from their own interests — their own visions of a place where they want to be, a thing they want to make or a subject they want to explore. The contribution of technology is that it makes possible projects that are both very difficult and very engaging."

Similarly, Linda Roehrig Knapp and Allen Glenn make the point that "Teacher professionals need to be prepared to work in schools that are designed as 'communities of learning' which actively involve children in realistic, project-based learning that includes seeking information resources from the local community and the global community" (Knapp and Glenn 1996, 198). In describing the role of schools, colleges, and departments of education in training prospective teachers, they stress the importance of "modeling appropriate technology use in restructured classrooms and curricula, and for prospective teachers to have frequent opportunities to practice using technologies as learning tools and also as teaching tools" (Knapp and Glenn, 202).

How then do we ensure that beginning teachers have and can utilize the appropriate technology skills to create communities of learning? As recently as January 1999, the U.S. Department of Education reported that "Teachers are being asked to learn new methods of teaching, while at the same time are facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom.... [Given such challenges] relatively few teachers (20 percent) report feeling well-prepared to integrate educational technology into classroom instruction." According to the joint Milliken-International Society for Technology in Education report (1999) on the findings from their survey of teacher-education programs in the United States, instructional technology instruction should be integrated into other courses and schools, colleges and departments of education activities rather than being limited to stand-alone courses.

As part of its accreditation efforts, the National Council for Accreditation of Teacher Education (2000) recognized the need for the use of technology in education as a fundamental part of the teaching, learning, assessment, evaluation, and productivity process. Technology competencies should focus on functional skills and on the people who must make decisions on how to use them, as well as provide opportunities for advanced applications. Technology standards for preparation of leaders in education must include: 1) how to use technology, 2) application of instructional principles, research, and appropriate assessment practices, 3) demonstration of knowledge in the use of computers for problem solving, data collection, information management, communications, presentations, and decision-making, 4) design and development of student learning activities that integrate computing and technology for a variety of student grouping strategies and diverse student populations, 5) demonstration of knowledge in the use of multimedia, hypermedia, and telecommunications to support instruction, and, 6) demonstration of knowledge relative to equity, ethical, legal, and human issues of computing and technology use as they relate to society (ISTE Standards, http://www.iste.org/standards/ncate/basic.html).

In 1999, the U.S. Department of Education reported that, "Teachers are being asked to learn new methods of teaching, while at the same time [they] are facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom...[given such challenges] relatively few teachers (20 percent) report feeling well-prepared to integrate educational technology into classroom instruction." According to the joint Milken-ISTE report (Coughlin and Lemke 1999) on the findings from their survey of teacher-education programs in the United States, instructional technology instruction should be integrated into other courses and schools, colleges and departments of education activities rather than being limited to stand-alone courses.

Student teachers need more opportunities to apply instructional technology during field experiences, perhaps through mentoring via distance education if mentors are not available in the schools. Faculty should be encouraged to model and integrate technology (NCATE 1997, Willis 1997, Willis and Raines 2001) through increased emphasis on faculty professional development, including incentives outside the traditional academic rewards system. To provide models for change, researchers, professional societies and education agencies should identify, study and disseminate examples of effective technology integration that reflect the current needs in both K-12 and teacher education (23-4).

While most teacher education faculty would probably agree that beginning teachers should be skilled at word processing, use of databases, spreadsheets, presentation software, the Internet, e-mail, and other tools of technology, faculty could not be expected to simply add this to their palettes and devote the many hours necessary to learn and maintain up-to-date skills in the use of technology. The challenge is how to facilitate this learning and support teacher preparation faculty to be motivated and comfortable infusing technology into their methods courses.

Practical Issues

California State University, Dominguez Hills (CSUDH), received two Preparing Tomorrow's Teachers to Teach Technology (PT3) grants from the U.S. Department of Education: a one-year capacity-building grant in 1999, and a three-year "Implementation" grant in 2000 (in a one-year "no-cost" extension during 2003-4), to facilitate the migration of technology instruction from a stand-alone course to full infusion into pre-service methods classes as mandated by the California Legislature. Previously, students had taken a course in a well-equipped lab with a technology-savvy instructor showing dazzling applications. Then, they took their methods classes, and in many cases, never saw technology applied again. The message that was sent was: Real teaching methods have little use for technology.

As the grant co-directors approached their colleagues, they heard numerous obstacles to technology infusion. It was not much of a motivational boost for the methods faculty when they were told that they would all have to comply with the new California State regulations. Some of the more popular avoidance examples included: 1) the faculty was already working on overload; 2) several faculty experienced technophobia; 3) there was too much information to convey in the methods course without including an additional technology unit; 4) there was not enough access to technology on campus and in the schools; and 5) faculty had technology skill deficits.

Technophobia Issues

Feelings of fear, discomfort or anxiety toward one or more forms of technology have been accepted as the definition of technophobia, and can result in the complete avoidance of using technology. The greatest predictor of technophobia resides in the attitude of the person who introduces that technology (Bollentin 1998). Rosen and Weil (1998) found that 45 percent of K-12 teachers are technophobic themselves. The goal, then, for the grant was to reduce technophobia through infusing technology into everyday tasks, so that instructors and students alike would feel comfortable in adapting its use in instruction.

To that end, Psychologist Larry Rosen presented his work on technophobia to the teacher education faculty and administered his technophobia index as a gauge of their existing level of technophobia. Since this is a self-report measure, the authors relied on the faculty's willingness to reveal their own anxiety. The results of this survey enabled the authors to focus on concerns central to faculty anxiety: lack of appropriate training and equipment. Through both grants, training sessions on a variety of helpful application tools were provided and smaller tutorial sessions ensued. In addition, the grant provided faculty with portable equipment (laptops with wireless capability, projectors, screens and digital video cameras).

Partners in the grant included the Los Angeles Unified School District and Torrance Unified School District, which provided lab space when none was available on campus; Apple Computers, which provided free online course training to faculty,

technical assistance and face-to-face training sessions in selected software and Web resources; Inspiration, which provided site licenses to both Inspiration and Kidspiration; Knowledge Adventure, which provided a site license for HyperStudio; and Blackboard, which provided Web sources and faculty training.

Training-of-Trainers Model

The co-directors of the California State University, Dominguez Hills (CSUDH) PT3 grant decided to adopt the "Training-of-Trainers" model for technology infusion into methods courses. This is a collaborative model based upon the literature on school change and reform (Goodlad 1997), which clearly delineates that changes agreed upon and implemented by those involved in the "culture" of the school are those that are most meaningful and most successful.

As a catalyst to change in classroom practice, learning technology can help educators promote active and participatory student learning. But the key to success isn't in the computers, probeware, graphing calculators, or access to networks and the Internet. It is liberated educators whose understanding and creative use of technology can help them to achieve undreamed-of levels of excellence for themselves and their students (Milliken).

As part of an earlier PT3 capacity building grant, we began by putting all of our full-time faculty into subject matter groups to develop a course-by-standards matrix as we addressed the ISTE and the new state of California technology standards that recommended incorporating technology into methods courses rather than offering a stand-alone course. Within our PT3 implementation grant, the paradigm the we have used to mentor methods faculty in the implementation of technology into the curriculum is the "Training-of-Trainers" model, thus making it easier for teacher preparation faculty to infuse technology into their methods courses, and be made accountable in non-threatening ways. Cadres of faculty mentors were created to act as change agents to work with other faculty to develop a common project among all methods courses in the same subject, pilot this in their courses, and in so-doing, produce training materials to be used by others teaching the course.

The first cadre of professors to participate in this model – who serve as an example of the faculty training and participation – were the social studies methods faculty. In this paper, is a description of how they shared in the planning and implementation of the database project, thus ensuring their commitment to mentoring other social studies methods faculty. The science methods faculty formed the second cadre of professors to participate. They planned and implemented a spreadsheet project in their classes. The paper delineates the trials and tribulations encountered in this implementation and the later training of part-time faculty in using the resulting CD-ROM. Finally, the reading methods faculty formed the most recent group to prepare a lesson infusing technology. A description of how technology can ease and enhance the teaching of reading skills through a collaborative project producing an interdisciplinary newsletter follows. The paper later describes how the lead faculty member modeled this project with secondary

teaching candidates, many of who are already teaching in inner-city schools. Following this is a discussion of the lessons learned from the development and implementation of the CD-ROMS, and the data collection and results from assessments collected from the entire Teacher Education faculty.

Technology features

The CD-ROM disks that resulted from this project were designed to serve as training and backup support for the faculty involved. They were also intended to serve as the basis for training new and part-time faculty. It is clear that it may also serve an additional role by being made available directly to pre-service students. Features of the CD-ROM disks include: video interviews with project faculty presenting the rationales for the project; classroom videos to show how to conduct the lessons; videos with student/group interactions; step-by-step software instructions; interactive training on software; demo version of software with data files; videos of faculty reflection on projects; blank data forms that can be printed out; and links to related Web resources.

The Immigration Database

The first cadre of professors to participate in the training-of-trainers model, who served as examples of the faculty training and participation, were the social studies methods faculty. They shared in the planning and implementation of the database project, thus ensuring their commitment to mentoring other social studies methods faculty (Cantor et al. 2003).

Despite the current trends imposing mandated, teacher-directed, scripted, skills-based curriculum , the social studies faculty still believe that student and adult learners need to engage in thoughtful, experiential learning activities designed to help them make meaningful connections to their prior knowledge . Theirs is a more demanding and thought-provoking approach. Nevertheless they believe that by engaging learners with relevant content they become proactive and look for ways to gain and understand new knowledge. During engagement, students want to learn, allowing skill development to occur effectively without resistance. Rather than tell students what others have learned, the faculty believe that learning is facilitated and guided in social contexts in which teaching for understanding is a shared responsibility of the community of student and adult learners . When learning activities integrate interdisciplinary approaches and multiple ways of knowing, critical and creative thinking develops and learners explore possibilities rather than recite facts .

As teacher educators, the social studies methods faculty are searching for ways for students to be historians, and *do* history, rather than merely study history. Real historians do not read digests of historical events and then answer the questions in the back of the chapter. To do the work of real historians, children need rich environments filled with the "manipulatives" of history teaching – primary source documents, historical photographs, oral histories, and surveys. Technology provides overwhelming opportunities for young historians to become "active discoverers," rather than "passive

recipients." Internet sources provide limitless resources for analyzing multiple viewpoints, so that students can draw their own conclusions and develop their own historical understandings.

In this project students go beyond simply collecting oral histories by using a database to help them make sense of what they learned about their families' "coming-to-America stories." They are able to devise predictions, make comparisons, and place what they learned into meaningful contexts. From this they can write analytical historical narratives. The teacher plays the role of facilitator, asking questions that help learners develop deeper understandings and clarify what they know. Students use this database project to pose questions and use inquiry methods to explore historical concepts in the world around them rather than focus on isolated facts. In these ways, students are encouraged to hypothesize, draw logical inferences, gather relevant data, and develop their own historical understandings.

The Heart-Rate Spreadsheet

The science methods faculty formed the second cadre of professors to participate. They planned and implemented a spreadsheet project in their classes. Developing spreadsheets for science and mathematics learning is not a new adventure. Drier (2001) reported using spreadsheets in mathematics methods courses in order to "create dynamic experiential environments for discovering mathematical relationships" (p. 170). Her students were able to use spreadsheet formats and create mathematical problems, such as exploring projectile motion or experimenting with probability.

Further, the National Science Education Standards (National Research Council 1996) calls for science to enter the K-12 classrooms through the same process that it enters the research laboratory – through inquiry: "Inquiry into authentic questions generated from student experiences is the central strategy for teaching science" (31). During their inquiries, students are encouraged to use technology in order to perform various tasks. They use technology to access scientific information needed for their research, plan and develop technological devices that will help them with their inquiries, use technology and databases in order to process and manipulate data, and use technology to communicate and compare results. A later addendum to the National Science Education Standards emphasizing examples of inquiry at the K-12 (NRC, 2000) clarifies the use and interdependence of technologies, mathematics, and science learning using inquiry:

A variety of technologies, such as hand tools, measuring instruments, and calculators, should be an integral component of scientific investigations. The use of computers for the collection, analysis, and display of data is also a part of this standard. Mathematics plays an essential role in all aspects of an inquiry. For example, measurement is used for posing questions, formulas are used for developing explanations, and charts and graphs are used for communicating results (166).

Collaborative efforts between the co-directors of the PT3 grant mentioned previously, science educators and pre-service teachers in a secondary methods course resulted in the development of a CD-ROM disk. This CD-ROM allows users to perform data manipulations ranging from simple ones, such as finding the heart rate averages for individuals with and without exercise, to the more complex ones, such as finding the correlation between the time that it takes to get to the normal pulse after exercise and considering the age of the individual. In addition, the CD-ROM might be used as a case study teaching tool as it shows how the instructor adjusted the procedure for the exercise to enhance the quality of the data collected for the spreadsheet. As the CD-ROM includes demonstration video clips, it is easy for the user to structure the teaching and learning environment in order to ensure the clarity of the data collection and the correctness/preciseness of the data collected.

The choice of heart rate as the subject was intentional, as it fulfills numerous science standards for life sciences, as well as health science standards, and teachers are more inclined to use something that enhances students' understanding on required science standards. In addition, the data collection does not require any sophisticated equipment or materials that might not be easily available to the pre-service teacher population in urban classrooms.

The heart rate CD-ROM is not just a spreadsheet tool. In addition to teaching the user the meaning and use of the spreadsheet, it provides biological information on the meaning of heart rate and related concepts, a lesson plan that includes experimentation and investigation, video clips showing how to collect data, and Internet Websites to read more about the issues related to heart functioning and heart rate.

As an immediate response, the CD-ROM on heart rate was used to train other faculty teaching science and mathematics methods courses for pre-service elementary teachers. One of the individuals who participated already used the CD-ROM in her elementary science methods course.

In infusing the CD-ROM into the science methods classes, the development team learned what did not work before experimenting further. This past semester, the lead developer, Dr. Hedy Moscovici, dedicated one class session to introducing the Heart Rate CD-ROM, and, using a different example, collected and used the spreadsheet functions to analyze data. As homework, credential candidates had to produce a spreadsheet on a subject of their choice and use spreadsheet functions to manipulate data and come up with some conclusions. This was far more successful than previous attempts to infuse it. To quote from Dr. Moscovici, "The development of the Heart rate CD-ROM was a wonderful learning opportunity and the existing product has a great potential as a teaching and learning tool. The CD-ROM not only provides a spreadsheet exercise, but also the content information, the lesson plan, additional Websites, and video clips showing what teachers should and should not do in order to collect reliable data."

Newsletters in Reading/Language Arts

The third cadre was the English/Language Arts/reading faculty, who successfully infused technology through a newsletter project. Popular culture contributes a large portion to students' knowledge base (Huddleston 2003). Adolescents, like many of their parents, receive information from news broadcasts and periodicals after it has been filtered through a variety of writers and editors. It is hard for anyone to appreciate the editorial decisions made to create a finished product until they have made those decisions themselves in producing a publication of their own.

The news creation process is the genesis for the desktop publishing assignment used in Cross-Content Reading and Writing Methods. By taking credential candidates through the stages of publication they come to understand feature writing, the use of graphics, two-column formatting, editing for space and other formatting considerations. In addition, candidates leave with a sample publication that they can show their students as a model of the type of work they can create. Therefore, the goal for the newspaper assignment is not just to teach the mechanics of desktop publishing.

It is important to begin this assignment with an understanding of the value of information distribution. Vygotsky (1978) emphasized the integral link between knowledge and its distributive nature in all social models of learning. In other words, it is not enough to possess a piece of information. The value in that information comes in the ability to share it and have it combined with other forms of information in a social interchange that can either occur verbally, visually or through print. The candidates in Cross-Content Reading and Writing are asked to consider this hypothesis at the outset of the assignment and then to consider the amount of student work that is typically produced only for a teacher's consumption. If, however, goals of making knowledge public through publications of many different sorts are set, then this creates an atmosphere where learning occurs from peer-to-peer as well as from teacher-to-student.

With this in mind, the next task is to de-construct a newspaper. In subject-matter groups candidates are asked to chart as many features as they can that comprise a typical news publication. The lists can be extensive after careful consideration is given to the prompt, and most often the class comes up with items such as the following: captions, editorial columns, crossword puzzles, feature stories, news stories, photographs, obituaries, book and software reviews, tables of content, mastheads, purchase price, advice columns, etc.

Next, they brainstorm specific content-related examples of what has been listed and develop one example to share with the class. The groups come up with interesting examples in class that involve Dear Abby letters from historical figures, obituaries of pioneers in science and letters to the editor concerning the fear of mathematics. This is all done to illustrate how subject-related pieces can be authored to create a content-based publication like *The Quadratic Times, Physical Fitness Today*, or *The Shakespeare Gazette*. These are actual editions that credential candidates have created, and the entire publications are devoted to the theme mentioned in the title.

They are encouraged to use the list of publication features that was generated earlier in class to think of a variety of pieces that could be included in their publication. In doing so, their publications will typically include a news story, a feature story, an advice column, and a puzzle of some sort. The primary requirement is that they include at least two graphics and follow the two-column formatting that was demonstrated for them in class. In addition, they must set up the publication using word processing software rather than desktop publishing software or newsletter "wizards" because this latter technology is not always available in classrooms.

WebQuests and Future Projects

The last group used WebQuests as a vehicle to infuse technology across and within discipline areas. All collaborative groups conducted training sessions with full and part-time faculty teaching the same courses. Current projects include the expansion of the immigration database to include video historical case studies, and a PowerPoint lesson for use in reading/language arts methods classes.

Lessons Learned

In this odyssey, the researchers learned many lessons. Below are a few of the more powerful ones:

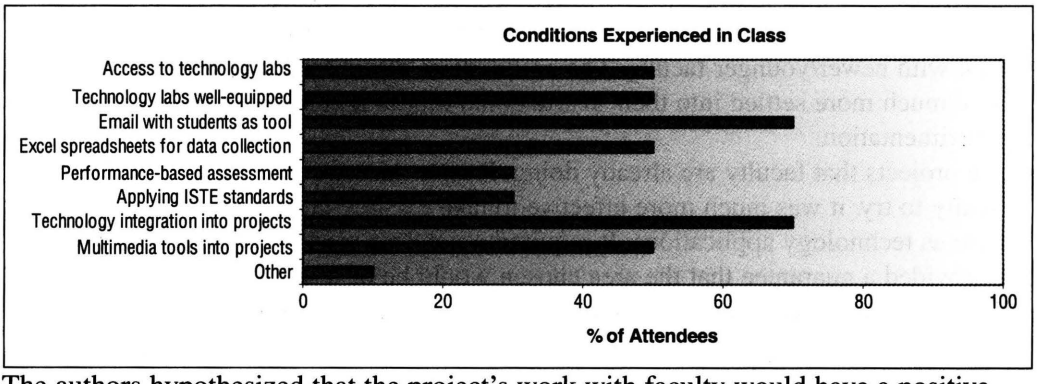
- Do not start with applications. The grant co-directors began by teaching applications that the faculty said they were interested in learning. These applications included the BlackBoard system to place class information on the Web, HyperStudio and WebQuests. This type of instruction turned out to be very abstract and had little transfer to the faculty's immediate needs.
- Do not use stand-alone workshops. Bringing large groups of faculty together in a one-time workshop setting rarely worked because the co-directors were unable to meet individual needs while trying to interest all of them simultaneously.
- Start with newer/younger faculty. The co-directors discovered that senior faculty were much more settled into their instructional modes and less disposed toward experimentation.
- Use projects that faculty are already doing. Rather than introducing new projects for faculty to try, it was much more effective to take existing curricular areas and adapt them as technology applications. It required much less work from busy faculty, and it provided a guarantee that the area chosen would be of interest to the faculty.
- Extend those projects with features that could only be accomplished with technology. Once a project area was selected, we had to find a way to produce desired results that extended the project in a very desirable way and could only be achieved through the use of technology.
- Support faculty in their initial presentations in terms of hardware and software. The co-directors worked in collaboration with methods faculty at every step of the process so that they learned about using technology as part of the development process, but that did not imply that they felt ready to try it alone. Back-up support was provided when they first tried out the projects in their classes. As it turned out,

the co-directors functioned more as observers, but their presence seemed comforting prior to the initial implementation of the projects in class.

Data Collection and Findings

With the help of an independent evaluator, periodic surveys were distributed to both full- and part-time faculty. Data collected since the start of the "capacity building" grant indicated that the Training-of-Trainers model has resulted in increased motivation to incorporate technology in teaching, feelings of comfort with technology, and more willingness to collaborate with colleagues on technology-based projects. A series of trainings were conducted with faculty by their peers, by guest speakers, and by the co-directors of the grant, and these have contributed to increased use and comfort in using technology.

In a survey distributed to faculty in January 2004, by the grant's outside evaluator, barriers to implementing this technology were examined. As noted in the table entitled, "Conditions Experienced in Class," 50 percent of the faculty felt that they now have easy access to technology laboratories and find them well equipped. In addition, 70 percent reported that they use email as a tool with their students, and that they have integrated technology into the projects they require in their classes. Fifty percent report that the technology includes multimedia. Another 50 percent have stated that they regularly use Excel spreadsheets for data collection. One need for further attention is indicated by the fact that only 30 percent of the faculty reported that they have incorporated the ISTE standards into their courses. The low percentage may be explained by the fact that there were a number of new instructors added to the survey population this year.



The authors hypothesized that the project's work with faculty would have a positive impact on pre-service and in-service public school teachers' integration of technology in their own classrooms. Given the immediate service area of California State University, Dominguez Hills, this translated into multicultural inner-city classrooms. To explore this hypothesis, the directors provided supervisors of interns and student teachers with an informational session on the ISTE NETS standards. Exploratory surveys will be distributed to supervisors regarding technology being used and infused by their pre-service and in-service supervisees, to be collected at the end of the

semester. Survey results, as well as samples of survey instruments used for data collection, will be analyzed and reported in a later paper.

In an informal survey conducted by the social studies methods faculty, students in three methods classes were asked to write their comments, anonymously, about the various aspects of the database project. Comments were overwhelmingly positive, but also revealed some of the limitations of the project, and provided suggestions for improvement. Many students commented on the value of interviewing immigrants. For example, one student wrote, "The most valuable part was the stories that the woman whom I was interviewing told as she explained the meaning of the numerical response." Some students found the project to be stimulating because they were actively involved from the start. One wrote that formulating questions for analysis was a good way "to get us . . . interested in what we were going to analyze. It made us guess what we thought the outcomes would be and then have to wait to find out." Students commented on the technological aspects of the project as well.

Many students wrote that the data entry process was very easy, with comments such as the following: "Very easy to do and computer friendly for the non-computer literate person." Students also reflected on the value of the data manipulation process, noting that it allowed the class to "look at information in many different ways," and that the process led to more questions. However, a few students expressed concern about their ability to implement this stage of the project. For instance, one student wrote, "The task was worthwhile, but the teacher would need to practice 'sorting' and 'organizing' prior to the lesson, or I could foresee disaster."

When asked if they would consider using a computer database in their own classrooms, 56 out of 57 students said that they would. Students wrote that they considered the activity worthwhile because it promoted task-based interaction, it integrated a variety of skills, it made students feel important, and it was a novel way to engage students in social studies learning. However, some students included caveats with their responses to this question. They commented that they would consider incorporating a database project if their schools provided the computer and software and if they were given guidance in fitting active learning strategies into the curriculum along with scripted programs such as Open Court.

Concluding Thoughts

The Teacher Education Division of the College of Education at California State University, Dominguez Hills, has reorganized its credential program to meet new performance standards, including technology. The training-of-trainers model that has been used for technology infusion has had a tremendous impact on the CSUDH teacher education faculty and, hopefully, on their students. In addition to faculty becoming comfortable with technology infusion in their classes, the cadre of trainers among the faculty developed into a research group that has presented at numerous conferences with the co-directors, and has resulted in the publication of at least one paper in a refereed journal (Cantor et al. 2003) and, hopefully, will be followed by

several others. Further analyses of the data on these impacts and their implications are currently in process. These will be completed toward the end of the 2005-6 school year and during the summer months. For more information, please see the CSUDH PT3 Grant Website at http://www.csudh.edu/soe/faculty/pt3/index.html.

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