Technology staff development: Is it effectively designed to increase classroom use of technology?

Susan Ellen Holliday
TECHNOLOGY STAFF DEVELOPMENT: IS IT EFFECTIVELY DESIGNED TO INCREASE CLASSROOM USE OF TECHNOLOGY?

A Thesis
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by
Susan Ellen Holliday
June 2002
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ABSTRACT

Teachers play a central role in the successful implementation of technology into education. The goal of most technology staff development training programs is to have teachers effectively implement technology into their classroom practices and curriculum. As part of this particular project, teachers are participating in a technology staff development program that was designed to help teachers increase the use of technology in their classrooms. With this technology program in place, the project was able to assess if the participants technology skills improved as a direct result of the technology training program. The project also appraised if the staff development training program truly increased the teachers use of technology in the classroom. As a result of this project, it was identified that staff development program was necessary to increase technology integration and that lack of it was a hindrance to technology implementation. In conclusion, this study of a technology staff development program determined that there was a higher occurrence of technology implementation in the classroom and an increased use of technology by students as a result of teachers having participated in an extensive technology staff development program.
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DEDICATION

"To my amazingly patient and loving husband, Peter
And to my ever encouraging parents, Diana and Jerry."
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CHAPTER ONE
BACKGROUND

Introduction

Ever since the birth of technology educational institutions have struggled with the question of how to teach given the variety of technologies that are available to enhance learning and improve teaching. It is obvious that in the twenty-first century, almost all jobs will involve computers in some way. It is, therefore, imperative that teachers have the appropriate training if they are to meet the needs for this technologically advanced generation. This final statement will be the focus of this project: are student’s needs being met in the classroom concerning the necessary implementation of technology into the curriculum.

Purpose of the Project

The purpose of this project was to examine the current staff development training programs impact on the integration of technology into the teacher/participants’ classrooms. This purpose evaluates whether or not training practices were being transitioned to the classroom, in addition to which practices need to be added to the training program which will increase the implementation of
technology into the classroom. To explore these objectives the technology staff development program was developed. This program specifically evaluated if the technology staff development program increased technology integration into the classroom and if that technology integration was a consequence of that staff development program.

Statement of the Problem

Traditionally past technology-training programs have taken place in many schools and districts (Kamil & Lane, 1998; Schrum, 1995). Typically, these technology-training programs were more focused on how to use the applications and not how to integrate the applications into the classroom. As a result of these trainings, teachers found that learning the applications skills were much easier than trying to integrate the applications into the classroom. Moreover, the trainings were not providing the skills necessary for them to learn how to successfully implement technology into their curriculum.

The problem of this project was to ask two questions: one, why are staff development program methods not being integrated into the classroom, and two, which program methods do provide a basis for classroom integration. If staff development programs are to take place, it is
important to provide a well designed program that facilitates the teachers' use of technology in their classrooms.

Project Overview

This project was designed to address the success of Instructional Technology (IT) staff development training programs in providing the tools for helping teachers take those skills learned in the trainings and implement them into their classroom curriculums. The examination of the current IT staff development training program helped evaluate the following questions: to what extent was technology being used in the classroom as a result of the training, what classroom management techniques were missing in the training, and what components needed to be added to the training in order to better prepare teachers for implementation of computers into their classrooms.

This struggle with implementation of technology into the classroom is common among many teachers. This project shows how to develop a technology staff development program in which participating teachers learn how to transition what they have learned in the training into the classroom. As a result of this project, it is anticipated that less money would be spent on classroom computers not
being used by the students and less time would be wasted on an IT staff development program that does not increase student use of technology in the classroom.

Research and data was provided by a series of surveys and questionnaires taken by Desert Sands Unified School District (DSUSD) kindergarten through high school level teachers that participated in technology training. The total number of participants in the technology staff development program was 207 teachers. The surveys and questionnaires, taken by these 207 participants, were administered both online and hard copy. The online format was the California Teacher Assessment Profile Survey (CTAP2) in which all teachers completed at the beginning of the training and at the end of the technology training. The CTAP2 Survey provided data related to the level of knowledge and use of technology by the participants as well as helped to measure the integration of technology that took place in the participant’s classroom.

In addition to the CTAP survey, teachers were required to complete a final product as part of the training program. This final product will be discussed in detail later. Participants also completed two more questionnaires as part of the program's final product. In Questionnaire One, Final Product Verses the Technology
(Appendix A), it evaluated if the teacher's final product impacted or increased their personal and/or classroom use of technology. In Questionnaire Two, Final Product Verses the Program (Appendix B), teachers determined if the IT training program design helped to improve their final product. The particulars of the surveys and questionnaires will be explained in detail in Chapter Three.

With these surveys and questionnaires, it was identified as to what methods worked best in providing teachers with the most useful tools for implementing technology. This opportunity to provide feedback gave teachers a role in designing a training program that worked best for them. This project provides a sample of an IT staff development program that brought about more classrooms having computers used on a daily basis and more students being better prepared for their future due to the exposure to technology. In conclusion, this project helped develop a technology staff development training program that provided teachers with the classroom management skills to use technology in their classrooms.

Significance of the Project

The significance of the project relied on the fact that teachers are crucial to the integration of
technology. They play the central role of the successful implementation of computers in the educational setting. The Desert Sands Unified School District increased the network and hardware expansion of technology over the past few years so that it was available to both teacher and student. But, was that technology being used to its full capabilities? Staff development classes in DSUSD have been established and highly used so to better prepare teachers to implement technology across the curriculum and so that the technology purchased was used productively. However, did staff development cross over to the students? Did the staff technology trainings provide the anticipated result that teachers will pass the knowledge onto their students?

Past DSUSD technology staff development trainings have provided many teachers with the skills and knowledge necessary for them to feel comfortable and confident in using the technology available to them. Technology educated teachers are now struggling with technology implementation and the integration of what they have learned into the not so ideal classroom. This project and research provided a sample of a staff technology training program that breeched the gap between the trainings and the classroom implementation. The project also evaluated whether or not the staff technology training program
resulted in increased student use of the available technology. Ultimately and the whole purpose of using technology in the classroom is to better prepare our students for their future. This research evaluated those building blocks that can lead to the successful implementation of technology into education.

Assumptions

The following assumptions were made regarding the project:

1. Staff development directly relates to technology integration in the classroom.

2. The majority of teachers involved in the study are at an intermediate level of knowledge in many computer application skills.

3. Teachers surveyed ideally want to implement technology into their lesson plans.

4. The lack of facilities and technical support greatly hinder the implementation of technology.

5. The lack of a technology plan and leadership to support that plan hinders the implementation of technology into the classroom.

6. Teachers do not exaggerate on their use of technology when answering the survey questions.
7. Teachers clearly understand what the survey questions are asking.

8. Teachers thoroughly update their CTAP2 survey answers at the end of the technology training.

Limitations and Delimitations

During the development of the project, a handful of limitations and delimitations were noted. These limitations and delimitations are presented in the next section.

Limitations

The following limitations apply to the project:

1. The CTAP2 online technology survey, provided by CTAP, did not note within the survey if it had been tested for reliability. The two questionnaires, used to assess the final project that was developed in the training, were not properly evaluated or tested for their reliability.

2. Methods of administering the surveys and questionnaires were diverse. In other words, some participants completed the surveys and questionnaires on their own time outside of the instructional setting, while others completed
them in the training setting with instructors available to provide support.

3. Teachers completing surveys and questionnaires may have embellished their skills or results. When completing evaluations, often teachers feel pressure to show growth or improvement and as a result of this pressure they may have exaggerated on their knowledge and use of computers.

Delimitations

The following delimitations apply to the project:

1. Steps could have been taken to make the administering of the surveys and questionnaires identical for all participants. The instructors could have required all participants to attend a mandatory session in which the instruments were administered in an identical manner. This would result in all participants being given identical explanations, descriptions, and support when taking the questionnaires and surveys. As a consequence of this method, results would be more reliable and consistent.
Definition of Terms

The following terms are defined as they apply to the project.

**Instructional Technology (IT)** - The Association for Educational Communications and Technology (AECT) officially adopted and approved the following definition of IT: "IT is the theory and practice of design, utilization, management and evaluation of processes and resources for learning" (Seels & Richey, 1994, p. 1).

**California Teachers Assessment Profile (CTAP2)** - is an on-line, self-assessment tool that allows educators to determine their level of technology proficiency - Introductory, Intermediate, or Proficient. The self-assessment is based upon rubrics established in each area of technology competency and aligned with the California Commission on Teacher Credentialing (CTC) "Factors to Consider," which is the Technology Standard for a California K-12 Preliminary Teaching Credential. Based on the results of the assessment, educators can view and select training opportunities that will advance their proficiency level. This description can be found at: http://ctap2.iassessment.org/ (January 25, 2002)
Organization of the Thesis

The project was divided into five chapters. Chapter one provides an introduction to the context of the problem, purpose of the project, significance of the project, limitations and delimitations and definitions of terms. Chapter Two consists of a review of relevant literature. Chapter Three documents the steps used in developing the project. Chapter Four presents the results and discussion from the project. Chapter Five presents conclusions and recommendations drawn from the development of the project. Finally, the Project references complete the project.
CHAPTER TWO
REVIEW OF THE LITERATURE

Introduction
Chapter Two consists of a discussion of the relevant literature. Specifically, the review will evaluate the introduction of technology into education, what must happen prior to the implementation of technology, how technology is currently being used in the classroom, and if staff development results in classroom implementation of technology. With this evaluation, an effective and successful sample of staff development that results in increased teacher implementation hopes to be identified.

Education and Technology
Teachers, it has been suggested, refrain from using computers in the classroom because computers cause them to question their existence as educators (Falk, 1987). For teachers to use computer technology, they must see it not as a challenge to their professional roles, but as a tool that will make their work easier. Teachers also need role models, encouragement, ongoing staff development, time to explore the capabilities of computer technology and a supportive environment (Hope, 1997). Before discussing the role of the teacher in integrating technology into
education, the research will first examine the change process that must take place in schools in order to advance them into the twenty-first century.

Technology in the Classroom

As a change agent, the principal must realize the teachers have emotions about computers and change. Most teachers are concerned about what computers will mean to them personally and professionally. Furthermore, the school’s culture and resource system must be able to promote and sustain a computer technology initiative and the principals must ask themselves which type of culture dominates their school (Hope, 1997). So one aspect to consider, before technology integration can occur and staff development can take place, is to recognize the culture of the school’s staff. But as Guba (1968) states, "The most innovative solutions to practical problems, the best packages of materials, can have no effect on practice if they are not diffused to the level of the practitioner," (p. 292) therefore consider your audience before becoming engulfed in elaborate schemes that set technology integration into motion. In light of that fact that few of America’s 2.8 million teachers use technology in their classrooms, it is safe to say that that diffusion has not occurred. It is possible that computer technology
will follow in the footsteps of so many other well-intentioned innovations that never became integral to the curriculum. Unless teachers have a change of heart or they are otherwise convinced or shown how to embrace it, technology will remain separate from the classroom curriculum (Hope, 1997).

With this information, it is quite obvious that there are many barriers to the integration of technology into education - including expertise, funds, ongoing support, leadership and supplies that must be addressed before contemplating the introduction of computers into his or her school or classroom. Teachers need to have sufficient opportunities to practice using computers, and they need technical assistance when they have questions or problems. If any one of these critical elements is not effectively addressed by a principal, teachers' acceptance and use of computer technology will be inhibited (Hope, 1997).

Technology and Teachers

With teachers playing a central role in the implementation of technology into the classroom and their struggle to implement technology, it is only necessary to question whether or not our students will be prepared for the future. Up until roughly twenty years ago, the technology that existed in our schools was at the very
least basic. Most school libraries were supplied with filmstrip and slide projectors, tape recorders, audio recorders and headphones, televisions, and the occasional videocassette recorder (VCR). There was a card catalog consisting of a large rectangular file with separate drawers for each letter of the alphabet and one card for each book on the shelf. Classrooms were void of any type of technological equipment except for the occasional "computer lab" where students could do nothing more than type term papers.

These types of materials not only limit the students' learning, they also inhibit teachers' methods of instruction, particularly in the elementary levels. Now more than ever, teachers are competing against many other outside forces for their students' attention. It is vital that they be given the tools they need to keep children interested in the lessons they are teaching. Among these tools lies the computer (Prawd, 1996). The dramatic developments in computer technology during the past three decades have influenced expectations from educational institutions. Now, educational institutions are expected to prepare the next generation of citizens for the technologically oriented world. Teacher education institutions are also being asked to prepare teachers for
the technology-enriched classrooms of the twenty-first century. For example, President Clinton challenged the United States to bring the power of the Information Age to students by connecting each classroom and library to the Internet before the twenty-first century (Clinton, 1997). However, Internet connections are useless unless teachers are adequately prepared and continuously supported in integrating computer technology into the classroom (Yildirim, 2000).

Preparing Teachers to Use Technology in the Classroom

Technology is defined as the process through which we attempt to expand human potential to improve and control our world (Seymour, 1993). Ever since technology was introduced to society educational institutions have struggled with how to teach with this tool that can enhance human potential and improve teaching. Similarly, teacher education programs have also struggled with the question of how to prepare prospective teachers for the next century (Yildirim, 2000).

A large body of literature supports the ideas that the biggest obstacle to teachers using technology in their classrooms is the lack of adequate teacher training (Yildirim & Kiraz, 1999). Perkins (1992) for example,
pointed out that teachers are not being adequately prepared for the challenges of the next century: "students are learning and teachers are teaching in much the same way they did twenty or even fifty years ago. In the age of Compact Disc's (CD's) and VCR's, communication satellites and laptop computers, education remains by large a traditional craft" (p. 3). Moursund (1989) is even more expressive in his criticism: "our colleges of education are doing a miserable job of preparing teachers to deal with the Information Age" (p. 9).

Perkins's (1992) and Moursund's standpoint in the issue of information technology and teacher education is one of the most detracting ones. However, there is a large body of literature that supports their point of view. In a report published by the United States Congress Office of Technology Assessment [OTA] (1995), it estimated that American schools have 5.8 million computers in use for instruction. However, the number of teachers who report little or no use of computers for instruction is still considerable. In the same report OTA also affirmed that teachers tend to use technology for instruction in traditional ways rather than as a tool to solve problems or improve students' critical thinking.
In most teacher education institutions, computer-specific courses are offered as an initial attempt to prepare a student teacher’s future in computer technology. In fact, most states require pre-service and in-service teachers to take a computer literacy course while fulfilling the requirements for a teaching credential. For example, Title 5 Regulation, in Section 44161.7 of the California Education Code (California State Legislature, 1997), requires teachers to take an educational computing course. These courses are usually designed to teach basic computer skills, introduce teachers to several common computer applications (e.g. word processing, spreadsheets, databases, telecommunications, and presentation programs), and teach how to integrate these applications into the classroom. These courses are intended to provide pre-service and in-service teachers with hands-on experience so they can integrate computer technologies into their teaching.

Despite the current attempts to prepare student teachers to use computer technology in the classroom, significant amounts of research indicate that, “teachers are more hesitant and less likely to embrace computer technology than other professionals” (Paprzycki & Vidakovic, 1994). According to Wetzel (1993), education
majors who become teachers report that they hesitate to use technology and do not feel prepared to integrate technology into their instruction when they are employed in schools. This raises questions about the effectiveness of the pre-service teachers' technology training.

Future of Technology and Teachers

According to the OTA (1995), more than thirteen hundred institutions of higher education now prepare future teachers in the United States; within the next decade, schools will need to hire nearly two million teachers. Teachers teach as they have been taught, and it is unlikely that computer skills will be transferred to students and encouraged by teachers unless the teachers have positive attitudes toward computer use. Hence, critical issues that need to be discussed for the fields of teacher education and technology include; an understanding of how pre-service and in-service teachers are trained and prepared for new technologies, the factors related to their attitudes, and how their attitudes and computer use are affected and improved through computer courses (Yildirim, 2000).

This factor brings us to our next topic of discussion which regards the recommendations that will improve the
likelihood of technology being implemented into the classroom.

Teachers and Technology Integration

Despite pressures on schools to increase the use of technology, the adoption of teaching and learning practices using new technologies has been limited (Kober, 1994). Although organizational research suggests that this requires change not just at the student-teacher interface but in a whole system, teachers play a central role in the successful implementation of computers in educational settings. The United States Congress OTA (1995) report states that helping teachers “effectively incorporate technology into the teaching and learning process is one of the most important steps the nation can take to make the most of past and continuing investments in educational technology” (Parr, 1999, p. 8).

It should not be taken lightly that the role of technology in education is a necessity and that the time and money spent on providing technology for our students should not be wasted. Therefore teachers need to have buy-in on the investment in educational technology. To take this investment to the next step the following suggestions can be used to introduce computer technology
and make the change process easier for schools and teachers.

Role of Technology in Education

Identify a purpose for computers in the school. It is an error to yield to the temptation of acquiring technology without planning for its use (OTA, 1995). Whatever the process, teachers first have to be able to use them appropriately. Expenditures for technical assistance, training for teachers, and release time for teachers to practice are all issues that schools must acknowledge when identifying what the computers are intended to accomplish in the school (Hope, 1997).

Involve teachers in the decision-making process. A school may not have many teachers who will have a use for one or more computer applications. Nevertheless, it is unwise to start computer technology process without involving all teachers. Including teachers in the planning process is a key part of ensuring that technology will be used (OTA, 1995). There are also certain questions about computers that need answers from the teachers' perspective. For instance, a principal needs to know whether teachers believe that computer technology is the solution to identified problems; such as can the technology improve low reading test scores. And the
principal needs to know what barriers teachers perceive exist in the school that may inhibit successful implementation of computer technology. A commitment from teachers to use computer technology is essential in attaining goals for computer use. Involving teachers - users and nonusers - in the advising and recommending of the use computers in the school is a practical means of moving a computer initiative forward. An array of teachers motivated by the potential of computers can ignite the interest of other teachers to become users. This shared leadership approach facilitates a "buy in" element that is central to teachers' acceptance of innovation (Hope, 1997).

Provide ongoing staff development. Training teachers to perform the expected tasks with computer technology is essential. That training needs to be ongoing and specific to the school's goals for introducing computers. Teachers will need time to practice, to experience the computer's capabilities and to plan its use. "One shot" and "show and tell" training sessions in which an expert demonstrates the computer's capabilities are neither sufficient nor suitable. Effective staff development sessions allow teachers to manipulate computer technology and practice the tasks that they will actually perform. When staff
development sessions end, teachers' access to computer technology needs to be immediate (Hope, 1997). These are just a few recommendations to prepare schools and teachers for the change process of technology integration into education. It is also important to recognize that not only staff development for practicing teachers is necessary but the preparation of pre-service teachers also requires intensive technology trainings to prepare them for technology-enriched classrooms of today. Here are a few recommendations by Yildirim (2000) for the practitioners and teacher education institutions in preparing pre-service teachers for the classroom.

1. Previous computer experience contributes to pre-service and in-service teachers' competency and has an effect on their attitudes. Therefore, teachers' computer competency should be assessed before they enroll in a computer competency course.

2. One way to encourage teachers to use computers in the classroom is to increase their level of competency. This can be achieved by providing several computer literacy courses tailored to specific levels of confidence, anxiety, and competency.
3. If more advanced computer courses are not available for those who are highly competent users, those individuals could be given more challenging assignments based on their competency levels and expectations. On the other hand, teachers with little or no prior experience should be provided with more personal attention to explore the basics of computers.

4. Faculty of teacher education programs should demonstrate their competency and willingness to use technology in teaching. They should be role models for prospective teachers in integrating technology into classroom teaching.

5. Teacher education programs should provide technology training for prospective teachers that can satisfy their specific needs in the schools at which they work. Therefore, teacher education institutions and schools districts should cooperate in designing technology-training curricula to meet teachers' specific technology needs.

Rational for Computers in the Classroom

With clear examples or recommendations of how to prepare all teachers for technology implementation, one
might then question what rational computers serve for schools or more importantly yet the students. In 1990, David Hawkridge produced four rationales for implementing computers in schools.

1. The Social Rational - The idea that children should be aware of how computers work, and the role they play in society

2. The Vocational Rational - Children may further their future employment opportunities by learning to operate computer equipment.

3. The Pedagogic Rationale - Computers can teach children to learn beyond traditional methods.

4. The Catalytic Rationale - Computers are catalysts of progress and change.

In the United States, the first two rationales are dominant, while the last two have yet to come full circle. Change is a challenge in any field, and educators are slowly getting used to the idea of becoming facilitators while engaging the computers in the teaching process. Of course, the United States is a long way from reaching the Pedagogic or Catalytic Rationales produced by Mr. Hawkridge (Prawd, 1996).

The rationales for the need of technology in education are convincing and they make evident the need of
technology in all classrooms. Every child should be afforded the right to the best education he or she can get. That is why teachers must be aware of these rationales and of the students needs. With this awareness there is more "buy in" to the integration of technology in education. This serves as a strong foundation to build upon when preparing teachers for the twenty-first century classroom.

Preparing Schools for Technology Implementation

This brings the topic of discussion back to the factors that must be in place in the schools before technology can be successfully infused. Without an effective needs assessment prior to implementation of technology, its effective and efficient use in achieving the expected outcomes is unlikely (Mathews, 2000). Possibly the most critical element for successful planning and implementation of any major initiative, particularly technology, is a technology plan. A technology plan is defined as a "written document that represents the very best thinking accumulated in a particular environment (school building, district, state, etc.) for the purpose of studying technology infusion, then recommending direction for the future" (Anderson, 1997). The necessary components of technology planning, as noted by Dr.
Anderson, are: a) initiating structure developing a technology planning team consisting of school personnel and other stake holders, b) vision building—formulation of belief and mission statements of the technology plan through consensus, c) development of goals and objectives, d) formulation of an action plan, e) implementation of the plan, and f) on-going evaluation.

An effective technology plan must have all of those components if one wants to see success in the implementation of technology in the classroom. The improvement in academic achievement by using educational technology in many of the nation’s schools has been dismal over the past decade. The failures have been attributed to such factors as: a) limited knowledge of technology by the teachers, b) a lack of technical support, c) a lack of time to learn about technology, d) technology plans based on numbers of machines and not learning outcomes, e) a lack of training and staff development. The National Educational Goals Report (1995) stated that only half of all teachers reported any professional development opportunities available to them in the areas of technology. Provisions for technology training and staff development must be included in technology planning. However, according to a technology study by Mann and
Shafer (1997), teachers reported spending three times as much of their own time learning technology as they spent in district sponsored training time. Hence, after the initial training phase, extra time commitment is required by teachers to master technology skills (Mathews, 2000).

The research and data strongly suggests the necessary component of implementing technology into the schools and curriculum requires not only training and staff development but also the time after the training to practice their newly learned skills. This opportunity will begin the transition of technology being used not only by the teacher but by the students in that teacher’s classroom as well. This is the first step in initiating this necessary transition of technology knowledge from the teacher to the student. Ideally, all staff development results in this transition, but not all staff development is designed to promote teacher use of technology in their classrooms. Next, it will be evaluated if staff development is in fact leading to increased student use of technology in the classroom. Are technology staff development trainings accomplishing the implementation of technology into the classroom curriculum?
How Technology is Being Used by Teachers

The research that follows starts by evaluating the role the teacher plays in implementing technology in the classroom followed by the discussion of what technology staff development components must be present to ensure implementation. Despite the fact that the number of computers in teachers' classrooms has increased dramatically in the last twenty years (OTA, 1995), researchers and educators alike still report that integrating technology into classroom curricula is not easily accomplished. Although many teachers today recognize the importance of integrating technology into their curricula, successful implementation often is hampered by both external (first-order) and internal (second-order) barriers (Ertmer, Addison, Lane, Ross, & Woods, 1999). Brickner (1995) extended the concept of first- and second-order change to categorize these obstacles as first- and second-order barriers to change. First-order barriers to technology integration include lack of access to computers and software, insufficient time to plan instruction, and inadequate technical and administrative support. In contrast, second-order barriers include beliefs about teaching, beliefs about computers,
established classroom practices, and unwillingness to change (Ertmer et al., 1999). Staff development needs to approach training with these barriers in mind if it wants to succeed in helping all teachers integrate technology into their curriculum. Clearly, changes in classroom practices will not occur simply because computers are more available in the classroom. Baker (as sited in Miller & Olson, 1994) describes teachers as viewing the computer as either an inspiration or an intrusion depending on the meanings and values they assign to technology.

It is generally acknowledged that teachers' uses of classroom technology evolve as they gain experience. Whereas teachers' initial uses tend to support existing teaching styles and methods, these approaches appear to change over time. Teachers' adoption and integration of technology is commonly described as being developmental—that is, progressing through a series of stages from nonuser to expert user (Sandholtz, Ringstaff, & Dwyer, 1997). As teachers advance through these stages, their technology use becomes more frequent, more sophisticated, and more creative— that is, they use more types of applications more often and more flexibly (Ertmer, et al., 1999). The barriers can be overcome with proper support
and training so that teachers can follow their own natural order of integrating technology.

Teachers often start by using technology to reinforce, support, enrich, or enhance their current classroom curricula. This can begin by teachers using technology as an incentive or as a reward for students completing assignments. Other teachers find a place for technology in their classrooms as "an add-on" for students to use the computer to practice skills. These are just a few samples of how technology can be introduced in the classroom and then possibly evolve to more sophisticated use over time. If staff development was added to this picture, would it evolve faster; would teachers be more likely to change their attitudes on computers and instead of viewing technology as a tool for "drill and practice" but as an opportunity for students to learn beyond traditional methods?

Teachers’ Reasons for Technology Use

Ertmer et al. (1999) published a study that examined the methods of implementing technology into the classroom and the observation of teachers integrating computers into their curriculum. The participating teachers, when asked why they used computers in their classrooms, cited five main reasons, four of which were related to how students
benefited from their use. Seven teachers mentioned how exciting and motivating computers were for their students. Six teachers mentioned how students needed to use technology to be prepared for the future. Additionally, five teachers described how technology made their lessons more interesting to students, either through direct interaction or by providing the teacher with access to more interesting materials. Four teachers made special mention of how technology enabled them to reach students with learning or attention problems (Ertmer et al., 1999).

Training Does Not Guarantee Integration

In contradiction to what is a stated above, Judy Parr’s (1999) research found that teachers that received a personal laptop and technology training in this study did not increase technology integration. Parr (1999) discovered that increased experience and personal competence did not ensure a comparable level of confidence or action in using the computers in the classroom. This data supports the findings of Wiley and Chrispeels (1997) that helping teachers to obtain computers for personal use, providing time for teachers to learn about educational technology and plan effective uses, and providing technical support are, in themselves, not sufficient to ensure a higher percentage of teachers
teaching with technology. It was not simply as Gilmore (1994) suggests, a case of when "teachers have sufficient confidence to introduce computers into their range of classroom tools; they are readily able to find innovative and productive ways of utilizing it" (p. 34). As others suggest (Friske, Knezek, Taylor, Thomas & Weibe, 1996), it is necessary that educators be equipped to use technology not just as a personal tool but as a standard tool of teaching. All too often trainings provide the teacher with skills on how to use the technology personally and not how to integrate it into the classroom. The question then remains as to what is involved in such a technology staff development program.

Parr (1999) suggests that there is a need in the staff development trainings for teachers to connect technological knowledge with pedagogical knowledge. The connection between technology and teaching is most likely to happen when teachers are supported to draw on their teaching experience and knowledge of classroom contexts as a basis for designing successful technology implementation. Other needs include that all teachers are supported to approach the teaching and learning process in a flexible way so that they are confident in employing a range of pedagogical practices with educational
technology. Also, the program should emphasize leadership from teachers who are early adopters. Effective teacher development and support needs to foster participation in a collaborative approach to technology implementation and to address the fact that there may be personal beliefs and institutional factors that influence successful implementation of computers into a classroom. Otherwise as Cohen (1988) suggests, to the extent technology is flexible, it will be bent to fit existing practice, and to the extent it cannot be bent, it will not be used.

From this review it is evident that there is not a clear answer to the successful development and implementation of teacher technology training. The suggestions are subjective to the subjects involved and it can be argued that what does work for one school may not work for another. This brings us back to the same discussion mentioned earlier that an assessment or evaluation of the school staffs needs is necessary for the development of an effective technology staff development training program. As a result of this needs assessment, teachers are more likely to connect technological knowledge with pedagogical knowledge.
Technology Staff Development and Classroom Implementation

This leads to the evaluation of staff development practices that have taken place in the past as well as in the present. The evaluation of other staff development trainings in technology will help to determine what seems to be effective and what seems to be ineffective. Research provides a variety of studies that have evaluated how technology training is presented to school staff and if that training succeeded in increasing the amount and level of technology being used in the classroom. After an evaluation of these studies, this research hopes to present a better understanding of the methods or practices that were used in popular technology training programs. Furthermore, the research will evaluate what programs resulted in an effective and productive technology teacher training that increased the technology integration into their curriculum.

Pre-service Technology Training

Yildirim's (2000) study, on the factors that contributed to computer use and the teachers' attitudes toward technology, helped define one way in which computer use can be assessed in pre-service technology trainings. Yildirim (2000), after his research, found that the
pre-service training to those with prior computer experience reported that the course did not contribute a great deal to their professional development, while inexperienced students thought that the course contributed significantly to their professional development. For the experienced user, the course or training needed to offer more practical ideas about using computers in the classroom. This finding suggests that pre-service teachers need to be offered training at a variety of levels so that it might meet more students’ technology training needs.

Based on Yildirim’s evaluation of a pre-service technology course, he offers a few recommendations for practitioners and teacher education institutions.

1. Previous computer experience contributes to pre-service and in-service teachers’ competency and has an effect on their attitudes. Therefore, teachers’ computer competency should be assessed before they enroll in a computer competency course.

2. One way to encourage teachers to use computers in the classroom is to increase their level of competency. This can be achieved by providing several computer literacy courses tailored to
specific levels of confidence, anxiety, and competency.

3. If more advanced computer courses are not available for those who are highly competent users, those individuals could be given more challenging assignments based on their competency levels and expectations. On the other hand, teachers with little or not prior experience should be provided with more personal attention to explore the basics of computers.

4. Faculty of teacher education programs should demonstrate their competency and willingness to use technology in teaching. They should be role models for prospective teachers in integrating technology into classroom teaching.

5. Teacher education programs provide technology training for prospective teachers that can satisfy their specific needs in the schools at which they work. Therefore, teacher education institutions and school districts should cooperate in designing technology-training curricula to meet teachers’ specific technology needs.
This evaluation of pre-service training gives an idea of how the teachers are being prepared before they move into the classroom. From this assessment it is evident that training will need to continue even when they have entered the classroom and that the school districts will need to provide the next level of training for these teachers.

From the training or courses discussed above, one can see the similarity between the training provided for the pre-service teachers and the classroom teachers. In both cases it is evident that teachers need to assess their level of technology knowledge and then from there be placed in a class that would meet their technology learning needs. Once again research supports the establishment of a pre-training assessment tool as well as a variety of levels of technology training.

Matching Support Strategies with Teachers' Levels of Use

In another study, preformed by Ertmer et al (1999), they evaluated the teachers' beliefs about the role of technology in the elementary classroom. They found that achieving meaningful technology use is a slow process that is influenced by many factors including both first- and second-order barriers. Knowing that teachers need more
equipment or more time to plan for technology use is critical, but it may not be enough. Understanding teachers’ goals for technology use and their beliefs about teaching and learning may be necessary to support teachers’ efforts to initiate and sustain the kind of second-order changes required for innovation to become practice.

Traditional staff development efforts have been based on the assumption that teachers can easily make the connections between the need for technology and identified instructional priorities. Yet in this study, teachers who used technology as a supplement struggled to make these connections. Staff development at this level might begin by challenging the belief that technology is an add-on. Demonstrations by peers, mentors, or development staff can illustrate ways to use technology to teach existing and expanded content. Time to learn skills, preview software, and explore available resources was considered critical by the teachers in this study. In addition, teachers might benefit from opportunities to observe and interact with other teachers who have resolved related concerns and problems in similar contexts. Relevance might be established further by testimonials from literature,
peers, or students that provide evidence of meaningful outcomes.

Teachers, in Ertmer et al's study, who used technology to support and enrich the existing curriculum, had used the technology within their established routines of classroom practice. Although these teachers were convinced of the relevancy of technology, they might benefit from developing a vision for use that goes beyond current topics and skills. This vision needs to be accompanied by ideas about how to support and manage students' exploration of individual topics. Observing or interacting (through conferences, site visits, and electronic discussions) with teachers who use problem-solving and application software in both whole- and small-group contexts can provide useful ideas and initiate meaningful discussions about alternative beliefs and practices. Involvement in Internet-based projects can introduce teachers to how others structure higher levels of use and provide additional excitement and motivation because of its collaborative nature.

In this study teachers using technology to facilitate an emerging curriculum were not observed, but it would be anticipated that teachers at this level would benefit from increased interactions with other teachers, mentors, and
even researchers. According to Sandholtz and colleagues (1997), "Teachers need increased and varied opportunities to see other teachers, to confront their actions and examine their motives, and to reflect critically on the consequences of their choices, decisions, and actions. They need opportunities for ongoing dialogue about their experiences and for continuous development of their abilities time to imagine and discover more powerful learning experiences for their students" (p. 51). In addition, these teachers should be encouraged to publish and present their experiences at local and national conferences as well as electronically on the World Wide Web as one way to support novice users who are struggling with issues they have already overcome or resolved.

The results from this study have implications for classroom teachers and educators involved in technology training efforts. It is important to recognize that teachers deal with both first- and second-order barriers to change. Second-order barriers may persist even when first-order barriers are removed. Based on these results, Ertmer and colleagues recommend that first- and second-order barriers be addressed simultaneously, as different types of barriers may be more or less critical at different levels of use. Based on the results of the
study, plus those reported in the literature, Ertmer and colleagues recommend using the following strategies to address barriers at each level of integration:

1. Incorporate a dual focus on technological and pedagogical issues during training efforts.
2. Foster a broader vision of technology integration.
3. Provide instructional resources (models, mentors, peers) during the change process.
4. Provide opportunities for reflection, collaboration, and discussions with peers.

With the evaluation of this research and these studies, a better understanding of how to develop and present technology staff development training for teachers has been uncovered. It is absolutely necessary to recognize the variety of barriers that prevent teachers from implementing technology into the classroom curriculum. Without an evaluation of these barriers even the most effective technology training will not result in classroom implementation. Ultimately, the goal is to have the technology used in the classroom and by the students and with this evaluation we can begin to see how teachers will integrate technology when first- and second-order barriers are addressed.
It is obvious that the presence of the computer in the classroom cannot alone be the catalyst for change but with the combination of classes, time for reflection on experiences and culture of the school, teachers can begin to move education into the 21st century. As Dexter, Anderson and Becker (1999) find; a simplistic view of the computer as a catalyst of instructional change is misleading because it disregards what we have learned about teacher development and the change process. Specifically, it underestimates the impact teachers' beliefs have on how they teach, it simplifies the process of how teachers develop and learn professional knowledge, and it diverts the examination of how social norms and structures might support or contradict a proposed change.

Instead, to understand the role computers play in changes to instructional practice, we should draw upon what is already established in the study of teacher development and school change. We should frame teachers as agents of change in need of a supportive context. If we view teachers as agents of change we will recognize that using computers in the classroom in a constructivist manner is a teacher's decision. To make this decision,
teachers will draw upon their knowledge and expertise of what works in the classroom. For that knowledge to include the use of computers, teachers must have opportunities with computers, models of how computers work in instruction, and opportunities to reflect on their and the computer’s roles in the learning process. In other words, they must be allowed to construct knowledge about educational technology. In this case, the school context plays a key role: it is in the workplace that the models should be situated, the opportunities for learning provided, and the positive reinforcement and support nurtured.

A supportive context with rich professional-development experiences and a professional culture that encourages reflection and trying new approaches will produce the learning necessary for technology use to become a part of a teacher’s decision making. This does not diminish teachers’ basic need for access to technology, technical support, and training and time to learn. It merely frames these needs in the larger context of factors conducive to a teacher’s learning to teach effectively with technology.

With this thought in mind, schools and teachers can then focus on the next relevant topic or concern that is
involved in implementing technology into the curriculum... that being staff development. With teachers being the "change agents", technology staff development needs to be developed and modeled so that the teachers can focus on pedagogical practices necessary for the successful implementation of technology into the curriculum. In order for teachers to practice technology implementation a couple different training techniques can be used to support the "transition" of what is learned to the classroom.

**Perspective on Preparing Teachers for Technology Implementation**

Before we discuss the techniques that can be used to effectively train and support teachers in technology implementation, we must evaluate the approach that teachers take when looking at integrating technology. When helping staff implement technology into the curriculum, one must take into consideration that the "transition" of learning and using technology in the classroom is different for each teacher.

Those of us who try to foster the use of technology in the schools are often guilty of being hubris: we start from a premise that the value of the new approach we urge is self-evident, and that teachers should naturally want
to shift their ways radically to take advantage of the new. Impatience is another characteristic of those interested in seeking transformation of the educational system through technology; they assume that schools, districts and the colleges that train teachers should push ahead with a variety of in-service workshops, short courses, and technology-specific pre-service course work. These ideas are powerfully expressed in much of the current writing on technology in the schools, whether written from the pro- or anti technology perspective: those who like technology want the changes they think it will bring to come as fast as possible, while those opposed fear that unplanned changes will come too rapidly, and thus harm the schools and their changes (Kerr, 1991).

The studies discussed by Kerr (1991), on the other hand, suggest that efforts to provide pre-service and in-service education about technology in the classroom should not proceed from an assumption that teachers' views of technology need to be "fixed," or that teachers are recalcitrant without reason in their approach to technology. The veteran teachers studied here had considered the use of technology thoughtfully and in their own ways, and found ways to incorporate it successfully into their practice. But while technology brought change,
that change was neither rapid nor revolutionary in the sense of forcing them to become radically new teachers over night. What happened, rather, was a measured development in their thinking about instruction, their role as teachers, and, most significantly, the look and feel of classrooms as the arenas where education takes place.

Teachers accommodate slowly to the new possibilities that technology presents, but that accommodation, when it happens, may in fact lead to new perceptions about teaching and about their roles as instructors. There are realizations that there are new ways of doing things, that students can use technology to work productively in groups, and that technology can make a contribution to out-of-class professional activity, but these take time to develop. When they do appear, they become parts of an integrated vision of classroom life that we probably should not expect to pass on to teachers through a work-shop lasting a single afternoon, or through a stand-alone course on technological applications taken as part of pre-service training (Kerr, 1991).

Approaches in Technology Education for Teachers

With this in mind, we need to develop staff development trainings that give teachers the time and
support to mold their own practices and methods for implementing technology into their curriculum. To get an idea of what programs seem to be effective in helping teachers evaluate the role of technology in their teaching style and helping them develop pedagogical practices that meet their needs, we will look at a few examples of research on staff development trainings that seem to have had a productive outcome.

One approach to providing in-service education and continuing school-based support needed by teachers to use computers effectively is mentoring. Computer mentor teachers take on a wide range of roles in helping novice teachers develop their use of technology. Mentors help by assisting these teachers with procedures, coaching in instructional matters, advising on classroom management, and providing emotional support when needed. Several important features from the literature on mentoring were incorporated in a design of one technology training program. For example, first of all mentors were selected based not only on experience with computers but also on recommendations from administrators that admired their teaching expertise and interpersonal skills. Second, mentors recruited protégés from their own schools to maximize opportunities for contact and the impact on
educational practice in individual schools. Third, a formal structure and incentives for both mentors and protégés were established to enhance commitment to the mentoring program and provide recognition for their efforts. Finally, support from principals was sought to ensure that participants would have the resources and administrative support needed to implement instructional changes (MacArthur & Pilato, 1995).

The Computer Mentoring Program was designed to provide long-term, on-site support focused on teachers' individual needs and the resources available at particular schools. The overall structure of the program included a course for mentors and a workshop for their protégés. Teachers with experience in using computers in their classes participated in a one-semester course that provided a) guidance on how to serve as a mentor to other teachers and b) information on specific technology applications and local resources. These teachers each mentored one to five teachers in their schools who were interested in making better use of technology in their teaching. The mentoring relationship was structured through the use of individual plans developed between mentor and protégé. Mentors and protégés met weekly for workshop sessions. Building administrators approved the
participation of their staff members, agreed to provide meeting time and computer access for mentors and protégés, and were encouraged to participate in planning goals for staff development at their schools (MacArthur & Pilato, 1995).

The results using this format for training teachers in technology integration rated as highly effective. The protégés were highly positive in their evaluations of the program. Most of the protégés agreed or strongly agreed that participation had increased their technical skills (96%) and knowledge about integrating computers with instruction (85%). Most of them also agreed that they had learned more from their mentors than from traditional in-service courses (88%), and that the individual mentoring plans were useful in structuring the learning process [94%] (MacArthur & Pilato, 1995).

In conclusion to MacArthur’s and Pilato’s (1995) research, the Computer Mentoring Program addressed the fact that teacher education is a critical factor in promoting the effective use of computers. Traditional in-service education, time-limited and decontextualized, cannot offer the on-site support that computer users require. To be effective, in-service methods must respond to the complexity of the process of adopting this new
instructional technology. This teacher mentor model proved to be highly appropriate in this area because of its ability to address a broad range of needs and to support an extended process of teacher development.

In a study by Maor (1999) on technology integration and teachers as learners, he also found similar conclusions to MacArthur’s and Pilato’s study. Maor (1999) studied how teachers behaved and interacted when put in the situation as learners using technology. The results of this study indicated that teachers preferred working co-operatively to overcome technical problems; that they engaged in discussions and reflections in order to solve problems and that they needed further support to attend to their students’ needs when using technology in the classroom. The teachers’ experiences as learners provided them with a better understanding of the learning process and helped them model teaching pedagogies appropriate for students working in a technology-learning environment.

In conclusion, looking at these two studies helped to determine what types of staff development programs helped teachers to see the value of technology in the classroom. This evaluation showed that both programs seem to be effective in helping teachers evaluate the role of technology in their teaching style and helping them
develop pedagogical practices that helped them implement technology into their curriculum.

**Classroom Modifications for Technology Implementation**

The final procedure for implementing technology that will be discussed and evaluated will be on classroom design. Often the implementation of technology results in the teacher developing new methods or molding old teaching methods to better implement technology into the classroom. Among the teachers in Kerr’s (1991) study and evaluation on Educational Technology, technology did not result in classrooms to be physically transformed in ways that were obvious and dramatic. These changes included, universally, a decrease in the amount of frontal instruction and a move toward more project activities and independent learning. In several cases, teachers noted that these changes allowed them to work more intensely with the students who most needed extra help, and that their need to manage behavior problems also decreased. The shift in classrooms toward a more individualized plan, then, is something technology surely facilitates. What is difficult to tell from the evaluation study at this point is the extent to which these teachers were already inclined toward an
individualized classroom arrangement prior to their involvement with the technology-based classrooms.

Technology can indeed become a fulcrum for educational change, but we should consider carefully the new patterns and ways of organizing classroom life. As we listen to the predictions of both the prophets and the doom-sayers, it is important to note that technology integration is really being promoted and modeled in the real classrooms. Instead of the machine-dependent, sterile, dehumanized environment pictured by the critics of technology, or the glorious hi-tech, efficient, and perhaps teacherless vision of technologists, teachers appear to be crafting their own new model of the present. The fulcrum of technology may in fact be providing a point around which classrooms can be restructured to feature the teacher, perhaps in a more complex and more demanding role than before, as organizer, encourager, director of and participant in classroom activities (Kerr, 1991). Once again we see that the teacher is the change agent and not the technology itself. Recognizing and implementing the practices and findings in each of the studies mentioned above will not only help give teachers the opportunity to learn and implement technology but prepare them and their
students for the twenty-first century and all its
technology involved careers.

As mentioned before, one cannot forget the
determining factor of technology integration that being
the teachers' attitudes. As explained by Ertmer and
colleagues (1999), "The problems of technology generally
arise from their novelty and their mismatch to the world
of schooling... This does not mean that the classroom
culture never changes; however, change is slow and
stimulated primarily by a perception among teachers that
new tools or approaches are valuable, easy to use, and
likely to endure in predictable form" (p. 11). Before
teachers embrace technology as an effective tool for
teaching and learning, they must believe that what they
are being asked to do will work and that it is the best
available solution to an identifiable educational problem.
If teachers are not convinced that student outcomes will
improve through the use of technology, they have less
incentive to incorporate it.

Summary of Technology Education for Teachers

As with any professional development endeavor, it is
critical that we know where we want to go, figure out how
information technologies will help us get there; involve
teachers deeply and continuously in on-site learning; hang

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in with them as the inevitable squalls of turmoil blow and recede; and, finally, have patience, for such changes in belief and practice take years (Ertmer et al, 1999). The infusing of technology into teaching requires a comprehensive approach that attempts to balance facilities, faculty professional development, course work and field experience. Finally, successful technology integration requires planning ahead, assessing your subjects, administrative support, clearly agreed upon goals by staff, time for practice and reflection, mentors and team work and training on the transition of technology skills that are learned into the classroom and most of all patience. This just briefly and quite simply describes the needs in preparing teachers for technology implementation into their curriculum.

Summary
The literature important to the project was presented in Chapter Two. From the information provided above, current staff development technology trainings can be evaluated to see if they are meeting some of the outlined requirements of success discussed in the Literature Review. As noted above, technology implementation is a complex and time consuming objective that requires
education to go beyond just staff development and demands that you look at the school and each individual staff member when determining how to prepare teachers to implement technology into the classroom.

With the in-depth look at research on technology in the classroom and preparing today’s teachers to use it, one can better prepare themselves and their staff to begin the challenge of transforming classroom thought and practice so that students are receiving a technology enriched education that better prepares them for 21st century and its careers.
CHAPTER THREE

METHODOLOGY

Introduction

Chapter Three documents the steps used in developing the project. Specifically, the format and techniques used to design the technology staff development training and the project are described. Following the discussion on the development of the project is the description of the population served in training. In conclusion, the explanation of the instruments used to collect the projects data is presented as well as a review of how the collected data was analyzed.

Project Overview

This section of the project provides an overview of how the technology staff development training program was designed as well as how it was evaluated.

Design

The study began in August of 2001 when DSUSD recruited over two hundred K-12 teachers to participate in a technology staff development training program. Participants were required to participate in a total of one hundred and twenty hours of training. The first forty hours took place in the summer of 2001 during a week long
training from August 13th to the 17th in which each day consisted of eight hours of training. In the summer training participants assessed their level of knowledge or skill in the use of computers. Once they determined if they were beginner, intermediate or advance, participants were placed in the appropriate level training program. This training was designed to not only teach them basic computer application skills but to bring the participants to a level of understanding so that they would be prepared for the next sixty hours of training in the fall. As an assessment tool, participants were required to take the CTAP2 survey at the beginning of this week and again at the end of the 120 hours of training.

In the fall teachers participated in a specific technology curriculum designed by Intel, classroom teachers, and many other Intel partners. The curriculum was developed to help teachers make technology centered lessons that were based on the California content standards. The goal of the program was to train classroom teachers on how to promote project-based learning and effectively integrate the use of computers into their existing curriculum to support student achievement. The curriculum used to meet this goal was the Intel Teach to the Future program.
The Intel program was used for the fall sixty hours of technology training. Participants met with their Intel Master Teacher or instructor for ten weeks; one day a week for four hours a session. During this time teachers were required to develop a series of projects that would support the final product, that being a unit lesson plan. The projects developed consisted of the following items. A teacher developed student sample of a PowerPoint presentation, a brochure or newsletter, and a website all based on specific California content standards. (A student sample is an example of the final product a student would make if they were to complete the assignment. A teacher develops and uses that student sample to help teach the unit when implementing it into the classroom).

Other products the teacher was required to develop in the Intel Teach to the Future program were student support materials such as worksheets or handouts. These support materials would help the student gather information to complete the student sample (i.e. PowerPoint, Brochure, or Website). Teachers also developed evaluation tools or rubrics to assess student work completed as a result of the unit lesson plan. And finally, a thorough and complete unit lesson plan was created with the help of a template. Teachers filled in the necessary components on the unit
lesson plan template so that it could be reproduced and used by others. The student samples, support materials, evaluation tools, and the unit lesson plan were all the projects that made up the final product of the Intel Teach to the Future program. The curriculum outline and description can also be found on the Intel website.

This Intel Teach to the Future program not only provided teachers with the opportunity to develop instructional tools and evaluation tools that supported their unit but also the time to develop implementation strategies for using it in the classroom setting. Along with the development of a unit, teachers were provided with the software and classroom management tips to learn how to develop a unit that was based on the content they teach. Teachers were also given the tools and management tips on how to implement it into their classroom. This encompassed the fall sixty hours of technology staff development training program.

The spring final twenty hours of training was described as the follow-up portion of the training program in that it was designed to summarize and wrap up what had happened in the previous sixty hour training. This final twenty hours was designed to be self-paced, self-directed, with more freedom for the participant to explore areas of
technology they may have had more interest in learning. Feedback and assignments in the follow-up portion of the program was provided through an online community.

In this portion of the program participants evaluated the role of technology in education by completing a critique of an article pertaining to that topic. This critique was completed and posted to an online community. During this follow-up training, participants also became more knowledgeable of technology through school site technology committees and specific technology programs designed within the school district. This was accomplished when they attended school site technology committee meetings and volunteered to attend district trainings on software like RiverDeep or Accelerated Reader.

The major component of the follow-up portion of the program was for participants to work on the implementation of their Intel unit plan into their classroom. Participants received time and support to work on the implementation of the product they developed in the previous sixty hours of training. Support was provided by their Intel Master Teacher in that they may have demonstrated how to integrate the lesson or they may have observed or critiqued the participating teachers’ methods of integrating the unit lesson plan.
The incentives of this training was the opportunity to receive free technology training and support, free Microsoft Office 2000 software, free Encarta 2000 software, optional college credit and a thousand dollar stipend provided by California State University Edtech program. This was available to all participants if they completed the full 120 hours of training.

To conclude the 120 hour training program, participants completed two questionnaires and one survey. To evaluate the final product developed as a result of the program and the impact the training may have had on that final product participants completed two questionnaires: Final Product Verses the Technology (Appendix A) and Final Product Verses the Program (Appendix B). The third evaluation tool was the CTAP2 Survey (Appendix C). This survey assessed the level of technology knowledge and skills gained as a result of completing the 120 technology staff development program. This survey was completed once at the beginning of the program and again at the end of the 120 hour of training program. These questionnaires and surveys will be discussed in more detail under the Instrument section of this project and they will provide the results and findings to be discussed in Chapter Four.
Resources and Content Validation

The curriculum and staff development program was designed and developed by Intel and their partners of teachers as well as an advisory committee of nine DSUSD technology instructors, five teachers, and three trained Instructional Technology educators who have all been in the field of technology and/or education for at least five years. This committee validated the curriculum and staff development by carefully reviewing and evaluating prior technology trainings, comparing survey results from past technology curriculum training, and assessing what educators needed or requested in staff development.

The CTAP2 survey and assessment tool was developed by iAssessment and funded by the California Technology Assistance Project Regions and the California Department of Education. This survey was recommended and required as per the California State University (CSU) Edtech grant requirements. Due to this technology staff development program being funded by the CSU Edtech grant program, it was required for participants to complete the CTAP2 survey twice.

The other two questionnaires used to assess the programs final products were developed, reviewed and recommended by the DSUSD advisory committee. This
committee was made up of three IT professors, one technology director, five technology project teachers, nine district technology staff development trainers, and five teachers from DSUSD K-12 classrooms.

Recommendations and evaluations will be made by this committee when determining what future adaptations or changes will be made to technology staff development opportunities.

Population Served

DSUSD has microwave connectivity to eighty percent of the school sites and the remainder twenty percent has fiber connectivity to the desktop. Every classroom has at least one computer and all fourth through eighth grade classrooms have at least four computers. Every teacher has email and access to the Internet. The district is made up of thirteen elementary schools, five middle schools and four high schools.

In the year 2001, this staff development opportunity in technology including the evaluation methods was presented to the Desert Sands Unified School District with a population of approximately 2000 educators. All teachers were presented this training opportunity and program in the spring of 2001. District technology project teachers
visited each school site. During this visit the project teacher presented the training program during a school site staff meeting. Interested teachers volunteered and signed up at that time to participate in this training.

Of those that were presented with this training opportunity, 201 of the 207 that signed up completed the full 120 hours of technology training. Participants were inclined to learn more about technology and how to personally use it as well as use it in the classroom. Almost forty percent of them had participated in past technology grant trainings and sixty percent were new to technology trainings provided by the district. Prior to the beginning of the training, the CTAP2 survey indicated that more than half of the participants had intermediate knowledge of computer application skills. Finally, almost all had interest in developing a product that they could use immediately in the classroom.

Protection of Human Subjects

The anonymity and the confidentiality of the participants and the data they provide in this study are protected. The data received has no reference to the participant’s names, grade level they teach, nor the school site at which they work. The only identification
given is the district they work for which is DSUSD. Therefore the anonymity and the confidentiality of the participants are protected.

Instruments

Three instruments were used to assess the results of the technology staff development program. The data used to formulate the assessment of the program was pre-existing and pre-organized.

The first two assessment questionnaires were required as part of the program's final product. In Questionnaire One, Final Product Verses the Technology (Appendix A); it was used to determine if the final product impacted the use of technology personally or in the classroom. Participants completed this questionnaire to evaluate if their final product impacted the use of technology in their classrooms. This questionnaire was given at the end of the training program. It consisted of twenty questions. When they answered each question, they gave a one if they strongly agreed, two if they agreed, 3 if they somewhat agreed, four if they disagreed, and a five if they strongly disagreed. Answers were based on if the development of the programs' final product resulted in an increased use of technology in the classroom.
In Questionnaire Two, Final Product Verses the Program (Appendix B); it followed the same format as Questionnaire One. The second questionnaires purpose was to determine if the final product would be improved if the technology training program was better designed. This survey consisted of sixteen rated questions. Again, participants rated questions from one to five by comparing the training format to the final product outcome.

The third instrument used was the CTAP2 survey. It was a self-assessment tool that allowed educators to determine their level of technology proficiency - Introductory, Intermediate, or Proficient. The self-assessment was based upon rubrics established in each area of technology competency and aligned with the California Commission on Teacher Credentialing (CTC) and the Technology Standards for a California K-12 preliminary Teaching Credential.

The CTAP2 survey was broken down into nine categories: 1) General Computer Knowledge and Skills 2) Internet 3) Email 4) Word Processing 5) Publishing 6) Databases 7) Spreadsheets 8) Presentation Software and 9) Instructional Technology. In each category the user assessed their level of technology knowledge or skills when they answered a series of questions within that
category. Once the user completed the survey, it determined if the user's technology skills and knowledge was Introductory, Intermediate, or Proficient. To view the rubric on how the survey determines which level the user was please refer to California Teachers Assessment Profile Survey Rubrics (Appendix D). The Proficient user was considered to be very skilled and knowledgeable in not only how to use the software but how to implement it into the classroom setting. The Intermediate user was knowledgeable in most areas of how to use the specific software but still was learning how to use it with their students. And the Introductory user was one that was still learning how to use the variety of software or applications. When the CTAP2 survey was completed, the online CTAP2 survey software organizes the participants' data and levels. The project analyzed this pre-existing and pre-organized data produced by the CTAP2 survey to determine if participants increased knowledge and use of technology.

These instruments, questionnaires one and two and the CTAP2 Survey, were used to determine if the technology training program was necessary and to determine what changes needed to be made to the program to improve or increase the use of technology in the classroom. Once
again the instruments were approved by the CTC, the California Department of Education and an advisory committee made up of technology professionals and educators.

Data Collection

With a clear understanding of the instruments used to collect the data, now will be the discussion of how that data was collected. The data was already provided as a result of the training program; therefore none of the data was really collected for this project. The project was based on existing data. This data was created as a result of participants completing the three instruments listed above. The instruments were administered as part of the technology staff development program. The project took this already established data to formulate its conclusions about the overall program.

Participants completed the online CTAP2 survey at the beginning and at the end of the program. Results of both those surveys were compared in this project. The surveys were completed by participants either in a class or on their own time either at school or at home. It had to be completed by April 15th, 2002. To complete the survey, one must have had access to a computer that was online.
The two questionnaires administered at the end of the program were given as hard copy and had to be completed and filled out by hand. Once again they were completed before April 15th, 2002 and on the participants own time. All hard copy questionnaires were turned into their Intel Master Teacher and then turned into the program coordinator. This overview explained the methods of administering the questionnaires and surveys as well as how the data was collected.

Data Analysis Procedures

The data that was analyzed is found in Appendixes E through I. All data gathered is presented in graphs and charts so to be easily read and understood. The data helped to determine if participant's level of knowledge improved and if the program was designed to increase the use of technology in the classroom.

The information gathered from the Questionnaire One, Final Product Verses the Technology (Appendix A), helped to determine if the development of the final product increased use of technology by the participant. The process used to determine the results of the questionnaire involved reading and recording each participant's response. For each question it was tabulated whether the
participant marked it as a one, two, three, four or five. Once all questionnaires were tabulated, one could determine the overall results of each question. The questions analyzed for Questionnaire One were numbers two, three, four, six and nine. The data for these questions are found in Appendix E.

The information gathered from Questionnaire Two, Final Product Verses the Program (Appendix B), helped to determine if the final product developed could have been improved if the training program design was changed. The same process described above was used to evaluate and tabulate the data from the second questionnaire. The questions analyzed for Questionnaire Two were numbers four, six, seven and eight. The results of this analysis can be found in Appendix F.

To gain access to the CTAP2 survey results, one would have to have administrative access. This online access allowed the project developer to view and compare the before and after results of the CTAP2 survey. The CTAP2 software or program had options within it that allowed the development of charts and graphs that compared pre and post CTAP2 survey results.

An explanation of the results of these questionnaires and surveys will be presented in Chapter Four. Also, at
that time, it will be explained as to why only certain questions within the questionnaires were used to determine the results of the training.

With the combination of these three questionnaires, the project anticipates to indicate that the technology staff development training was a necessity and that the training did in fact increase proficiency and increased technology integration into the classroom.

Summary

The steps and design of this technology staff development program was outlined as well as the tools that were used to assess technology skills learned and how to increase the use of technology in the classroom. The target population was K-12 educators that hoped to improve their technology skills as well as learn how to use technology in the classroom. The instruments used to gather the data were validated. Finally, the data analysis procedures were discussed and reviewed so that one would understand the purpose of the data collected.
CHAPTER FOUR
RESULTS AND DISCUSSION

Introduction

Included in Chapter Four was a presentation of the result of completing the project. Further, the chapter presented and evaluated the technology training’s survey findings and data. The Presentation of Findings looked at the data before and after the technology staff development training took place. The Discussion of Findings examined if technology training was a necessity for technology integration. It examined if training improved personal use of technology and if it increased the integration of technology into the classroom. Finally, the Discussion of Findings examined what changes needed to be made to the technology staff development to increase classroom use of technology.

Presentation of the Findings

In this section, the project will present and compare the existing data from the CTAP2 survey. The CTAP2 survey (Appendix C) was used at the beginning and at the end of the training; these surveys will be referred to as the Pre CTAP2 and the Post CTAP2 Surveys. Data from the Pre CTAP2 survey can be found in Appendix G and data from the Post
CTAP2 survey can be found in Appendix H and the comparison of the pre and post CTAP2 survey data can be found in Appendix I.

**Pre California Teacher Assessment Profile Survey Data**

Below is the graph of approximately 206 participants' levels of knowledge before the technology training took place. One can see the nine areas of concentration of the CTAP2 survey. This shows that prior to the training, the participants overall were at the intermediate level of knowledge and skills.

Due to prior training, participants were at a Proficient level in General Computer Knowledge and Skills and in Word Processing. In Internet, Email, Publishing, Databases, Spreadsheets, Presentation Software, and Instructional Technology participants were at an Intermediate level. From this graph, it is clear that participants or teachers still have more to learn, especially in the area of Instruction Technology.
Figure 1. Pre California Teacher Assessment Profile Results

<table>
<thead>
<tr>
<th>Category</th>
<th>Assessment Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 General Computer Knowledge and Skills</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>2 Internet</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>3 Email</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>4 Word Processing</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>5 Publishing</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>6 Databases</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>7 Spreadsheets</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>8 Presentation Software</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
<tr>
<td>9 Instructional Technology</td>
<td>Introductory</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
</tr>
</tbody>
</table>

Integrational Technology, the ninth CTAP2 category, will be the focus for this portion of the evaluation of
the data. This category looked at the teachers' abilities to develop lessons that implement technology, the teachers' abilities to assess student work done with the use of technology and the teachers' abilities to develop and use classroom management procedures when using technology in the classroom. Before the training, teachers were at an Intermediate level in this category which implicates that the teachers needed to learn more about the skills involved in the process of integrating technology into the curriculum. In the next section there is an in-depth look at if the training resulted in an increase in proficiency in the Integrational Technology category as well as in the other eight CTAP2 categories.

**Post California Teacher Assessment Profile Survey Data**

The data presented below for the Post CTAP2 survey shows the growth of knowledge and skills after 120 hours of technology staff development. This data was taken from the 196 participants that had completed the whole training and had taken the CTAP2 survey prior to the training and after the training had completed.

This graph shows that teachers reached Proficient levels in seven out of the nine categories. In the Pre CTAP2 survey teachers were only proficient in two of the
nine categories. Though they were on the verge of proficiency prior to the training, teachers still gained skills and knowledge to bring them to a level of better understanding in Technology Integration (CTAP2 category nine).

After completing the survey two or three times, teachers had a better understanding for the terminology used in the survey and therefore assessed their personal level more appropriately than in the beginning. It is also important to note that the staff development program did not involve any skills training in databases (category six) or spreadsheets (category seven); therefore growth in these areas were slight.

Figure 2. Post California Teacher Assessment Profile Results
In the ninth category Integrational Technology portion of the graph above, it illustrates that the participants improved in their proficiency and knowledge in this area. This shows that the participants had increased their ability to be able to effectively use technology in the classroom setting. And as a possible result of the training, teachers could better adapt lessons and classroom management procedures to implement the use of computers in the curriculum they teach.

This was just a brief overview of the data taken before and after the training using the CTAP2 survey. In the Discussion of Findings, there will be a more detailed comparison of the pre and post CTAP2 data.
Discussion of the Findings

Comparison of the Pre and Post California Teacher Assessment Profile Surveys Data

With the completion of the CTAP2 survey at the end of the training, a comparison of the data from the pre to the post CTAP2 survey was conducted. The comparison of the results from both surveys showed the impact the technology training had on improving teacher knowledge of computers and use of computers in the classroom.

Comparing the Pre CTAP2 graph and the Post CTAP2 graph, one would come up with a graph found in Appendix G also found in Figure 3.

Figure 3. Pre and Post California Teacher Assessment Profile Results
This graph shows that the format used in the technology staff development training helped to improve the participants' overall computer knowledge and skills.

The graph found in Figure 3 shows a variety of results. For example the bar graph for the post CTAP2 goes up which indicates that the training was useful to the participants. The graph also indicates that the participants in many categories went from an Intermediate level to a Proficient level of knowledge and understanding. The bar graph also implicates that the technology staff development training program must have provided lessons in almost all nine of the categories due to a rise of each bar.
If one takes a deeper look at the results, it can be exposed that the survey results are not a hundred percent reliable. First of all, one must note the difference in number of participants from the beginning of the training verses the number of participants at the end of the training. The difference can be accounted to a few factors. One being that during the beginning of the training some participants joined late and took the survey once in the middle of the training and once at the end. Also, if you compare the September 20, 2001 graph with the April 22, 2002 graph, the number of participants really went down, from 207 to 196. This shows that nine participants dropped the training all together or they never completed the survey before April 22\textsuperscript{nd}. From this information, it can be presumed that the results are not one hundred percent accurate or reliable in evaluating the impact the technology training had on all the teachers.

After further evaluation of the CTAP2 comparison graph and survey questions, it was found that teachers may have exaggerated the results in the attempt to look good. Teachers may have felt pressured to feel knowledgeable of the content and as a result embellished their skills. They may have also overestimated their abilities due to the lack of understanding some of the terminology in the
survey and checked that they were capable of skills that they truly were not capable of doing. These factors mentioned above could have altered the data, but if participants embellished each time they took the survey then the data would be consistent.

One example of how the embellishments impacted the results can be found in category six (databases) and seven (spreadsheets). The database and the spreadsheet categories both show increases in the knowledge gained, but ironically the staff development program did not involve any training in either of these areas. To explain the increase, one must assume that teachers felt obligated to show they improved and exaggerated their knowledge. Another explanation is that teachers better understood the terminology and found they could do more than they first suspected. Or, teachers felt more confident in their computer skills and attempted on their own time to advance their skills in some of the skill areas that were not part of the training. Any of the explanations discussed above could account for the increase in knowledge in the database and spreadsheet categories.

Looking even more in depth at the bar graph in Figure 3, teachers did increase their skills in a few areas regardless of their possible embellishments. For example,
two intensely taught skills in this training were category five, publishing, and category eight, presentation software. In both categories they showed dramatic increase in proficiency. This data demonstrates that the training did in fact increase the participants' level of proficiency.

The last category that will be compared in the CTAP2 survey is category nine, Integrational Technology. This category showed that there was an increase in proficiency in the teachers' abilities to use computers in the classroom, to be able to evaluate student-developed work that used technology and to be able to develop classroom management techniques to help implement technology into the curriculum. Although the graph illustrates that it has in fact increased, it is not hundred percent reliable. Similar to what was mentioned before, teachers may have exaggerated their level of proficiency in the Integrational Technology category by stating that they can implement technology into the curriculum but that does not mean that they are actually doing it. One method of determining if teachers are really using technology in the classroom is to go observe them. How teachers respond on the survey may not be actually taking place in the classroom. With further in depth observations, one could
thoroughly assess if in fact the training did truly increase the teachers' implementation of technology into the curriculum.

In conclusion, the data presented from the comparison of the pre and post CTAP2 surveys illustrates that the technology staff development helped teachers to improve their computer skills and knowledge as well as helped them learn how to integrate technology into their curriculum. Although some of the data is not a hundred percent reliable, the survey limitations have been noted and with the combination of the data taken from the CTAP2 survey and the data from the questions to come, the project can better indicate that the training did increase teacher integration of technology into the classroom.

Evaluation of Results from Questionnaires One and Two

With the completion of Questionnaires One and Two given at the end of the 120 hour technology staff development training, they helped answer the following questions: Was the training programs final product necessary for technology integration? Did the development of the final product improve the personal use of technology? Did the development of the final product increase the use of technology in the classroom? What
changes can be made to the technology staff development design to increase the use of your final product in the classroom? These were the main questions of the questionnaires that were evaluated.

Not all questions in the questionnaires were used in this evaluation. The reason being was that many of the questions were repetitive and some questions were difficult to understand and so they were thrown out. Also some of the questions did not relate to the final product so those as well were not used to evaluate the results of the two questionnaires. The data and graphs for these two questionnaires can be found in Appendix E and F.

Questionnaire One’s, Final Product Verses the Technology, main purpose was to determine if the technology training program and the development of its final product was necessary for technology integration to take place. Also the questionnaire evaluated if the development of the final product increased computer use and integration into the classroom. Questionnaire Two’s, Final Product Verses the Program, purpose was to determine what type or design of training program would improve the final product and increase the likelihood of that final product being used in classroom.
Using Questionnaire One, it was determined that the technology training program and the development of a final product was necessary for technology integration into the classroom. Question number three, of Questionnaire One, asked if teachers were well prepared before the training to integrate technology in the classroom. Most teachers replied that they were somewhat prepared, about 51%; while 21% said that they were not prepared at all to integrate technology into the classroom. To see if the program improved those results, question number two asked if the training and the development of the final product increased personal knowledge and use of computers and 88% of teachers replied that they agreed to strongly agreed that the training had improved their computer skills. And with the improvement of computer skills the likelihood of technology integration will most likely increase.

When teachers were asked in question number four if there was increase in the use of technology in their classrooms as a result of developing a final product, 32% of them strongly agreed and 39% agreed that the training did increase technology classroom integration. The questionnaire then asked in question number six if the teacher was better prepared to implement technology as a result of the technology training and the final product
development. 44% strongly agreed and 42% agreed that the training program better prepared them to implement technology into their curriculum.

Questionnaire One’s data showed that technology training program with the combination of the development of a final product was somewhat necessary for the implementation of technology in the classroom. In question number nine teachers were asked if they thought teachers would implement technology into their classroom without the requirement of a final product. Almost 50% of them stated that teachers will not implement technology without having to develop a product that is a result of participating in a training program. Therefore, from Questionnaire One, it can be concluded that the training with the requirement of final product was successful in increasing teacher’s technology skills and classroom integration of computers.

Finally, Questionnaire Two was evaluated, which helped to determine what types of technology trainings increased the integration of the final product into the classroom. This data fluctuated due to the teachers learning style and level of technology knowledge. For example more advanced teachers wanted online classes and the less experienced teacher wanted more face-to-face
training. But, for the most part teachers wanted to see more technology staff development training opportunities that would help them implement their final product into the classroom. A majority of participants did not want to see principal involvement in requiring teachers to take technology training or requiring them to implement the final product into their lessons. Teachers stated that they feared that it would result in more rules and requirements in career that already has too many demands to be met.

For the future technology staff development trainings, most teachers wanted to see more grade level specific technology trainings so that they could work together to build technology based lessons and classroom management skills in implementing their final product. Teachers also showed interest in trainings that provide mentors that could demonstrate and model how their final product could be implemented into the classroom. The mentor could help the technology-training teacher in the process of helping them develop classroom practices and procedures that result in the students using the computers. Finally, teachers wanted trainings to be in small groups for more one-on-one attention and support. The small groups would also allow more opportunities for
the trainer to go out to the participating teacher’s classroom to help model and support them in the task of technology integration. This information was determined by the evaluation of Questionnaire Two’s results.

Summary

Chapter Four was a presentation of the result of completing the project. The chapter presented and evaluated the three questionnaires used to assess the success of the technology staff development training. The Presentation of Findings stated the results of the pre and post CTAP survey, illustrated by graphs that supported the trainings positive impact on improving teachers’ computer skills. In final, the Discussion of Findings demonstrated that technology training is a necessity for technology integration to take place and the findings supported that the training did improve personal use of technology. But most importantly the evaluation of the data confirmed that the training did increase the integration of technology into the classroom by the participants.
CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

Introduction
Included in Chapter Five was a presentation of the conclusions gleamed as a result of completing the project. Further, the recommendations extracted from the project are presented. Lastly, the Chapter concludes with a summary of final thoughts on the project.

Conclusions
The following conclusions are based on the data evaluated during the duration of the DSUSD technology staff development training program. The below conclusions represent not only the outcomes that were found as a result of the analysis of the data but also the faults in the process of gathering that data.

The conclusions extracted from the project follows:
1. The training program indicated to have an impact on increasing teacher technology knowledge and skills;
2. The study showed that training was important in improving technology integration into the classroom;
3. The study confirmed that training resulted in an increase in personal use of technology by the participants;

4. The study showed that training resulted in an increase in the use of computers in the classroom;

5. The study demonstrated that the training better prepared teachers to want to integrate technology into the classroom;

6. The training improved the teachers skills in implementing technology into the classroom;

7. The training improved teachers skills to integrate technology into the curriculum;

8. The study showed that as a result of the teacher technology training more students were given further opportunities to use technology;

9. The questionnaires implicated that the development of a final product increased the use of technology by the participant;

10. The questionnaires implicated that the development of a final product increased the likelihood that the product will be used in the classroom;
11. With an evaluation of the training programs final product, it can be determined which training format best supports the development of that final product;

12. The evaluation of the final product helped to determine what training program formats work best in supporting the use of the final product in the classroom;

13. It is difficult to determine, other than through the teacher surveys, if in fact students are really using the computers;

14. It is hard to measure classroom integration of computers based only on teacher response;

15. With only the use of a survey, it is difficult to measure if the teachers have the skills to successfully implement technology into the classroom.

Recommendations

Although this study did to a degree indicate that technology training was necessary for most teachers to integrate technology into the curriculum, it was still a difficult concept to establish without question. Below is a list of recommendations on how the study and the
training could have been changed for more concrete results as well as recommendations on possible effective technology staff development formats or designs that would have improved teacher technology integration.

The recommendations resulting from the project follows:

1. Evaluate a specific grade level or group of teachers instead of everyone in the training;
2. Evaluate and assess the training over a longer period of time rather than just 120 hours;
3. Include an evaluation or an assessment of the students that were in the classes of a training participants;
4. Design different trainings for the different grades; for example elementary school teacher technology training and a middle school teacher technology training;
5. Do classroom observations of the teachers participating in the training to observe technology integration;
6. Provide school site technology mentors to assist participating teachers with technology implementation;
7. Have smaller class sizes, so the trainer to participant ratio is closer to 10 to 1;

8. Provide time for teachers to practice skills learned in the trainings and time to develop lessons that implement technology;

9. Provide time for the teachers to come together to discuss what is and is not working when integrating technology in their classrooms;

10. Provide more hands on training in classroom management to help teachers learn how to deal with students and the technology at the same time;

11. During the training provide more mentors to go into the participants classrooms to help model and demonstrate technology integration into the curriculum;

12. Before completing surveys, provide participants with definitions of terminology that is used in the survey so that they will have a better understanding of what it is asking them;

13. When teachers are completing the surveys, stress that they don’t embellish their skills and provide them with an environment that doesn’t
make them feel pressured or obligated to show growth;

14. Assess specifically how the teachers are integrating technology as a result of the training.

Summary

Chapter Five reviewed and presented the conclusions extracted from the project as well as the recommendations derived from the project. The objective of this project was to evaluate the DSUSD technology staff development training program. The projects author’s evaluation of the data obtained through assessment and research substantiates that the DSUSD technology staff development training provided a good foundation for teachers to learn how to seamlessly integrate technology into the curriculum.

In answering the question stated in this projects Introduction: Are student’s needs being met in the classroom concerning the necessary implementation of technology into the curriculum? The projects author believes that this technology staff development training program introduced teachers to the importance and the necessity to use technology in the classroom. And, in
fact, as a result of this training, more students are using computers in the classroom due to the teacher’s ability to now integrate technology into the curriculum. In conclusion, the ultimate result of having teachers trained in using and integrating technology did in fact happen as a result of the technology staff development training program because student exposure to technology in the classroom increased.

As with any professional development endeavor, it is critical that we know where we want to go, figure out how information technologies will help us get there; involve teachers deeply and continuously in on-site learning; hang in with them as the inevitable squalls of turmoil blow and recede; and, finally, have patience, for such changes in belief and practice take years (Ertmer et al, 1999). This project and technology staff development training program just touches on the very beginning of a career transforming event for the participating teachers.
APPENDIX A

QUESTIONNAIRE ONE FINAL

PRODUCT VERSES THE TECHNOLOGY
"FINAL PRODUCT VERSES THE TECHNOLOGY"

How many hours of professional development or training in the use of computers or the internet have you participated in during the past 5 years?

______________________________________________

What grade level do you teach? ____________________________________________

What subject(s) do you teach? ____________________________________________

On a scale from 1 to 5 rate your answers for the following questions.

1=Strongly Agree
2=Agree
3=Somewhat Agree
4=Disagree
5=Strongly Disagree

When ranking the following questions think about if your final product you developed in the technology training program could have been improved if the statement would have taken place:

_____ 1. Do you believe technology training should be required for teachers?

_____ 2. Did the development of the final product in improve your use of computers?

_____ 3. Before the development of your final product were you well prepared to use computers and/or the internet for classroom instruction or use?

_____ 4. Did the final product development increase the use of technology in the classroom?

_____ 5. Will the development of your final product increase the likelihood of you using technology in the classroom in the future?

_____ 6. Are you better prepared to implement technology after the training and the development of the final product?

_____ 7. Overall, Do you think that any technology training with the requirement of a final product increases the implementation of technology in the classroom?

_____ 8. Is staff development in technology and the final product necessary to increase the implementation of technology in the classroom?
9. Do you think teachers will implement technology into their curriculum without training or the development of a final product?

10. Do you think teachers will implement technology into their curriculum more with Principal support?

11. Do you think teachers will implement technology into their curriculum more with District support?

12. Do you think teachers will implement technology into their curriculum more with a site Technology Plan in that the teachers are highly knowledgeable of the plan?

13. Do you think students benefit from the implementation of technology (through your unit plan) into the curriculum?

14. Do you think that it is a disservice to the students to not have technology integration into the curriculum?

15. Do you think students need to have technology skills for their future?

16. With future participation in technology trainings will you implement technology into the classroom more often than now?

17. Do you think that school site discussions on technology integration would increase technology use by the site teachers?

18. Do you believe that a discussed and agreed upon school site technology plan will increase site technology integration?

19. Do you believe that technology informed and technology trained principals will increase technology integration in the classroom?

20. Do you believe that if principals held teachers accountable for technology integration in weekly submitted lesson plans, it would increase technology implementation in the classroom?
APPENDIX B

QUESTIONNAIRE TWO FINAL

PRODUCT VERSES THE PROGRAM
Final Product Verses The Program:

Rate the following questions from 1 to 5

1. Strongly Agree
2. Agree
3. Somewhat Agree
4. Disagree
5. Strongly Disagree

Before each statement below say: **Would your final product be improved...**

____ 1. If more of the following types of technology trainings were available?
____ 2. With more basic computer application skills classes
____ 3. With training on how to integrate technology into the curriculum
____ 4. With one on one informal technology training
____ 5. With small group technology training classes
____ 6. With subject specific technology training classes
____ 7. With grade level specific technology classes
____ 8. With online web-based technology training classes
____ 9. With site technology mentors available to observing and mentoring in the use of computers in the classroom
____ 10. With training offered during the school day
____ 11. With training offered after school
____ 12. With trainings offered in the evenings
____ 13. With trainings offered on the weekends
____ 14. With more trainings offered during the summer
____ 15. When site committees develop and share a technology plan for your school site?
____ 16. With the development of goals and objectives for the role of technology in education at your school site?
Rate the factors listed below in the order of what you think is most likely to increase the use of technology in all classrooms? (1 being most important and 7 being least important)

____ Site Technology Plans
____ More computer labs
____ More computers in the classrooms
____ Principals requiring technology use in submitted lesson plans
____ Technology Staff Development
____ Technical Support
____ Site Technology Mentors (to support you in using technology and help you implement technology into your curriculum)
APPENDIX C
CALIFORNIA TEACHER ASSESSMENT
PROFILE SURVEY QUESTIONS
## General Computer Knowledge and Skills
### General Knowledge of Basic Hardware and Software Terminology

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- [ ] I can identify hardware components, peripherals and their purpose.
- [ ] I can identify icons, windows, and menus.
- [ ] I know how to use icons, windows and menus.
- [ ] I know how to use basic peripherals (i.e. CD-ROM, storage media, etc.).
- [ ] I incorporate general knowledge of basic hardware and software into lesson design as appropriate (i.e. vocabulary, naming and saving conventions, printing, etc.).

### Operation and Care of Hardware

**Question 2:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- [ ] I know how to start up and shut down computers and peripherals.
- [ ] I know how to use a mouse.
- [ ] I know how to insert and eject diskettes, CD-ROMs, etc.
- [ ] I know how to use software from a disk, hard drive, or CD-ROM.
- [ ] I know how to perform regular computer maintenance tasks, (i.e. rebuilding the desktop, defragmenting the hard drive, running scan disk operation).
- [ ] I select and use appropriate anti-virus software.

**Question 3:**

- [ ] I know how to start an application and create a document.
- [ ] I know how to name, save, saves as, retrieve, and revise a document.
- [ ] I know how to initialize, format, and name diskettes.
- [ ] I know how to copy documents between the computer and diskettes.
I can open and work with more than one application at a time.

I have my files and programs organized.

I know how to create, name/rename folders and files.

I know how to organize the desktop.

I know how to adjust memory allocation to applications, if needed.

I can access and change my control panels.

I know how to set software preferences.

I know how to install software.

I know how to print a document.

I can choose my printer location (select a printer).

I regularly use print preview and options.

I know how to share files and printers on a network.

I know how to restart a frozen computer.

I can identify directly connected or networked printer problems.

I know how to solve simple printer problems with a directly connected printer.

I know how to troubleshoot basic hardware, software, and printing problems before accessing the appropriate level of support.

I know how to check cables for proper attachment to computer, peripherals, and power outlets.
I am comfortable troubleshooting common hardware, software, printing, and network problems before accessing the appropriate level of support.

### General Computer Knowledge and Skills

**Integration, Student Learning, and Classroom Management**

<table>
<thead>
<tr>
<th>Question</th>
<th>Select the item that best describes your current knowledge and/or skills. If unsure, select the lesser item.</th>
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</thead>
<tbody>
<tr>
<td>C</td>
<td>I am aware of various models for classroom management of technology tools.</td>
</tr>
<tr>
<td>C</td>
<td>I can explain various models for classroom management of technology tools.</td>
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<tr>
<td>C</td>
<td>I select and use effective classroom management techniques using technology in a limited number of educational settings.</td>
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<tr>
<td>C</td>
<td>I am comfortable teaching others how to use effective classroom management techniques using technology in various educational settings.</td>
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</table>

**Internet**

**General Knowledge and Skills**

<table>
<thead>
<tr>
<th>Question</th>
<th>Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.</th>
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</thead>
<tbody>
<tr>
<td>✔️</td>
<td>I know how to rename and organize links in a web browser Favorites or Personal toolbar.</td>
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<tr>
<td>✔️</td>
<td>I can launch an Internet browser and use the tool bar.</td>
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<tr>
<td>✔️</td>
<td>I can access the help feature of an Internet browser to find information on using the browser.</td>
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<tr>
<td>✔️</td>
<td>I know how to access the history feature to view a list of previously visited web sites.</td>
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<tr>
<td>✔️</td>
<td>I know how to hide and display the toolbar on an Internet browser.</td>
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<tr>
<td>✔️</td>
<td>I know how to change the settings on an Internet browser tool bar.</td>
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<tr>
<td>✔️</td>
<td>I know how to refresh or reload a web page in an Internet browser.</td>
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<tr>
<td>Question 1: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.</td>
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<td>--------------------------------------------------</td>
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<tr>
<td>I know how to rename and organize links in a web browser Favorites or Personal toolbar.</td>
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<td>I know how to access the Internet through a modem or network connection.</td>
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<td>I know how to change window sizes in a browser.</td>
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<td>I can configure preferences for an Internet browser.</td>
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<td>I can set the home page in an Internet browser.</td>
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<td>I know how to configure page setup in an Internet browser to print citation resources.</td>
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<tr>
<td>I know how to use and manage multiple windows in a browser.</td>
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<tr>
<td>I know how to designate the helper applications to be used to open files that I download from the Internet.</td>
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<tr>
<td>Question 2: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.</td>
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<tr>
<td>I know how to point and click to navigate on existing links.</td>
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<tr>
<td>I know how to save a web page as a file on my computer.</td>
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<tr>
<td>I know how to copy text on a web page and paste it into a document on my computer.</td>
<td></td>
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<tr>
<td>I know how to copy graphics on a web page and paste it into a document on my computer.</td>
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<tr>
<td>I know how to download files from the Internet to my computer.</td>
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<tr>
<td>I know how to export my bookmarks as an html file and open them using another computer or browser.</td>
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<tr>
<td>Question 3: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.</td>
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<tr>
<td>I know how to access bookmarks in Internet browsers.</td>
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<tr>
<td>I know how to add or delete a bookmark in an Internet browser.</td>
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<tr>
<td>I know how to organize bookmarks into sections and/or folders in an Internet browser.</td>
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<tr>
<td>Question 4: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.</td>
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<tr>
<td>I know how to enter a URL to access or open a specific web site.</td>
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<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Category</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet</td>
<td></td>
<td>I can explain basic Internet terminology (i.e. HTML, URL, links, download, etc.).</td>
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<td>I can explain the anatomy of a URL.</td>
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<td>I can troubleshoot URL address errors (i.e. 404 errors) to find the web site I am trying to access.</td>
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<tr>
<td>Communication</td>
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<td>I can explain the use of email as a means of communication with others.</td>
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<td>Collaboration</td>
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<td>I regularly use email to communicate with others.</td>
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<td>I regularly use email to communicate with members of a group. (i.e. listserv or personal distribution list)</td>
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<td>I can explain how chat, newsgroups, and threaded discussion lists are used to communicate with members of a group.</td>
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<tr>
<td></td>
<td></td>
<td>I regularly use chat, newsgroups, and threaded discussion lists to communicate with members of a group.</td>
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<tr>
<td>Research Tools</td>
<td></td>
<td>I know how to do a basic keyword search using an Internet browser or electronic reference source.</td>
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<td></td>
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<td>I can explain the differences among a search index, a search engine, and a metasearch tool.</td>
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<td>I know how to use Boolean logic in a search.</td>
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<td>I know how to conduct natural language searches.</td>
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<td>I use the Internet and other electronic reference tools as a resource for lesson development.</td>
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<td></td>
<td></td>
<td>I use the advanced search features of a search index, search engine, metasearch tool, or an electronic reference resource.</td>
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<td></td>
<td>I use multiple search strategies to locate and validate information.</td>
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<tr>
<td>Ethics and Policies</td>
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</tbody>
</table>
I am aware of issues involving the use of the Internet in the classroom for instruction.

I can explain the issues involving the use of the Internet in the classroom (i.e. AUP, copyright, student safety, classroom management, etc.).

I regularly implement procedures and classroom management techniques addressing Internet use in the classroom for instruction.

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### Internet

**Sub-Category:** Information Literacy

**Question:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I evaluate the information I locate on the Internet for accuracy.
- I determine if the source of the information I locate on the Internet is credible and unbiased.
- I organize the information I access to improve my ability to analyze and interpret the results.
- When conducting research, I analyze and interpret the information I locate.
- I filter information for relevancy to the lesson and content.
- I incorporate information literacy strategies into lesson design.
- I use a wide variety of sources such as Internet, electronic reference, and others, when conducting research.

### Internet

**Sub-Category:** Integration, Student Learning, and Classroom Management

**Question:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I am aware of Internet resources that can be used for student learning and/or classroom management.
- I assess Internet resources to determine if they would be appropriate for integrating into a lesson and/or for classroom management.
- I select and implement Internet resources into my classroom lessons.
- I select and use effective classroom management techniques utilizing Internet resources.

### Email

**Sub-Category:** General Knowledge and Skills
I can explain the three main components of an email address.  

I can explain telecommunication terms, (i.e. CC, BCC, Signature, attachment, etc.).  

I know how to create and use an address book.  

I can recognize and use web links embedded in a message.  

I know how to manage an address book (i.e. setting up mailing groups, importing data from other applications).  

I know how to locate, open, and manage attached files.  

I know how to launch an email program, retrieve, read, and send email.  

I know how to save, print, and delete email as appropriate.  

I compose, edit, and send new email messages.  

I regularly use CCs and BCCs email to interact with one or a group of people.  

I regularly use reply to sender, reply to all, and forwarding as appropriate.  

I compose email messages that compensate for the reader not seeing my body language or hearing my voice inflections.  

I employ email as a tool to interact with and provide information to students, parents and other community members.  

I can explain procedures and processes for use of email in the classroom.  

I can describe the uses of email in the classroom for connecting with others such as: keypals, global classrooms, parallel problem-solving, mentoring, etc.
### Design Curricular Lessons
- I design curricular lessons that utilize email as a part of the activity.

### Classroom Management
- I select and implement effective classroom management techniques using email in a limited number of educational settings.

### Teaching and Learning Process
- I select and implement appropriate email tools to effectively support the teaching and learning process.

### Email
#### Legal and Ethical

**Question 1** - Select all that apply to your current knowledge and/or skills. If unsure, do not select an item:

- I can explain netiquette to my classroom, co-workers, and other members of the community.
- I can explain issues surrounding student safety and security.
- I practice appropriate netiquette related to email.
- I implement practices related to issues of personal safety and security with regard to email.
- I regularly incorporate netiquette practices in my classroom instruction.
- I regularly implement student email safety and security procedures in my classroom instruction.

### Word Processing
#### General Knowledge and Skills

**Question 1** - Select all that apply to your current knowledge and/or skills. If unsure, do not select an item:

- I can identify word processing terms, such as font, style, tab, margin, table etc.
- I know how to preview a document to identify layout or print problems.
- I regularly use basic proofing tools (i.e. spell check, grammar check, etc.).
- I know how to find and replace text within a document.

**Question 2** - Select all that apply to your current knowledge and/or skills. If unsure, do not select an item:

- I can open, save, print, and delete a document.
- I know how to access and use the program Help function.
I know how to navigate in a large document.

I know how to save word processing documents in other file formats (i.e. TXT, HTML, RTF, etc.).

I know how to retrieve documents with the Find File command.

**Category:** Word Processing

**Sub-Category:** Communication through Printed Media

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.

- I know how to adjust tabs and margins.
- I know how to change on-screen view mode and magnification.
- I know how to apply borders to documents.
- I know how to create numbered and bulleted lists.
- I know how to add and delete page breaks, and create headers and footers.
- I enhance documents by inserting graphics.
- I incorporate drawing tools as appropriate.
- I know how to resize and relocate graphics within a document.

**Question 2:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.

- I know how to type, select, correct, and delete text within a document.
- I know how to apply and change fonts, characters, and paragraph formatting as appropriate.
- I know how to copy, cut, and paste text within and between documents.
- I can use styles to change the appearance of paragraphs and outlines.
- I know how to format text in columns with different fonts and colors.

**Question 3:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.

- I know how to create tables using built-in software assistance (i.e. wizards, etc.).
I regularly use templates to create documents.

I create templates for personal and/or student use.

I regularly use word processors to create lesson plans, articles, reports, etc.

**Category:** Word Processing

**Sub-Category:** Integration, Student Learning, and Classroom Management

**Question:** Select all that apply to your current knowledge and/or skills. If unsure, do not select item.

- I regularly use templates to create documents.
- I create templates for personal and/or student use.
- I regularly use word processors to create lesson plans, articles, reports, etc.
- I can define publishing terms (i.e. page layout, stories, fields, etc.).
- I know how to open, save, print and delete a document.
- I know how to access and use program Help.
- I preview documents to identify layout problems.
- I regularly use basic proofing tools (i.e. spell check, grammar check, etc.).
- I know how to navigate in a large document.
- I know how to find and replace text within a document.
- I know how to save text documents in other file formats (i.e. TXT, HTML, RTF, etc.).
I can identify types of publishing software (i.e. word processing, page layout, image/graphics, etc.).

I know how to create a new document.

I know how to change the document set-up.

I know how to create and modify headers and footers.

I know how to control page numberings.

I know how to change page tabs, margins, and indents.

I understand elements of basic design (i.e. white space, page layout, etc.)

I know how to change text alignment/justification.

I know how to copy, cut, and paste text and graphics.

I know how to change typefaces, font size, and other text attributes.

I know how to incorporate clip art.

I know how to use suitable size, style, and number of fonts.

I know how to create a simple shape graphic.

I know how to edit line and shape, style, and fill.

I know how to save publishing documents in appropriate formats (i.e. postscript, PDF, HTML, etc.).

I know how to undo unwanted changes.

I know how to change on-screen view mode and magnification.

I know how to create numbered and bulleted lists.

I know how to create multiple text columns.

I know how to import/place and resize graphics both as objects and as type.
I know how to move, arrange, and layer objects.

I know how to insert digital images from external sources (i.e. cameras, scanners, WWW, etc.).

I integrate and use various and appropriate software for publishing tasks (i.e. word processing, page layout, image/graphics, etc.).

### Publishing

#### Sub-Category: Integration, Student Learning, and Classroom Management

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I can describe various types of publishing media and their possible classroom application.
- I regularly select appropriate publishing media to support instructional objectives.
- I develop student assignments that embed elements of effective basic design in publishing.
- I regularly plan for effective classroom management of available publishing resources.

### Databases

#### Sub-Category: General Knowledge and Skills

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I can define database terms (i.e. records, fields, etc.).
- I know how to create, open, and save a database.
- I know how to format fields to reflect appropriate data (i.e. date, name, currency, etc.).
- I can explain differences among report, query, search, and find.
- I know how to add/edit headers and footers.

**Question 2:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I know how to select, move, copy, delete, clear and insert fields and records.
- I use print preview to identify print and layout problems.
- I know how to find and replace data in records and fields.
**Category:** Databases

**Sub-Category:** Manage Records

Question 1 - Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- [ ] I know how to sort, match, and go to specific records.
- [ ] I know how to import/export data from a database.
- [ ] I know how to enter text and data into appropriate fields.
- [ ] I know how to use Find command to locate a specific record.
- [ ] I know how to create and modify report layouts.
- [ ] I know how to merge database information with word processing documents to produce "form letters."

**Category:** Databases

**Sub-Category:** Communication through Printed Media

Question 1 - Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- [ ] I know how to sort data to produce reports (i.e. alphabetical listings, etc).
- [ ] I know how to format text and numbers in records or layouts (i.e. boldface, currency, time, etc).
- [ ] I know how to find or define data to print only required records (i.e. students reading at grade level, students with 3.0+ GPA, etc).
- [ ] I know how to import data from other applications.
- [ ] I regularly create new layouts or edit existing layouts for specific productivity or curricular goals.

**Category:** Databases

**Sub-Category:** Integration, Student Learning, and Classroom Management

Question 1 - Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- [ ] I can describe the educational uses of databases.
- [ ] I can identify lessons that require the manipulation of data.
- [ ] I create new databases related to content area (i.e. world populations, animal data, etc).
I design curricular lessons that utilize databases to enhance learning outcomes.

I regularly develop student assignments that require management and manipulation of a variety of data.

<table>
<thead>
<tr>
<th>Category: Spreadsheets</th>
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<tbody>
<tr>
<td>Sub-Category: General Knowledge and Skills</td>
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</tbody>
</table>

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.

- I can define spreadsheet terms (i.e. cells, alignment, formula, etc).
- I know how to create, open, and save a spreadsheet.
- I know how to navigate using the mouse and tabs.
- I know how to undo unwanted changes.
- I know how to move or copy sheets between spreadsheet files.

**Question 2:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.

- I know how to locate cells based on column/row addresses.
- I know how to select, move, copy, delete, clear and insert cells.
- I know how to change typeface, font size and other cell attributes.
- I know how to sort cells.
- I know how to replicate a formula or range of cells (i.e. “fill”).
- I know how to align and rotate text and numbers within a cell.

**Question 3:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.

- I know how to create simple bar or pie charts, create a variety of charts and label graphs appropriately.
- I know how to select charts for appropriate data representation.
- I know how to change size, placement, and title of charts.
- I know how to import/export charts and data into other applications (i.e. word processing, etc).

**Question 4:** Select all that apply to your current knowledge and/or skills. If unsure, do not select any item.
### Spreadsheets

#### Manage Records

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

| | I know how to select an entire column or row. |
| | I know how to resize cells and rows. |
| | I know how to add shading and borders. |
| | I know how to change text cell alignment and justification. |
| | I know how to save in a variety of formats (i.e. Tab Delimited, CSV, DBF, DIF, SYLK, etc.). |

| | I know how to enter text and data into specific cells. |
| | I know how to create formula cells (i.e. sums, average, etc). |
| | I know how to format cells for appropriate content (i.e. text, decimal alignment, currency, etc.). |
| | I utilize grade book templates. |
| | I maintain student records in a spreadsheet. |

#### Communication through Printed Media

**Question 1:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

| | I know how to adjust layout and margins. |
| | I know how to use print preview and print document with title. |
| | I know how to set up print options for grid lines, zoom, etc. |
| | I know how to create and edit headers, footers, and page numbers. |
| | I know how to change page margins. |
| | I know how to search for and replace text within a document. |
I know how to print a specific range of cells, pages, and sheets.

I import/export charts and data into a word processing application.

**Category:** Spreadsheets  
**Sub-Category:** Integration, Student Learning, and Classroom Management

**Questions:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I can describe the educational uses of spreadsheets.
- I occasionally create new spreadsheets related to content area.
- I regularly design curricular lessons requiring use of spreadsheets.
- I regularly create appropriate charts for a content lesson.

**Category:** Presentation Software  
**Sub-Category:** General Knowledge and Skills

**Questions:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I can define presentation and multimedia terms (i.e. slides/cards, slideshow, hype-navigation, etc).
- I know how to create, open, modify, and save presentations.
- I can define available tools (i.e. drawing, text, etc).
- I know how to use templates or wizards to create new presentations.
- I regularly use available tools (i.e. drawing, text, etc.).
- I know how to connect, configure, and troubleshoot peripheral devices for presentation.
- I know how to create a presentation to automatically play using timed settings.

**Questions:** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I know how to insert, format text, or add text boxes to a presentation.
- I know how to add new slides or cards.
- I know how to insert or change slide or card design.
| I know how to re-arrange the order of the slides or cards in the presentation. |
| I know how to organize presentation resources in a folder on the desktop or server. |
| I know how to apply transitions and effects, if appropriate, to slides or cards. |
| Question: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item. |
| I know how to navigate using scrollbar, slide sorter, menu, key commands, etc. |
| I know how to switch between different page views. |
| I know how to create and edit navigational buttons to help users move through a presentation. |
| I know how to create presentations that are clear and easy to understand. |
| I know how to apply backgrounds and objects appropriately. |
| I know how to incorporate sound. |
| I can define different image types (i.e. TIFF, GIF, PCX, etc.). |
| I know how to incorporate hypertext links, animations from library, movies from library, and clip art from other sources. |
| I know how to record and insert sound into presentation. |
| I know how to edit clip art (if appropriate). |

**Presentation Software**

**Sub-Category: Communication through Printed Media**

Question: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

| I know how to print presentation slides. |
| My documents demonstrate an understanding of basic design elements (i.e. color, design, space, and composition, etc.). |
| I know how to print using advanced printing options. |
| I print handouts that enhance the instructional objectives (i.e. outlines, notes, etc.). |
### Presentation Software

**Integration, Student Learning, and Classroom Management**

**Question 1**: Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- I can describe the educational uses of presentation software.
- I know how to create cards or slides using effective design to enhance communication.
- I use appropriate background and text colors to ensure clarity and readability.
- I organize information in a clear, consistent way for the viewer.
- I regularly design curricular lessons that utilize multimedia to enhance learning outcomes.
- I follow fair use and copyright law for text, graphics, and sound.

### Instructional Technology

**Analyzes Best Practices**

**Question 1**: Select the item that best describes to your current knowledge and/or skills. If unsure, select the lesser item.

- I occasionally locate computer-based technology learning, teaching, and communication resources related to implementation in the classroom.
- I am able to locate and adapt computer-based technology lessons based upon best practices and research findings.
- I know how to analyze best practices and research findings on the use of computer-based technology and design lessons accordingly.

### Instructional Technology

**Selection of Appropriate Technology Resources**

**Question 1**: Select the item that best describes to your current knowledge and/or skills. If unsure, select the lesser item.

- I can describe or list some of the established criteria used to evaluate digital media.
- I often practice evaluating educational digital media using established criteria.
- I regularly evaluate educational digital media using established criteria.
### Instructional Technology

#### Sub-Category: Matching Student Learning Styles to Appropriate Resources

**Question 1** Select the item that best describes to your current knowledge and/or skills. If unsure, select the lesser item.

- [ ] I am aware of learning style inventories for students.
- [ ] I know how to examine a variety of computer-based technology resources for their applicability to learning styles.
- [ ] I know how to select and use activities to identify student learning styles.
- [ ] I occasionally use a variety of computer-based technology resources in lesson plans to meet student learning styles.
- [ ] I regularly integrate appropriate computer-based technology resources and adapt lessons and classroom practice according to learning style inventory results.

---

### Instructional Technology

#### Sub-Category: Effective Learning Environments Using Computer-Based Technology

**Question 1** Select all that apply to your current knowledge and/or skills. If unsure, do not select an item.

- [ ] I can describe various models of computer-based technology use that enhance learning and increase efficiency and productivity.
- [ ] I know how to use teacher productivity tools for classroom management (e.g. home-school communication, student records and grades, etc).
- [ ] My lesson plans reflect a management system for computer-based activities.
- [ ] I effectively use computer-based technology in a variety of instructional settings (i.e. whole class, small groups, and individual instruction).
- [ ] My classroom activities allow all students to build upon their technology skill and increase learning.
- [ ] I regularly implement management procedures that support assessment of student involvement and achievement related to computer-based technology assignments.

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### Privacy, Security, and Safety Issues

**Question:** Select all that apply to your current knowledge and/or skills. 
*Note: Do not select all items.*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>I can explain the need for and use of copyright policy, protection of student privacy, security and safety.</td>
</tr>
<tr>
<td>✓</td>
<td>I regularly implement established policies for safe, private and secure practices in personal work.</td>
</tr>
<tr>
<td>✓</td>
<td>I personally implement established policies surrounding copyright and plagiarism.</td>
</tr>
<tr>
<td>✓</td>
<td>I regularly implement established policies for safe, private, and secure practices in the classroom.</td>
</tr>
<tr>
<td>✓</td>
<td>I regularly implement policies surrounding copyright and plagiarism in the classroom.</td>
</tr>
</tbody>
</table>
APPENDIX D

CALIFORNIA TEACHERS ASSESSMENT

PROFILE SURVEY RUBRICS
### Rubric Category - General Computer Knowledge and Skills

Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>General Knowledge of Basic Hardware and Software Terminology</th>
</tr>
</thead>
</table>
| Introductory | - Identifies hardware components, peripherals and their purpose  
- Identifies icons, windows and menus |
| Intermediate | - Uses icons, windows and menus  
- Uses basic peripherals (e.g. CD-ROM, storage media, etc.) |
| Proficient   | - Incorporates general knowledge of basic hardware and software into lesson design as appropriate (e.g. vocabulary, naming and saving conventions, printing, etc.) |

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Operation and Care of Hardware</th>
</tr>
</thead>
</table>
| Introductory | - Starts up and shuts down computer and peripherals  
- Uses a mouse  
- Inserts and ejects diskettes, CD-ROM, etc.  
- Uses software from a disk, hard drive, or CD-ROM  
- Creates, names/renames folders and files  
- Starts an application and creates a document  
- Names, saves, saves as, retrieves and revises a document  
- Prints documents |
| Intermediate | - Organizes the desktop  
- Initializes, formats, names diskettes  
- Copies documents between computer and diskettes  
- Chooses printer location |
| Proficient   | - Allocates memory needed by applications  
- Accesses and changes control panels  
- Sets software preferences  
- Makes more system memory available  
- Performs regular maintenance  
- Organizes files and programs  
- Uses print preview and options |
- Opens and works with more than one application at a time
- Shares files and printers on a network
- Installs software
- Selects and uses appropriate anti virus software

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Introductory</th>
<th>Intermediate</th>
<th>Proficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Restarts a frozen compute</td>
<td>- Troubleshoots basic hardware, software and printing problems before accessing the appropriate level of support</td>
<td>- Troubleshoots common hardware, software, printing and network problems before accessing the appropriate level of support</td>
</tr>
<tr>
<td></td>
<td>- Identifies directly connected or networked printer problems</td>
<td>- Checks cables for proper attachment</td>
<td>- Solves simple printer problems with directly connected printer</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>Rubric Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Word Processing</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Knowledge and Skills</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory</td>
<td>- Identifies word processing terms (e.g., word processing, cursor, styles, etc.)</td>
<td>- Opens, saves, prints and deletes a document</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>- Navigates in a large document</td>
<td></td>
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</tr>
<tr>
<td>Sub-Category: Communication through Printed Media</td>
<td></td>
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<td></td>
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<tr>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Accesses and uses Help</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Previews document to identify layout problems</td>
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<tr>
<td>- Uses basic proofing tools (e.g. spell check, grammar check)</td>
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<tr>
<td>Introductory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Finds and replaces text</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Saves word processing documents in other file formats</td>
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<tr>
<td>- Retrieves documents with the find file command</td>
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</tr>
<tr>
<td>Intermediate</td>
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<tr>
<td>- Types, selects, corrects, deletes, text within a document</td>
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<tr>
<td>- Adjusts tabs and margins</td>
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<tr>
<td>- Applies and changes font, character and paragraph formatting</td>
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<tr>
<td>- Changes on-screen view mode and magnification</td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Proficient</td>
<td></td>
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</tr>
<tr>
<td>- Copies, pastes text within and between documents</td>
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<tr>
<td>- Uses styles to change the appearance of paragraphs and outlines</td>
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<td></td>
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<tr>
<td>- Uses templates</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Applies borders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Creates numbered and bulleted lists</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Adds and deletes page breaks, and creates headers and footers</td>
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<tr>
<td>- Creates tables using built-in software assistance</td>
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<tr>
<td>Rubric Category – Email</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>- Transcribes handwritten documents into word processed documents</td>
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<td></td>
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<tr>
<td>- Creates a simple word processed document</td>
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<tr>
<td>Proficient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Creates enhanced word processed documents for classroom use</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>- Designs lessons that utilize word processing as part of the activity</td>
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</tr>
</tbody>
</table>
Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>General Knowledge and Skills</th>
</tr>
</thead>
</table>
| **Introductory** | - Explains telecommunications terms  
| | - Explains the 3 main components of an email address |
| **Intermediate** | - Configures email preferences  
| | - Attaches, receives and opens attachments  
| | - Creates and uses an address book  
| | - Recognizes and uses embedded web links |
| **Proficient** | - Manages an address book  
| | - Locates, opens and manages attached files |

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Communication and Collaboration</th>
</tr>
</thead>
</table>
| **Introductory** | - Starts up program, retrieves and reads email  
| | - Saves, prints and deletes email  
| | - Composes, edits, and sends new email |
| **Intermediate** | - Uses reply to sender, reply to all and forwarding appropriately  
| | - CC?S and BCC?S email to interact with one or a few people |
| **Proficient** | - Employs email as a tool to interact with and provide information to students, parents, and other community members |

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Integration, Student Learning, and Classroom Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introductory</strong></td>
<td>- Explains procedures and processes for use of email in the classroom</td>
</tr>
<tr>
<td><strong>Intermediate</strong></td>
<td>- Describes use of email in the classroom for connecting with others such as: keypals, global classrooms, parallel problem-solving, mentoring, etc.</td>
</tr>
</tbody>
</table>
| **Proficient** | - Designs curricular lessons which utilize email as a part of the activity  
| | - Selects and uses effective classroom management techniques using email in a limited number of educational settings  
| | - Selects and implements appropriate email tools to support teaching and learning |
### Rubric Category – Internet

Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Legal and Ethical</th>
</tr>
</thead>
</table>
| Introductory | - Explains netiquette  
                - Explains issues surrounding student safety and security |
| Intermediate | - Practices appropriate netiquette related to email  
                - Implements issues related to personal safety and security |
| Proficient   | - Incorporates netiquette in classroom instruction  
                - Implements student safety and security procedures in instruction |

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>General Knowledge and Skills</th>
</tr>
</thead>
</table>
| Introductory | - Launches a browser and uses the tool bar  
                - Specifies a URL and can point and click to navigate on existing links  
                - Changes window sizes  
                - Views history  
                - Accesses help file  
                - Explains basic internet terminology  
                - Accesses Internet through a modem or network |
| Intermediate | - Explains the anatomy of a URL  
                - Configures preferences for software  
                - Sets a home page  
                - Refreshes or reloads a page  
                - Hides, displays or configures the tool bar  
                - Locates and opens a local file within the browser  
                - Copies, pastes and saves from web pages  
                - Downloads files  
                - Configures page setup to print citation resources |
| Proficient   | - Selects helper files/applications used to open downloaded files  
                - Maintains and organizes bookmarks/favorites  
                - Troubleshoots address errors (i.e. 404 errors)  
                - Uses and manages multiple windows |
<table>
<thead>
<tr>
<th>Sub-Category: Research Tools</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory</td>
<td>- Conducts basic searches</td>
</tr>
<tr>
<td>Intermediate</td>
<td>- Explains the differences between search indexes, search engines and metasearch tools</td>
</tr>
<tr>
<td></td>
<td>- Understands Boolean logic</td>
</tr>
<tr>
<td></td>
<td>- Conducts natural language searches</td>
</tr>
<tr>
<td>Proficient</td>
<td>- Uses advanced search features</td>
</tr>
<tr>
<td></td>
<td>- Conducts multiple search strategies to locate and validate information</td>
</tr>
<tr>
<td></td>
<td>- Uses internet search as a resource for lesson development</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub-Category: Ethics and Policies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>- Explains issues surrounding Internet use in the classroom (e.g. copyright, management, student safety, AUP, etc.)</td>
</tr>
<tr>
<td>Proficient</td>
<td>- Implements procedures and management techniques concerning Internet use in the classroom for instruction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub-Category: Information Literacy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory</td>
<td>- Evaluates information for accuracy</td>
</tr>
<tr>
<td></td>
<td>- Identifies whether a source is credible</td>
</tr>
<tr>
<td>Intermediate</td>
<td>- Organizes information</td>
</tr>
<tr>
<td></td>
<td>- Analyzes and interprets information</td>
</tr>
<tr>
<td>Proficient</td>
<td>- Uses a wide variety of sources</td>
</tr>
<tr>
<td></td>
<td>- Filters information for relevancy</td>
</tr>
<tr>
<td></td>
<td>- Incorporates information literacy strategies into lesson design</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub-Category: Integration, Student Learning, and Classroom Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>- Locates resources appropriate for integrating technology into lessor</td>
</tr>
</tbody>
</table>
### Rubric - Presentation Software

Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>General Knowledge and Skills</th>
</tr>
</thead>
</table>
| Introductory | - Defines presentation and multimedia terms (e.g. slides/cards, slideshow, hyper-navigation, etc.)  
- Creates, opens, modifies and saves presentations  
- Defines available tools (e.g. drawing, text, etc.)  
- Uses templates or wizards to create a new presentation  
- Adds new slides or cards  
- Inserts text, formats text or adds text box  
- Uses toolbar or menus to apply formatting changes  
- Inserts clip art or digitized pictures |
| Intermediate | - Inserts or changes slide or card design  
- Navigates using scrollbar, slide sorter, menu, key commands, etc.  
- Switches between different page views  
- Re-arranges the order of slides or cards  
- Applies backgrounds and objects appropriately  
- Uses available tools (e.g. drawing, text, etc.)  
- Incorporates sound  
- Defines different image types (i.e. TIFF, GIF, PCX)  
- Connects, configures and troubleshoots peripheral devices for presentation |
| Proficient   | - Creates and edits navigational buttons to move through presentation  
- Navigation through presentation is clear and easy to understand  
- Applies transitions and effects, if appropriate, to slides or cards  
- Incorporates hypertext links  
- Incorporates animations from library  
- Incorporates movies from library  
- Records sound and inserts in presentation  
- Incorporates clip art from other sources (e.g. web, scanner, etc.) |
<table>
<thead>
<tr>
<th>Subcategory:</th>
<th>Presentation Resources Management</th>
</tr>
</thead>
</table>
| Introductory | - Organizes presentation resources in a folder on the desktop or server  
                 - Edits clip art (if appropriate) |
| Intermediate | - Demonstrates understanding of basic design elements (i.e. color, design, space and composition)  
                 - Prints using advanced printing options |
| Proficient | - Prints handouts that enhance instructional objectives (e.g. outlines, notes, etc.) |

<table>
<thead>
<tr>
<th>Subcategory:</th>
<th>Printed Media - Communication through Printed Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory</td>
<td>- Prints slides</td>
</tr>
</tbody>
</table>
| Intermediate | - Organizes information in a clear, consistent way for the viewer  
                 - Creates cards or slides using effective design to enhance communication  
                 - Uses appropriate background and text colors to ensure clarity and readability |
| Proficient | - Designs curricular lessons which utilize multimedia to enhance learning outcomes  
                 - Follows fair use and copyright law for text, graphics, and sound |

**Rubric Category – Publishing**

Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Subcategory:</th>
<th>General Knowledge and Skills</th>
</tr>
</thead>
</table>
| Introductory | - Defines publishing terms (e.g., page layout, stories, fields, etc.)  
                 - Opens, saves, prints and deletes a document |
| Intermediate | - Navigates in a large document  
                 - Accesses and uses Help  
                 - Previews document to identify layout problems  
                 - Uses basic proofing tools (e.g. spell check, grammar check) |
<table>
<thead>
<tr>
<th>Sub-Category:</th>
<th>Communication through Printed Media</th>
</tr>
</thead>
</table>
| **Proficient** | Finds and replaces text  
- Saves text documents in other file formats |

<table>
<thead>
<tr>
<th>Sub-Category:</th>
<th>Integration, Student Learning, and Classroom Management</th>
</tr>
</thead>
</table>
| **Introductory** | - Creates a new document  
- Changes document setup  
- Copies, cuts and pastes text and graphics  
- Changes on-screen view mode and magnification  
- Incorporates clip art  
- Changes typefaces, font size and other text attributes  
- Changes text alignment/justification  
- Identifies types of publishing software (e.g. word processing, page layout, image/graphic, etc.)  
- Undo unwanted changes |

| **Intermediate** | - Imports/ places and resizes graphics, (e.g. clip art, charts, auto-shapes, etc.) both as objects and as type  
- Uses suitable size, style and number of fonts  
- Creates a simple shape graphic  
- Controls text flow around graphics  
- Moves, arranges and layers objects  
- Creates numbered and bulleted lists  
- Uses guides and rulers  
- Creates multiple text columns  
- Controls page numbering  
- Changes page tabs, margins and indents  
- Edits line and shape style and fill  
- Creates and modifies headers and footers |

| **Proficient** | - Understands elements of basic design (e.g. white space, page layout, etc.)  
- Saves documents in appropriate formats  
- Integrates various and appropriate software for desktop publishing (e.g. graphics, layout, etc.)  
- Incorporates digital images from external sources (e.g. cameras, scanners, WWW, etc.) |
### Rubric Category – Spreadsheets

Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Introductory</th>
<th>- Describes various types of publishing media and possible classroom applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>- Selects media to support instructional objectives</td>
</tr>
<tr>
<td>Proficient</td>
<td>- Develops student assignments that embed elements of effective design</td>
</tr>
<tr>
<td></td>
<td>- Plans for effective classroom management of available resources</td>
</tr>
</tbody>
</table>

**Introductory**
- Defines spreadsheet terms (e.g. cells, alignment, formula, etc.)
- Creates, opens and saves spreadsheets
- Navigates using the mouse and tabs
- Undo unwanted changes
- Locates cells based on column/row addresses
- Selects, moves, copies, deletes, clears and inserts cells
- Selects entire column or row
- Resizes cells and rows
- Changes typeface, font size and other cell attributes

**Intermediate**
- Sorts cells
- Changes text cell alignment and justification
- Replicates a formula or range of cells (e.g. :fill)
- Creates simple bar or pie charts
- Adds shading and borders
- Selects charts for appropriate data representation

**Proficient**
- Saves in a variety of formats
- Imports/exports charts and data (e.g. spreadsheet to word processing, etc.)
- Aligns and rotates text and numbers
- Creates a variety of charts
- Labels graphs appropriately

### Manage Records

<table>
<thead>
<tr>
<th>Introductory</th>
<th>- Enters text and data into specific cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>- Creates formula cells (e.g. sum, average, etc.)</td>
</tr>
<tr>
<td>Rubric Category – Databases</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
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</tr>
<tr>
<td>Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Introductory</th>
<th>Intermediate</th>
<th>Proficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Formats cells for appropriate content such as text, decimal alignment, currency</td>
<td>- Utilizes grade book templates</td>
<td>- Imports/exports charts into word processing application</td>
<td></td>
</tr>
<tr>
<td>- Maintains student records</td>
<td>- Adjusts layout and margins</td>
<td>- Adjusts layout and margins</td>
<td></td>
</tr>
<tr>
<td>- Uses print preview and print document with title</td>
<td>- Creates and edits headers, footers and page numbers</td>
<td>- Creates and edits headers, footers and page numbers</td>
<td></td>
</tr>
<tr>
<td>- Creates and edits headers, footers and page numbers</td>
<td>- Sets up print options for grid lines, zoom, etc.</td>
<td>- Sets up print options for grid lines, zoom, etc.</td>
<td></td>
</tr>
<tr>
<td>- Sets up print options for grid lines, zoom, etc.</td>
<td>- Prints a specific range of cells, pages and sheets</td>
<td>- Imports/exports charts into word processing application</td>
<td></td>
</tr>
<tr>
<td>- Searches for and replaces text</td>
<td>- Searches for and replaces text</td>
<td>- Imports/exports charts into word processing application</td>
<td></td>
</tr>
<tr>
<td>- Changes size, placement and title of charts</td>
<td>- Changes page margins</td>
<td>- Changes page margins</td>
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<tr>
<td>- Changes page margins</td>
<td>- Changes page margins</td>
<td>- Changes page margins</td>
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</tbody>
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<thead>
<tr>
<th>Sub-Category: Communication through Printed Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Describes the educational uses of spreadsheets</td>
</tr>
<tr>
<td>- Creates new spreadsheets related to content area</td>
</tr>
<tr>
<td>- Designs curricular lessons requiring use of spreadsheet</td>
</tr>
<tr>
<td>- Creates appropriate charts for a content lesson</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub-Category: General Knowledge and Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Defines database terms (e.g. records, fields, etc.)</td>
</tr>
<tr>
<td>- Creates, opens and saves a database</td>
</tr>
<tr>
<td>- Selects, moves, copies, deletes, clears and inserts fields and records</td>
</tr>
<tr>
<td>- Formats fields to reflect appropriate data (e.g. date, name, currency, etc.)</td>
</tr>
<tr>
<td>Sub-category</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>Introductory</td>
</tr>
<tr>
<td>Intermediate</td>
</tr>
<tr>
<td>Proficient</td>
</tr>
<tr>
<td>Introductory</td>
</tr>
<tr>
<td>Intermediate</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Proficient</td>
</tr>
<tr>
<td>Introductory</td>
</tr>
<tr>
<td>Intermediate</td>
</tr>
<tr>
<td>Proficient</td>
</tr>
</tbody>
</table>

- Explains differences between report and query/search/find
- Uses print preview to identify print problems
- Finds and replaces data
- Sorts, matches and goes to specific records
- Exports data from database
- Adds header and footer
- Imports data from other applications
- Creates new layouts or edits existing layouts for specific productivity or curricular goals
- Identifies lessons that require the manipulation of data
- Creates new databases related to content area. (e.g. world populations, animal data, etc.)
- Designs curricular lessons which utilize databases to enhance learning outcomes
- Develops student assignments that require management and manipulation of a variety of data

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### Rubric Category - Instructional Technology

Each subcategory has 3 levels of proficiency: Introductory, Intermediate, and Proficient.

<table>
<thead>
<tr>
<th>Sub-Category</th>
<th>Introductory</th>
<th>Intermediate</th>
<th>Proficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Identifies established criteria used to evaluate digital media</td>
<td>- Practices evaluating educational digital media using established criteria</td>
<td>- Evaluates educational digital media using established criteria</td>
</tr>
<tr>
<td></td>
<td>- Is provided with examples of lesson plans that integrate technology</td>
<td>- Practices including appropriate technological resources in classroom lesson plans</td>
<td>- Includes appropriate technological resources in classroom lesson plans</td>
</tr>
<tr>
<td></td>
<td>- Identifies process used to match technology with content</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td>Level</td>
<td>Description</td>
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</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory</td>
<td>- Describes various models of technology use that enhances learning and increases efficiency and productivity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>- Uses teacher productivity tools for classroom management (e.g. home-school communication, student records and grades)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Lesson plans reflect a management system for computer based activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficient</td>
<td>- Effectively uses technology for whole class, small group and individual instruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Classroom activities allow all students to build upon their technology skills and increase learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Implements management procedures that support assessment of student involvement and achievement</td>
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</table>

<table>
<thead>
<tr>
<th>Sub-category</th>
<th>Privacy, Security, and Safety Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory</td>
<td>- Explains the need for and use of copyright policy, protection of student privacy, security and safety</td>
</tr>
<tr>
<td>Intermediate</td>
<td>- Implements established policies for safe, private and secure practices in personal work</td>
</tr>
<tr>
<td></td>
<td>- Personally implements established policies surrounding copyright and plagiarism</td>
</tr>
<tr>
<td>Proficient</td>
<td>- Implements established policies for safe, private and secure practices in classroom</td>
</tr>
<tr>
<td></td>
<td>- Implements policies surrounding copyright and plagiarism in classroom</td>
</tr>
</tbody>
</table>
APPENDIX E

QUESTIONNAIRE ONE RESULTS
Did the technology training you participated and the development of a final product in improve your use of Computers?
Before the tech training and the development of the final product were you well prepared to use computers and/or the internet for classroom instruction or use?

Did the training and the development of the final product increase the use of technology in the classroom?
Are you better prepared to implement technology after participating in the training and developing a final product?

Do you think teachers will implement technology into their curriculum without technology training or the development of a final product?
APPENDIX F

QUESTIONNAIRE TWO RESULTS
Would your final product be improved...

If more of the following types of technology trainings were available?

<table>
<thead>
<tr>
<th>Survey Two, Question #4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
</tr>
<tr>
<td>Question #4</td>
</tr>
<tr>
<td>Question #6</td>
</tr>
<tr>
<td>Question #7</td>
</tr>
<tr>
<td>Question #8</td>
</tr>
</tbody>
</table>

4 people forgot to fill out the back side of the survey: Part 2

#4 Small Group Technology Classes
#6 Grade level specific technology classes

#7 Online web-based technology training classes
#8 Site technology mentors available to train, observe and mentor in the use of computers in the classroom and in the implementation of the final product?
APPENDIX G

PRE CALIFORNIA TEACHERS

ASSESSMENT PROFILE SURVEY DATA
Bar Graph from data gathered September 20, 2001

### 24-DSUSD-CSUSB 2001 Current Summary Chart

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>2</td>
</tr>
<tr>
<td>Proficient</td>
<td>3</td>
</tr>
</tbody>
</table>

| 1 | General Computer Knowledge and Skills (Includes 211 users in calculation) |
| 2 | Internet (Includes 209 users in calculation) |
| 3 | Email (Includes 207 users in calculation) |
| 4 | Word Processing (Includes 206 users in calculation) |
| 5 | Publishing (Includes 206 users in calculation) |
| 6 | Databases (Includes 206 users in calculation) |
| 7 | Spreadsheets (Includes 205 users in calculation) |
| 8 | Presentation Software (Includes 206 users in calculation) |
| 9 | Instructional Technology (Includes 205 users in calculation) |

148
### Summary Chart for General Computer Knowledge and Skills

#### Main Summary Chart

<table>
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<tr>
<th>Assessment Level</th>
<th>Categories</th>
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<td>1</td>
</tr>
<tr>
<td>Intermediate</td>
<td>2</td>
</tr>
<tr>
<td>Proficient</td>
<td>3</td>
</tr>
</tbody>
</table>

1. General Knowledge of Basic Hardware and Software Terminology (Includes 210 users in calculation)
2. Operation and Care of Hardware (Includes 207 users in calculation)
3. Basic Troubleshooting (Includes 208 users in calculation)
4. Integration, Student Learning, and Classroom Management (Includes 207 users in calculation)
<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Categories</th>
<th>Users in Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introductory</td>
<td>General Knowledge and Skills</td>
<td>205</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Communication and Collaboration</td>
<td>201</td>
</tr>
<tr>
<td>Proficient</td>
<td>Research Tools</td>
<td>201</td>
</tr>
<tr>
<td></td>
<td>Ethics and Policies</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td>Information Literacy</td>
<td>198</td>
</tr>
<tr>
<td></td>
<td>Integration, Student Learning, and Classroom Management</td>
<td>199</td>
</tr>
<tr>
<td>Assessment Level</td>
<td>Categories</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Introductory</td>
<td>1 General Knowledge and Skills (Includes 204 users in calculation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Communication and Collaboration (Includes 205 users in calculation)</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>3 Integration, Student Learning, and Classroom Management (Includes 204</td>
<td></td>
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<tr>
<td></td>
<td>users in calculation)</td>
<td></td>
</tr>
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<td>Proficient</td>
<td>4 Legal and Ethical (Includes 204 users in calculation)</td>
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</table>

Main Summary Chart
Summary Chart for Word Processing

Main Summary Chart

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Proficient</th>
<th>Intermediate</th>
<th>Introductory</th>
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<tr>
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<tr>
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<td>General Knowledge and Skills (Includes 205 users in calculation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Communication through Printed Media (Includes 203 users in calculation)</td>
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<td>3</td>
<td>Integration, Student Learning, and Classroom Management (Includes 205 users in calculation)</td>
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### Summary Chart for Publishing

<table>
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<tr>
<th>Category</th>
<th>Number of Users in Calculation</th>
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<tr>
<td>General Knowledge and Skills</td>
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<tr>
<td>Communication through Printed Media</td>
<td>203</td>
</tr>
<tr>
<td>Integration, Student Learning, and Classroom Management</td>
<td>202</td>
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</table>

#### Main Summary Chart

- Categories:
  - "1"
  - "2"
  - "3"

- Levels:
  - Introductory
  - Intermediate
  - Proficient
### Summary Chart for Databases

<table>
<thead>
<tr>
<th>Category</th>
<th>Users in Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Knowledge and Skills</td>
<td>203</td>
</tr>
<tr>
<td>Manage Records</td>
<td>203</td>
</tr>
<tr>
<td>Communication through Printed Media</td>
<td>204</td>
</tr>
<tr>
<td>Integration, Student Learning, and Classroom Mgmt</td>
<td>202</td>
</tr>
</tbody>
</table>

#### Main Summary Chart

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Introductory</th>
<th>Intermediate</th>
<th>Proficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categories</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Summary Chart for Spreadsheets

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>General Knowledge and Skills (Includes 204 users in calculation)</th>
<th>Manage Records (Includes 203 users in calculation)</th>
<th>Communication through Printed Media (Includes 204 users in calculation)</th>
<th>Integration, Student Learning, and Classroom Management (Includes 204 users in calculation)</th>
</tr>
</thead>
<tbody>
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<td>Categorical Level</td>
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<td>3</td>
<td>4</td>
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<tr>
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<td>0</td>
<td>0</td>
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<td>Intermediate</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Proficient</td>
<td>2</td>
<td>3</td>
<td>3</td>
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</tbody>
</table>

**Main Summary Chart**
### Summary Chart for Presentation Software

#### Main Summary Chart

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Introductory</th>
<th>Intermediate</th>
<th>Proficient</th>
</tr>
</thead>
</table>

#### Categories

1. **General Knowledge and Skills** (Includes 205 users in calculation)
2. **Communication through Printed Media** (Includes 203 users in calculation)
3. **Integration, Student Learning, and Classroom Management** (Includes 204 users in calculation)
Summary Chart for Instructional Technology

<table>
<thead>
<tr>
<th>Categories</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of Appropriate Technology Resources</td>
<td>Introductory</td>
<td>Intermediate</td>
<td>Proficient</td>
<td>Introductory</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Matching Student Learning Styles to Appropriate Resources</td>
<td>Introductory</td>
<td>Intermediate</td>
<td>Proficient</td>
<td>Introductory</td>
<td>Intermediate</td>
</tr>
</tbody>
</table>

1. Analyzes Best Practices (Includes 203 users in calculation)
2. Selection of Appropriate Technology Resources (Includes 203 users in calculation)
3. Matching Student Learning Styles to Appropriate Resources (Includes 205 users in calculation)
4. Effective Learning Environments Using Computer-Based Technology (Includes 205 users in calculation)
5. Privacy, Security, and Safety Issues (Includes 204 users in calculation)
APPENDIX H

POST CALIFORNIA TEACHERS

ASSESSMENT PROFILE SURVEY DATA
### Main Summary Chart

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>24-DSUSD-CSUSB 2001 Current Summary Chart as of April 22, 2002</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>General Computer Knowledge and Skills (Includes 196 users in calculation)</td>
</tr>
<tr>
<td>II</td>
<td>Internet (Includes 196 users in calculation)</td>
</tr>
<tr>
<td>III</td>
<td>Email (Includes 195 users in calculation)</td>
</tr>
<tr>
<td>IV</td>
<td>Word Processing (Includes 195 users in calculation)</td>
</tr>
<tr>
<td>V</td>
<td>Publishing (Includes 195 users in calculation)</td>
</tr>
<tr>
<td>VI</td>
<td>Databases (Includes 196 users in calculation)</td>
</tr>
<tr>
<td>VII</td>
<td>Spreadsheets (Includes 195 users in calculation)</td>
</tr>
<tr>
<td>VIII</td>
<td>Presentation Software (Includes 195 users in calculation)</td>
</tr>
<tr>
<td>IX</td>
<td>Instructional Technology (Includes 195 users in calculation)</td>
</tr>
</tbody>
</table>
### Summary Chart for General Computer Knowledge and Skills

#### Assessment Levels
- **Introductory**
- **Intermediate**
- **Proficient**

#### Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Assessment Level</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>General Knowledge of Basic Hardware and Software Terminology</td>
<td>Introductory</td>
<td>Includes 196 users in calculation</td>
</tr>
<tr>
<td>Operation and Care of Hardware</td>
<td>Intermediate</td>
<td>Includes 195 users in calculation</td>
</tr>
<tr>
<td>Basic Troubleshooting</td>
<td>Proficient</td>
<td>Includes 194 users in calculation</td>
</tr>
<tr>
<td>Integration, Student Learning, and Classroom Management</td>
<td>Proficient</td>
<td>Includes 195 users in calculation</td>
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<tr>
<td>Assessment Level</td>
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<td>Communication and Collaboration (Includes 193 users in calculation)</td>
</tr>
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<td>------------------</td>
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<td>-----------------------------------------------------------------</td>
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<td>2</td>
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<tr>
<td>Intermediate</td>
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<td>3</td>
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<td>4</td>
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</table>

**Chart for Internet**
Summary Chart for Email

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>Introductory</th>
<th>Intermediate</th>
<th>Proficient</th>
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</thead>
</table>

1. General Knowledge and Skills (Includes 195 users in calculation)
2. Communication and Collaboration (Includes 195 users in calculation)
3. Integration, Student Learning, and Classroom Management (Includes 195 users in calculation)
4. Legal and Ethical (Includes 195 users in calculation)
Summary Chart for Word Processing

<table>
<thead>
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<th>General Knowledge and Skills (Includes 195 users in calculation)</th>
<th>Communication through Printed Media (Includes 194 users in calculation)</th>
<th>Integration, Student Learning, and Classroom Management (Includes 195 users in calculation)</th>
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<tr>
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<td>2</td>
<td>3</td>
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</tr>
<tr>
<td>Assessment Level</td>
<td>Summary Chart for Publishing</td>
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</tr>
<tr>
<td>------------------</td>
<td>------------------------------</td>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Intermediate</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Proficient</td>
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<td></td>
</tr>
<tr>
<td>Categories</td>
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</tbody>
</table>

**Main Summary Chart**

1. **General Knowledge and Skills** (Includes 195 users in calculation)
2. **Communication through Printed Media** (Includes 194 users in calculation)
3. **Integration, Student Learning, and Classroom Management** (Includes 194 users in calculation)
<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>General Knowledge and Skills (Includes 196 users in calculation)</th>
<th>Manage Records (Includes 194 users in calculation)</th>
<th>Communication through Printed Media (Includes 195 users in calculation)</th>
<th>Integration, Student Learning, and Classroom Management (Includes 193 users in calculation)</th>
</tr>
</thead>
</table>
1. General Knowledge and Skills (Includes 195 users in calculation)
2. Manage Records (Includes 195 users in calculation)
3. Communication through Printed Media (Includes 195 users in calculation)
4. Integration, Student Learning, and Classroom Management (Includes 195 users in calculation)
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<tr>
<th>Assessment Level</th>
<th>General Knowledge and Skills (Includes 195 users in calculation)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Communication through Printed Media (Includes 195 users in calculation)</td>
</tr>
<tr>
<td></td>
<td>Integration, Student Learning, and Classroom Management (Includes 195 users in calculation)</td>
</tr>
</tbody>
</table>
### Summary Chart for Instructional Technology

<table>
<thead>
<tr>
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<th>Main Summary Chart</th>
</tr>
</thead>
<tbody>
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<td>Introductory</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
</tr>
<tr>
<td>Proficient</td>
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</tr>
</tbody>
</table>

#### Categories

1. **Analyzes Best Practices** (Includes 195 users in calculation)

2. **Selection of Appropriate Technology Resources** (Includes 195 users in calculation)

3. **Matching Student Learning Styles to Appropriate Resources** (Includes 195 users in calculation)

4. **Effective Learning Environments Using Computer-Based Technology** (Includes 195 users in calculation)

5. **Privacy, Security, and Safety Issues** (Includes 195 users in calculation)
APPENDIX I

COMPARISON OF PRE AND POST

CALIFORNIA TEACHERS ASSESSMENT

PROFILE SURVEY DATA
Comparison of Data from September 20, 2001 to April 22, 2002

24-DSUSD-CSUSB 2001 Custom Chart

<table>
<thead>
<tr>
<th>Assessment Level</th>
<th>09/24/2001</th>
<th>04/22/2002</th>
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</thead>
<tbody>
<tr>
<td>1 Introduction</td>
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</tr>
<tr>
<td>2 Intermediate</td>
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<tr>
<td>3 Proficient</td>
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</table>

<table>
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<th>04/22/2002</th>
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</thead>
<tbody>
<tr>
<td>General Computer Knowledge and Skills</td>
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<td>196 users</td>
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REFERENCES


