CONTRADICTIONS IN TECHNOLOGY USE:

STORIES FROM A MODEL SCHOOL

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TABLE OF CONTENTS

APPENDICES

CHAPTER ONE:

THE EDUCATIONAL TECHNOLOGY SCENE

What's Said And What's Not

Educational technology (used here to mean computers and computer-based technology) is a topic that has received extensive coverage in the public media and in educational literature. This coverage generally consists of innumerable accounts of the uses of computers in classrooms, portrayals of educational technology as the key to education reform, and reports of abundant support for installing technology in the nation's schools. There is little research documenting actual improvement in student learning and generally little consideration of the educational purposes for implementing technology (Hannafin, Hannafin, Hooper, Rieber, & Kini, 1996; Harp, 1997; Trotter, 1997e; Viadero, 1997b).

Even more rare is the examination of how appropriate educational technology is for mediating students' education and what widespread computer use means for students, teachers, curriculum, or society (Ely, 1995b; Holloway, 1996; Kerr, 1996b). The works that have been published in this area are for the most part rather hard to locate as this viewpoint is far from that of the mainstream. And just as importantly, they are not generally written for the educator who works in the nation's public schools. Thus a gap exists in the professional literature regarding how students and teachers experience educational technology in today's schools. As an educator who uses educational technology daily with students and who is involved in the implementation of educational

technology in public schools, I felt the need for a more thorough investigation of these issues. Furthermore, in view of the pervasiveness of the demand for educational technology and its increasing presence in the schools, this subject calls for greater scrutiny. Accordingly, this study is an exploratory case study of how teachers and students construct meaning about themselves, school and their world in an environment that emphasizes the use of technology.

Technology and Learning

Interest in using machines to enhance human learning is not new (Lumsdaine, 1964/1996). Behavioral psychologists began experimenting with teaching machines for spelling and arithmetic in the 1920s. The prominent behaviorist, B.F. Skinner, developed drill-and-practice programs for educational purposes during the 1950s (Burton, Moore, & Magliaro, 1996). Some educational computer applications are still of the drill-and-practice format, but with the decline of behaviorism, the educational model of drill-and-practice has been superseded by interest in tutorials, artificial intelligence systems, and simulations (Pinar, Reynolds, Slattery, & Taubman, 1995). Most of these are based on cognitive perspectives (Hannafin, et al., 1996). Humanistic curriculum efforts to foster critical thinking, self-esteem, and positive attitudes toward school brought about calls for an interdisciplinary approach to educational technology, including integration of technology into the existing curriculum and the design of a collaborative technological learning environment for students (MacGregor, 1990).

A 1994 Carnegie Mellon survey of educators who used the Internet in the classroom identified benefits the educators believed their use of educational technology

brought to students. These included making students aware they are part of a global community; giving students a wide variety of resources; stimulating thinking; improving computer literacy; creating increased enthusiasm in students and teachers; altering roles of teachers and students so that teachers become facilitators; helping students work more independently; helping students proceed at their own pace; and boosting students' self-esteem (Carnegie Mellon University, 1994). Some teachers believe students have an intrinsic interest in computers that results in increased motivation for school which in itself constitutes sufficient reason to use educational technology (Brownlee-Conyers & Kraber, 1996; Viadero, 1997b).

Anecdotal evidence of improved student learning is abundant, but empirical studies that indicate the use of educational technology can improve student achievement are only recently becoming more common. One of these is a study conducted by Professor Dale Mann, at Teachers College, Columbia University, who surveyed over 5,000 students and faculty members in a five county region in New York. The study "appears to show that where there are more computers, student academic performance improves" ("Study shows," 1997, p. A4).

Recent movements toward educational reform, in a wide range of educational environments, have seized upon educational technology as an essential component. "Virtually every proposal or plan includes educational technology as one of the major vehicles for implementing change" (Ely, 1995b, p. 39). Many of these reform movements include the perceived need for a change to student-centered learning from the traditional pedagogical approach to schooling, which has been described as teacher-centered, textbook-dependent, whole group instruction that uses a question-and-answer format

(Cuban, 1983). The search for a process to bring about such a change in pedagogy has encouraged a re-examination of the capabilities of educational technology for instructional purposes (Ely, 1995b). Rapid developments in technological innovation, such as local and wide area computer networks, access to the Internet, and to cable and satellite communications, have made available impressive and unprecedented instructional delivery systems. In The Electronic Classroom, Plater (1995) stated, "as a symbol, the electronic classroom has become a name given to a changed relationship among learners, faculty, their institutions, and the purposes that bring them all together" (p. 4).

Statement of the Problem

Previous research on educational technology has focused on such things as effective use of computers for instruction, how technology can enhance learning, and independent learning through computer use. In light of this research and the claims and expectations that educational technology will bring about significant changes in schools, its seems imperative that we also look at what technology use means to students, teachers, and curriculum. Researchers must look beyond the enthusiasms currently infusing discourse surrounding educational technology to a more balanced view that helps us understand both the structural constraints and individual cultural choices framing the use of technology in schools (Ely, 1995b; Holloway, 1996; Kerr, 1996b).

Therefore, this research seeks to address the following: What meanings do teachers and students construct about themselves, about school and about their world in an environment that emphasizes the use of technology? What help can those meanings

provide us in making value judgments regarding the appropriateness of using technology to mediate students' educational experiences? Should we decide to use technology in schools, what can those meanings tell us about striving to employ technology in ways that are emancipatory and empowering?

Purposes of the Study

By examining the curriculum of a school that emphasizes the use of educational technology, as well as the perceptions of teachers and students working and learning with educational technology in such a setting, I have sought to gain an understanding of the values and meanings these participants attach to the use of educational technology. This included specifically looking at the everyday realities and cultures of students and teachers and inquiring into what part educational technology played in influencing their views of the world and of school, and their expectations of themselves. Related to this understanding, the study sought to make known attitudes and assumptions about the use of computers in school, and identified and discussed aspects of the prevailing discourse that operated within an educational environment in which technology is upheld as essential to preparing students for work and successful living in the 21st century.

For the purposes of this research, curriculum is interpreted broadly to include "all of the experiences, planned and unplanned, that occur under the auspices of the school" (Jackson, 1992, p. 8). I designed questions to guide my entrance into the research mindful that such questions were tentative and would likely evolve in response to conditions noted in the field. My questions were as follows:

1. What does curriculum look like in a school setting that emphasizes educational technology?

2. What were the historical, political, economic, and cultural contexts that helped create the emphasis on technology in this school?

3. How does the use of educational technology in classroom practice (methods of teaching or assessment, types of assignments, classroom management) relate to the school's articulated educational philosophy?

4. What perceptions do administrators and teachers have of their own use, as well as of the school's use of educational technology?

5. What perceptions do diverse groups of students have of schooling and of themselves in a school setting that emphasizes the use of educational technology?

Setting

Glesne and Peshkin (1991) suggested that in deciding on a site, the researcher must look to the needs of the study. High Plains Public Schools, located in a midwestern state, comprise a very small, rural district that recently received 1 of 19 national Technology Challenge Grants and recognition as a "national educational benchmark" in the use of educational technology. As one response to being placed on the state's low-performing-schools list, the district made the decision in 1990 to emphasize the use of educational technology with students throughout the curriculum. A continuing program of technology acquisition and extensive faculty training for integration of educational technology into the curriculum is based on the belief that educational technology is essential for the preparation of students for work and successful living in the 21st

century. The district's success with educational technology has resulted in making it a model school that draws many visitors and educators interested in implementing educational technology in their own districts. High Plains Public Schools had just under 400 PreK-12 students, approximately 64% of whom receive free or reduced school lunches, and approximately 51% are identified as Native Americans with the remainder almost all whites. (In this study I use the terms Native American and White because those are the terms most often used by the participants of the study.) Because of its ethnic makeup, its more accessible size, and because it was recognized to be in the forefront in educational technology, this district offered the opportunity to access a wide variety of curriculum areas, grade levels, and social and cultural issues. This allowed the research to encompass a more inclusive range of possibilities for how teachers and students negotiate meaning about themselves, school and their world in an environment that emphasizes technology.

A Qualitative Case Study

I chose to employ a qualitative case study methodology in this specific bounded setting because I wished to emphasize the social context and the complexity and interrelatedness of many variables embedded in that context and because of a lack of research exploring such issues (Glesne & Peshkin, 1991; LeCompte & Preissle, 1993; Stake, 1994). In seeking to understand how schooling and the use of educational technology took place in this setting, I used direct observation, informal interviews and document analysis. I visited on average one full day per week for 5 months, spending about 7 hours per day in the school. I recorded field notes after sitting in on a variety of

7th through 12th grade classes (including computer classes), and after wandering the halls, cafeteria, commons, and library. I observed school and classroom routines, including a pep rally and lunch breaks. I also observed informal conversations and interactions between and among faculty and students seeking to understand how they viewed technology and school in general. I interviewed 9 high school students of varying ages regarding their use of technology and their future plans. I also interviewed 29 adults including administrators, staff, and all but 2 of the faculty to determine their perspectives on educational technology use in schools. I examined samples of class and staff development assignments, and downloaded pages from the school's Internet site showing students' published works and teachers' curricular materials.

A Critical Postmodern/Poststructural Research Approach

In this research, I employ a qualitative theoretical and methodological framework that operates at the intersection of critical theory and postmodern/poststructural thought. This approach follows from such researchers as Wexler (1987, 1992), Lather (1991), and Kincheloe and McLaren (1994). These educational scholars have combined elements of each of these research paradigms to examine the complexities of postmodern society and schooling, and how dominant groups maintain their power through social and institutional practices.

Making use of both the critical and the postmodern/poststructural theoretical lenses allows me to make sense of the complex and contradictory realities of schooling in a technologically enriched school environment. This approach also allows me to show how race, ethnicity, class and gender issues in curriculum operate in continuous

contradictory fashion with each other, and to focus on the multiple positions that students, teachers, and administrators inhabit. It demands also that I include my position as researcher, since I necessarily bring my own predispositions, experiences and theoretical orientations to the conceptualizing and carrying out of the research. In order to disclose the researcher's complicity in the production of meaning, I strive to make my own voice explicit in the text, just as I do the voices of the participants and those of researchers who have produced the scholarship from which I draw.

Support for Educational Technology

This study is undertaken during a particular time period in which technology is receiving unprecedented support from educational professionals, the government, business interests, and from the public itself. Few voices are heard calling for a questioning of this "compulsory enthusiasm" (Roszak, 1996, p. 12). Moreover, those who express concern are often immediately dismissed as Luddites unreasonably condemning technology (Bromley, 1998).

The Public

The vision of the electronic classroom that can bring about a re-creation of the nations' schools has garnered wide support. Education policy analyst, Julie Davis Bell, at the National Conference of State Legislatures, stated, "I've never worked on an issue where there was more interest of governors, legislators, corporate leaders, school officials, and parents" (White, 1997a, p. 15).

A telephone survey of over 1,000 registered voters was conducted in May and June of 1997 by Peter D. Hart Research Associates, Inc. for the Milken Family

Foundation. Results released at the foundation's National Education Conference show strong support from the public for educational technology. "Over 90 percent of voters think schools that are well-equipped with technology have a major advantage over other schools in access to information and in preparing students for entering the workforce" (Trotter, 1997d, p. 8). In 1996 over 27,000 individuals and 2,300 sponsors around the country volunteered for NetDay, which involved the installation and testing of classroom wiring for local networking and Internet access (Morgridge, 1997).

Education Professionals

Educational policy groups have joined the forces that are encouraging the use of educational technology in schools. The National Education Association (NEA) has adopted resolutions that relate to educational technology. These include a recognition of the needs of teachers to be trained in educational technology, to be involved in the planning and implementation of educational technology, and to have access to educational technology on at least the same level as that available in society in general (Holloway, 1996; National Education Association, 1999). The National Coalition for Education and Training has developed plans for encouraging use of the Internet in schools (Ely, 1995b). The National School Boards Association has recently created the Institute for the Transfer of Technology to Education (Trotter, 1997a).

Additionally, several professional associations have been created to assist in the implementation of technology into the schools. These include: the Association for Educational Communications and Technology (AECT), dedicated to the improvement of instruction through the use of media and technology; the Association for the Advancement of Computing in Education (AACE), designed to advance the knowledge,

theory, and quality of learning and teaching at all levels with information technology; the National Educational Computing Association (NECA) which has for 21 years hosted the annual National Educational Computing Conference to bring together educational and information technology industry leaders to develop and encourage use of technology in classrooms; and the International Society for Technology in Education (ISTE) which promotes teachers helping teachers use technology in the classroom. Many universities also now have outreach groups such as the University of Oregon's Center for Advanced Technology in Education which is dedicated to transforming teaching and learning through the use of computing and communication technologies.

Government

"President Clinton has named education his top priority and stated that access to computers and the Internet is essential for children to make the most of their lives" (Trotter, 1997a, p. 22). The President, Vice President, and governors from both political parties have identified technology as necessary for education. Educational technology was one of the two main goals for school change identified at the 1996 national education summit (Trotter, 1997e). In the Improving America's Schools Act of 1994, Congress adopted a technology plan which holds that technological literacy is essential knowledge for students who will otherwise not be prepared for the 21st century workforce ("Getting America's," 1996; "Summary of the Improving," 1994). Clinton's Secretary of Education, Richard W. Riley, stated, "We are in the midst of nothing short of a revolution in teaching and learning....computers and technology are the new basics of education" (Harp, 1997, p. 41).

In 1993 Riley appointed a special technology advisor, Linda G. Roberts. The experience she brought to the position includes work that relates computer and telecommunications developments with school reform. In addition to policymaking, Roberts has indicated that one of her major goals was to find ways to help teachers use technology more effectively in the classroom (Trotter, 1997a). She has also been instrumental in producing "a long-range national plan for the use of technology in education" (Roberts, 1996). Secretary Riley has stated, "All of us are aware of the importance of technology in education, but to have somebody in those key policy meetings who makes sure it's injected as a critical topic is important--and it ends up being part of the solution" (Trotter, 1997a, p. 22).

A further indication of the extent of support for educational technology in schools is the total amount of funds being spent on equipment, software, and teacher and staff training. In 1996, $4.34 billion dollars were spent by the nation's K-12 schools on computers. That figure was expected to double in less than three years (Trotter, 1997e; White, 1997a). Government supported Regional Educational Laboratories also provide information on technology implementation. In 1997 the federal government began funneling technology grants through the states to local districts. By 1999 the Technology Literacy Challenge Grants amounted to $425 million and the Technology Innovation Challenge Grants ran $115 million (Revenaugh, 1999).

Business Interests

Demands by business for skilled workers have resulted in national educational efforts such as the school-to-work program which often includes student instruction in the use of computers (Olson, 1997). Corporate interest in educational technology is

evidenced by such involvement as Pacific Bell's commitment of $100 million toward free high speed phone lines for schools and libraries in California to connect to the Internet (Zehr, 1997). Oracle Corporation has also donated $100 million to be used to bring networked computers into public school classrooms (Sandham, 1997). More recently, Intel and Microsoft corporations have combined to provide free training for 400,000 teachers to use computers and Windows-based software in student lessons. This represents the "largest effort by private industry to date to encourage and improve the use of technology in education" (Trotter, 2000, p. 5).

The CEO Forum on Education and Technology, a committee of business and education leaders, investigates the level of use and integration of educational technology in the nations' schools (Trotter, 1997b). Companies represented on this panel include Discovery Communications Inc, the Learning Channel, Bell Atlantic Corp., and Compaq Computer Corp. This committee monitors the progress of the nation's schools in four areas which include: connections to the Internet, availability and accessibility of equipment, adequacy of teacher training and professional development, and appropriateness of software.

Other business involvement in promoting technology in schools can be hard to distinguish from marketing groups, since many nonprofit organizations' promotion of technology feed into the profit side of their corporations. Students and teachers accustomed to using free services of such companies may be more likely to turn to those companies for fee-based services. One example is the New York Times Learning Network that provides a portion of the newspaper's online information services free to students in grades 3-12, and includes daily lesson plans for their teachers to encourage its

use in classrooms. Another is the AOL (America On Line) Foundation, established in 1997 as a non-profit, private organization dedicated to using online technology to improve people's lives and benefit society, particularly the disadvantaged.

Objections to Educational Technology

There are those in education who, for a variety of reasons, disagree with the impetus to spend large sums on educational technology. Objections mainly come from two distinct viewpoints. One is concerned with the ways educational technology is sometimes implemented in schools. The other takes exception to educational technology itself.

Implementation

The more frequently voiced objections deal with the mindless purchase of educational technology equipment with little planning or foresight for ensuring appropriate use. In the rush to keep current, schools across the country are hurriedly installing educational technology, often with little consideration of the educational purposes for doing so (Ely, 1995a; White, 1997b). Whether considered the basis for school reform or for improvement in the quality of instruction, the introduction of educational technology does not guarantee benefits to students. "Many of these computers are not integrated into the curriculum in a meaningful way...to truly exploit these advances, technology and innovation must permeate the culture of education" (Peha, 1995, p. 42). The CEO Forum on Education and Technology reported that educational technology is integrated into all aspects of the educational programs in only 3

percent of the nation's schools, out of the 38 percent that have significant amounts of equipment available (Viadero, 1997a).

In view of the size of the expenditure of funds for educational technology and the scarcity of data demonstrating improvements in student achievement or other benefits, such questioning may become more strident in the future as state and federal legislatures that have appropriated billions in funding begin to ask "what parts of these programs are working and what parts of them aren't" (Harp, 1997, p. 43). This information is not readily available since data about the extent of computer use in schools does not indicate the quality of use nor the effects on students (Cuban & Kirkpatrick, 1998). Ely (1995b) concluded, "there do not appear to be any current studies about ways in which computers are used for instruction" (p. 14). Rhonda Edmiston, spokesperson for the Idaho Department of Education, stated, "We don't have any good evaluation mechanisms yet....we need to start finding out whether these programs are helping students learn basic skills and other academics" (Harp, 1997, p. 43).

Educators also have expressed concern that businesses involved in the production and development of technology are responsible for driving school reform based on educational technology for monetary gain rather than for the benefit of students (Noble, 1996). Morris (1997) proposed that the rationale motivating some schools to adopt educational technology with little regard for educational purposes has to do with conforming to external pressures to maintain legitimacy and thereby safeguard the flow of resources.

Biases of Technology

Important but less commonly heard criticisms of educational technology deal with the social and cultural consequences of its use. Inequities have been documented that result from the use of educational technology with regard to race, class, and gender differences. Schools that have higher percentages of poor and minority students commonly either provide students less access to educational technology or only use technology for remediation. More often girls have had only word-processing experience with computers, whereas boys have used computers to solve math or science problems (Brunner, 1997; Holzberg, 1997; Sutton, 1991; Trotter, 1997c).

Because educational technology is assumed to exercise some degree of control over the nature of teaching and learning and thereby influence the way that students view themselves and the world, educators need to "assess the social and pedagogical impact of the growing presence of computer technology in the classroom" (Connell, 1996, p. 4). In 1999 the Alliance for Childhood was formed to challenge the belief that early, intensive use of computers by children was beneficial. This group includes educators, writers, psychologists and physicians. It holds that most students are only taught to use computers in formulaic, creativity blunting ways, rather than receiving instruction in how computers work or in analyzing the effects computers have on personal, societal, and ecological goals (Guerard, 2000). Cuban (1997) contended that:

> Reframing the problem would let us see it as a dilemma of conflicting values--those of techno-enthusiasts who seek efficiency and preparation for a computerized workplace vs. those who are unconvinced that higher productivity

is better for students or meets the social purpose of building literate and caring citizens. (p. 41)

In 1988 C. A. Bowers wrote The Cultural Dimensions of Educational Computing: Understanding the Non-Neutrality of Technology, charging "experts who design technologies for making learning more efficient and predictable" (p. 1) with a lack of consideration of the educational and cultural consequences of the use of computers. Bowers contended that computer use influences patterns of thought and communication, advancing a technological mind-set that has contributed to a worldwide ecological crisis.

That the underlying social and cultural values of educational technology may go unquestioned becomes especially problematic when examined from the viewpoint of race, class, or gender concerns (Bromley, 1998; Damarin, 1998; Sutton, 1991). Bowers (1988) described the values espoused by educational computing as those of the dominant Western male culture, which stresses individualistic intelligence, efficiency, and rational control of the external world.

Significance of the Study

Earlier in this chapter I recounted the total expenditures nationwide on educational technology, the amount of attention and support educational technology receives from local to national levels, and the relative scarcity of critical research in the area of educational technology. In light of these issues, this study may serve to encourage a "backing off from practical affairs at least far enough to gain perspective on the whole and also of seeking to effect change through altering the way people look at the world and think about it" (Jackson, 1992, p. 36). Marshall and Rossman (1989) indicated that

research should be important for policy, for practice, and as a contribution to fundamental knowledge. Regarding educational policy, school board members and administrators might learn that the significant changes in teaching and learning expected from the introduction of educational technology may be illusory. Most school boards around the country are facing tremendous pressures to find ways to fund expensive technology programs. A broader perspective of how students and teachers understand the use of technology may better inform educational policy decisions regarding the acquisition and apportionment of funding for technological innovations within a school district and will have contributed to the tools policymakers have at their disposal for improving decisions involving schools and society.

Knowledge of students' and teachers' perceptions of educational technology and how it plays into their views of their own futures, their understandings of school and the world, may be helpful to both administrators and teachers. It may provide an understanding of how students construct meaning related to technology use in classroom activities and in learning. This may assist teachers and administrators in considering ways to make school and teaching more relevant to students' lives. Knowledge of students' perceptions of technology and its use may be of benefit for those educators concerned with helping students critically interrogate mass media such as the Internet. This research may be of assistance to those educators interested in increasing students' knowledge of the implications of the explosion of electronic and telecommunications technology for the local community, as well as for the national and global environments and political scenes.

Administrators and teachers seeking to introduce educational technology into the curriculum may find such knowledge helpful as they consider the importance of such a

powerful symbol in our society on teachers' understandings of their own work and of appropriate classroom use. Practitioners may also find this study of value because it uncovers relationships between technology and students' sense of self and how such relationships vary among members of various social groups. Knowledge of how students of differing race, class and gender negotiate meaning with regard to educational technology may help inform construction of curriculum. Uncovering complex interactions, taken for granted processes, and the often hidden beliefs and values involved in the use of educational technology may provide the potential to improve educational practice.

Finally, research on educational technology has previously focused on the effective use of educational technology for student achievement, the requirements for effective implementation of educational technology in schools, the use of educational technology as a tool for reforming pedagogy, and the use of educational technology as a tool for helping to change the culture of schools (Ely, 1995b). Postmodern/poststructural research seeks to deconstruct social practices and language that control and repress individuals and social groups, and to emphasize multiple perspectives. It also challenges the unequal power relations between researcher and researched (Kincheloe & McLaren, 1994; Lather, 1991; Wexler, 1992). Critical research seeks to disclose sources of oppression, including social structures, and to work for a more just society (deMarrais & LeCompte, 1999; Lather, 1991; Pinar, et al., 1995). There has been a limited amount of research done that uses a critical approach to investigate educational technology, and even less that also draws from postmodern/poststructural thought. This research adds to an even smaller number of empirical studies that employ a critical

postmodern/poststructural framework to examine how teachers and students negotiate meaning about themselves, school and their world. It encourages an alternative discourse to that of uncritical acceptance of educational technology.

Delimitation

Although critical theory calls for emancipatory action in research, especially for collaboration and reciprocity between the researcher and the participants of a study, I achieved this to a lesser degree than I wished. Due to time constraints and the difficulty in scheduling interviews, I had left the field before a significant portion of the analysis had been completed. Therefore, I was only able to share with participants in the following ways: by being open and honest about the purposes of the study, by using participants' questions as ways of addressing the reasons for research questions, and by explaining my own perceptions when asked about the use of technology in classrooms.

Additionally, perhaps a longer time frame (such as one that included the beginning as well as the end of the school year), would have given rise to other data, insights, and interpretations of the use of educational technology at High Plains. Also, a lengthier stay in the field might have allowed further development of interview questions which could have brought new understandings of students' and teachers' perceptions. An important source of data that proved unavailable to me in this study was a larger number of interviews with High Plains students, which might have provided additional views of students' understandings of the use of educational technology.

As a researcher from outside the community of High Plains, my perspective can never more than approximate that of inhabitants. I also recognize that for some Native

Americans, my position as a White researcher presents insurmountable difficulties in speaking for/about Native Americans and educational technology.

Summary

Educational technology has received extensive coverage in the public media and in educational literature. Becoming ever more strident, this coverage generally consists of unrestrained advocacy for installing technology in the nation's schools. This discourse emanates from several sectors of society including business, education, government, and the public, and forms a part of most visions for school reform. Few voices have expressed concern for how teachers and students construct meaning about themselves, school and their world. As qualitative research using a critical postmodern/poststructural approach, this study examined a small rural, technology-enriched school to uncover the perceived realities of schooling for students and teachers in an educational setting that emphasized the use of technology.

The next chapter will entail a review of the literature on educational technology, as well as an overview of the philosophy and sociology of technology. Chapter Three will then present the philosophical and methodological considerations for this study. Chapter Four is an interpretive discussion of the socio-economic and historic background from which the use of technology at High Plains Public Schools emanated. The heart of the analysis of this study forms Chapter Five. It is an explication of the conflicts and contradictions surrounding the use of educational technology in a school in which technology is upheld as essential to preparing students for work and successful living in

the 21st century. I conclude with Chapter Six by arguing for a more thoughtful consideration of the purposes for using technology in education.

CHAPTER TWO:

REVIEW OF THE LITERATURE

Introduction

Given this study's focus and the use of a theoretical framework that employs multiple lenses, it is necessary to draw from a variety of literatures. Exploring the meanings teachers and students construct about themselves, school and their world in an environment that emphasizes the use of technology first requires some familiarity with the current discourses within the field of educational technology itself. Next, the literature of the philosophy and sociology of technology in general provides the basis for a theoretical, as well as a social critique of the use of educational technology. Questions from this body of work have been influential in the examination of the social and economic structural changes that take place in schools and communities due to the use of educational technology. Finally, the work of the few researchers concerned with critical theory and postmodern/poststructural investigations of educational technology has provided insights into the disparities, complexities, and contradictions involved in the implementation of technology in schools.

In its broadest sense, discourse refers to anything written, said, or otherwise communicated. However, Foucault treated discourse as communication that defines the object that is communicated about (Smart, 1985). In this sense, the discourse surrounding educational technology shapes the possibilities for how technology is used, as well as situates educators, students, and schools "within discourses of social regulation"

(Anderson & Damarin, 1996, p. 272). Bettis (2000) stated, "Discourses are not just ways of talking, but they include ways of listening, acting, and ultimately of contributing to the creation of identities" (p. 25). Thus, the language and normative practices that comprise the discourse of educational technology "inscribe the activities and potentialities of teachers and students, and thus 'speak them' into a certain way of being" (Anderson & Damarin, p. 270).

By beginning this chapter with a discussion of the discourses surrounding technology use in schools, I hope to acquaint the reader with a brief overview of some of the most prevalent current topics and to help orient the reader to the entire spectrum of the literature. The literature on educational technology is voluminous. It ranges in form from mass media headlines to scholarly treatises of the philosophy of technology. News items and the promotional trade literature (such periodicals as Technology & Learning, T.H.E. Journal, and Classroom Connect) have an immense impact on public perceptions, and on the introduction and implementation of educational technology in public schools. Much of the professional literature is of similar nature to the trade literature, consisting of passionate discussions of the urgent need for technology and of ways it can be used in classrooms. There is little research documenting improved student learning and little thoughtfulness about the educational purposes for implementing technology (Hannafin, et al., 1996; Harp, 1997; Trotter, 1997e; Viadero, 1997b). Examination of how appropriate educational technology may be for mediating students' education is even more uncommon. Likewise, few researchers have investigated what widespread computer use means for students, teachers, curriculum, or society (Ely, 1995b; Holloway, 1996; Kerr, 1996b). Enthusiastic educators and researchers alike often focus on issues of enhanced

learning for students, school reform possibilities and the preparation of students for future work experiences (Ely, 1995b). This non-research-based literature informs only a limited range of problems within a narrow context and depth of understanding. Its predominance fashions a discourse that promotes the uncritical acceptance of educational technology.

More critical discussions of educational technology sometimes have their origin within the philosophy and sociology of technology (Bowers, 1988). Issues such as technological determinism and the non-neutrality of technology play into sociologically oriented work, as well as that of critical theorists and postmodernists/poststructuralists. Each of these strands of research has called attention to the multiplicity of power relations among administration, faculty, students, and the community. And each strand can aid in understanding the complex and contradictory nature of integrating technology into the organizational structure of schools, as well as to issues relating to race and gender.

Therefore, I will begin this literature review with a discussion of current discourses surrounding the use of educational technology. I will then provide a brief orientation to the general philosophy and sociology of technology, including instrumental versus substantive theories of technology, technological determinism, and the non-neutrality of technology. Following this, I provide the reader with an examination of a critique of technology in education. This critique considers in turn a body of sociological work that deals with the effects of technology on schools as organizations, as well as some of the same issues as the research that overtly employs critical theory. Finally, I describe research investigating educational technology through the lenses of critical theory, postmodernism, and poststructuralism, and a combination of the three. There is

much overlap between the sociological research and the research using critical and postmodern/poststructural approaches; therefore, I have not kept these sets of works completely separate.

Prevailing Discourses Surrounding Educational Technology

Trade literature in the field of educational technology assumes the appropriateness of the use of educational technology in the nation's schools and proceeds to describe methods of implementation or to debate such issues as what should constitute computer literacy (Bryson & de Castell, 1998; Turkle, 1997). If technology use is questioned at all, it is assumed that the computer is a neutral technology that has been misunderstood and misused by the classroom teacher or at worst, by the software developers (Bowers, 1988). In the following sections, I briefly review some of the various discourses common in the trade literature, along with an occasional supporting sociological study from the professional literature.

Preparing Students for the Future

One of the most commonly heard justifications for educational technology is the need to provide students the opportunity to acquire essential computer skills for future employment. This discourse has convinced the public that schools should employ technology to prepare students for entering the workforce of the future (Trotter, 1997d). In the past decade, government has become more vocal and active in promoting educational technology for technological literacy at all levels in the public schools ("Getting America's," 1996; "Summary of the Improving," 1994). Business and industry have donated considerable sums to encourage the use of technology in schools. Such

groups have promoted the concept that students must become skilled workers through classes in computer literacy and such programs as school-to-work in order to meet the requirements of the future workforce (Kerr, 1996b; Olson, 1997; Trotter, 2000). A few educators point out that students must be able to learn new computer skills on their own since they will most often face such situations in on-the-job training (Coburn, 1998).

Tapscott (1998), in Growing up digital: The rise of the Net Generation, proposed that computer technology is changing the economy and society so rapidly that those students who are currently living and learning in a digital environment are in the process of redefining "marketing, commerce, education, leisure, and culture" (p. 2). Rather than adapting to the workplace, this digital generation could be expected to change the workplace based on values developed through interaction within communities connected digitally. Such changes would likely include "nonhierarchical ways of working" (Tapscott, p. 10), independent thinking, adapting and customizing the work environment, and expecting and demanding customized services and products. Tapscott and others maintain that students who do not receive training in computers and technology could be seriously handicapped when entering the job market (Dede, 1998; Kent & McNergney, 1998; Means, 1994).

This discourse assumes that the use of educational technology can only be considered a positive that contributes to individual and social progress, and is a part of a more general discourse that frames the purpose of schooling as preparation of students for the work force. Questions of whether such a view benefits certain social groups unequally or whether it defines human needs in terms of what can be supplied by a commodity driven culture, never seem to surface.

Enhanced Learning

Some educators believe their use of educational technology in the classroom has brought students significant benefits. Much of the trade literature consists of reports of such benefits as the following:

- Educating students as part of a global community leads to increased awareness of the connectedness of all people, forging links between students and the world beyond their classroom. The electronic contacts between people provided by technology can promote democratic values of communication and mutual understanding in a broader, more diverse society.
- Technology can provide a wider variety of resources for learning that can integrate visual, auditory, and verbal learning and, thus can support an individualized approach to teaching students with various abilities and intelligences.
- Teachers report that stimulating student thinking and problem solving can be accomplished by providing access to a wider selection of rich materials that require evaluation for quality and suitability.
- Technology has also been said to provide students more ways to control the processes of locating and analyzing resources, interpreting and contextualizing their learning, and creating materials that express their own understandings.
- Technology can also open up possibilities for student investigations not otherwise available, such as the use of computerized instruments to collect and analyze physical data.

- In addition to giving students skills for the jobs of the future, computer literacy has been seen as a means to give students more ways to derive meaning from their educational experiences.
- Educators believe that some computer technology (such as tutorials and simulations) allows students to work more independently and to learn at their own pace.
- Teachers report that the use of technology has resulted in improving students' self-esteem. It has allowed them to acquire valued skills that permit them to express meaning in different formats, reflect on and assess the value of their work, and share that work with multiple audiences.

(Brunner & Tally, 1999; Carnegie Mellon University, 1994; Coburn, 1998; "Getting America's," 1996; McGrath, 1998)

Other reports in the trade literature hold that word processing programs, databases, spreadsheets, multimedia authoring programs, and the Internet have had documented, positive effects on student learning, including writing skills and accessing and manipulating information (Peck & Dorricott, 1994). Teachers have reported that technology can be used to foster increased and improved oral and written communication. Making such communication easier can then allow students to focus on, and often show more persistence in, problem-solving activities ("Getting America's," 1996; McGrath, 1998; Peck & Dorricott, 1994).

This type of literature is abundant, and it assumes that such uses (and effects) of technology are the norm. In many classrooms, however, this may not be the case. Schools often purchase educational technology equipment with little planning for ensuring its

appropriate use and with little consideration of the educational purposes for doing so (Ely, 1995a; White, 1997b). Teachers most often have little or no experience using computers or training in how to integrate their use into instructional programs. In 1997 only 3 percent of the nation's schools were reported to have integrated their use of technology into all aspects of the educational programs (Viadero, 1997a).

Student Interest and Motivation

The Wall Street Journal report, *What We've Learned*, listed the top ten perceptions gained from the years of computers in schools, with number ten being that "kids love computers" (Salpeter, 1998, p. 70). Some articles propose this intrinsic interest in computers results in increased motivation for learning (Brownlee-Conyers & Kraber, 1996; McGrath, 1998; Viadero, 1997b).

Student interest reportedly stemmed from many sources. One of these was the engaged, interactivity of the process of working with computers that students preferred over the more passive learning mode required for the lecture method of teaching. Another factor involved *real-world* practical projects for learning. Such projects, of course, do not necessarily require technology. But since technology is generally seen as a part of a progressive workplace, students often associate projects that employ computers "with high prestige jobs, power, and money" (Viadero, 1997b). Other reasons for student interest in working with computers include the audience gained from utilizing e-mail or publishing student work on the Internet and the timeliness and relevance of the material on the Internet (Coburn, 1998; McGrath, 1998; Peck & Dorricott, 1994; Salpeter, 1998; Tapscott, 1998). However, the motivation students have to use computers does not

automatically result in increased learning; students must be guided into engaging with computers in serious learning opportunities (Salomon, 1997).

Reforming Schools

The discourse of school reform has for several years now often included a call for educational technology to revamp the system (Brunner & Tally, 1999; Ely, 1995b; Kerr, 1996b). For those calling for a standardized curriculum, the efficiency and control of computerized instruction and assessment seem ideal. For those wishing to encourage an environment that is built around students' construction of knowledge, the integration of technology into classroom processes and procedures holds the promise of a changed pedagogical approach (Cuban, 1983; Kent & McNergney, 1998; Kerr, 1989; Newsom, 1996). Such change seems most likely to those educators who believe "technology promotes a 'balance of power' between the teacher and his or her students" (McGrath, 1998, p. 59) that encourages students to take greater responsibility for their own learning.

Educational technology is seen as a tool that can help change the roles of teachers from directors to facilitators of learning by reconfiguring the balance of expertise (and therefore, power) between teacher and students. Many students currently have as much or more expertise with computer technology as teachers. This unprecedented shift in expertise "almost requires teachers to shed lecture-style teaching" (Viadero, 1997b, p. 17). Rather than serving as the source of knowledge, teachers are asked to become facilitators and to employ a constructivist model of learning that posits students as active builders and testers of knowledge and encourages them to direct their own learning. Technology then is to be integrated into instructional programs in service of these inquiry-based teaching methods that urge students to decide on their own investigations

and to pose questions that interest and concern them. Teachers, as facilitators, guide students as they research and make sense of their findings.

This discourse of technology-driven reform discounts the difficulties of the many teachers currently in the field who are neither trained in nor comfortable with using computers and other such technology. Additionally, many teachers in today's schools are unfamiliar with the constructivist model of learning, as well as the teaching methods required when the role of teacher is redefined to that of facilitator of learning. This reform discourse also ignores the complexity of how such changes affect the web of relations within the social organization of the school and its surrounding community (Kerr, 1996b).

Distance Education

Telecommunications technology has made it possible to provide increased opportunities for access to higher level courses or to more specialized curricula than may be available locally (Coburn, 1998; McGrath, 1998). It can also provide access to distant events and experiences not otherwise available to students (Tapscott, 1998). For rural educators "technology has become the great equalizer" (Coburn, 1998, p. 64) that allows students in more isolated areas to participate more easily in the society as a whole and to prepare for the technological needs of future careers. Distance education may also form a part of the homeschooling movement as parents enroll their children in classes through the Internet (Zehr, 1999). The extreme form of this model for educational technology is proposed by pro-technology theorists such as Lewis Perelman, who in 1992, wrote School's out: Hyperlearning, the new technology, and the end of education. Perelman posited that technology can and should replace mass schooling as we know it. For such

theorists, the upheaval of society that such a scenario would entail is an acceptable cost for what they see as necessary to preserve our economic competitiveness and national security (Blacker, 1994). Distance learning technology has been portrayed as the most obvious tool to accomplish such ends.

Educational Technology as Progress

These prevailing discourses of preparing students for the future, enhancing learning, increasing motivation, and reforming schools, frame the computer in education as a mechanism for progress, a means of achieving unequivocally positive results. Underlying this view are the assumptions that the computer is a tool whose use can be directed and whose effects can be predicted.

Anderson and Damarin (1996) stated that,

> As a part of the institutional machine, educational technology and communication has a history of promising tools and materials that can be used in any context, teach concepts quickly using scientific principles, and widen student vision beyond the limitations of the local classroom. These promises have appeal to educational groups that value concepts of scientific progress, professional power, civil control, and orderliness. (p. 272)

The introduction of computer technology has at times included demands for changes in how teaching is to take place in classrooms. Even though such changes may work to enhance administrative power and decrease the autonomy of classroom teachers, these changes have been justified and accepted in the name of efficiency, a norm that overrides any examination of the moral aspects of the decision.

In support of the assertion that computer use is automatically assumed to exert a positive influence on education, Bowers (1988) outlined some of the underlying assumptions of such discourses. First, that all forms of knowledge can be made explicit and can be organized into discrete components, and second that all forms of knowledge have operational rules that can be formally represented. Those who hold such assumptions about the nature of knowledge would maintain that knowledge can be converted to digital information and transmitted through electronic communication to students without it being affected by the interpretations of the people who collected it or translated it to digital form. Likewise, knowledge would be unaffected by teachers' and students' own constructions of meaning. In essence, such assumptions disregard any sense of history, of language, or cultural perspective. As an example, with regard to the discourses of preparing students for the future and of distance education, when we consider the current immense rate of change in our information society, it would seem obvious that we may not be able to predict exactly what knowledge or skills are essential for workers in the future, including the educational workers in the future's schools.

Alternative Discourses

"Technological hyperactivity ensures that philosophic thought seldom surfaces" (Thiele, 1997, p. 504). This statement characterizes the condition of many of our schools with regard to educational technology. As is evidenced by many of the above discourses in education technology, a deeper understanding of the meaning of technology in society, much less the meaning of educational technology in the schools, is seldom take into account. In the following section, I will introduce some key concepts from the philosophy

and sociology of technology: instrumental versus substantive theories of technology, and technological determinism. Such concepts address technology in general but form the basis for alternative discourses regarding educational technology.

Instrumental versus Substantive Theories of Technology

An instrumental theory of technology holds that technology is the embodiment of progress and that technology's capability to assist people in achieving predetermined goals more efficiently is an indisputable good (Feenberg, 1991a). That is, technologies are tools that simply await human direction, to be used for specific tasks, and which carry no inherent meaning or value. The discourse embodied in this theory is typified by the modern search for the one best way to accomplish a task, based on efficiency, control, and rationalism (Bowers, 1988, p.31). Participants in this discourse assent to the reform of technology, or technology use, only if based on technical or design principles rather than on the effects technology might have on people and society (Feenberg, 1996). In many of the discourses of technology and schooling, technology is viewed as a tool, a means to an end. Disruption of the social order of schools or personal consequences to those teachers uncomfortable with less traditional teaching methods, are seen merely as the costs of progress. An instrumental view of technology assumes meaning is dictated solely by the purpose for which technology is used and does not acknowledge individual construction and enactment of meanings for technology itself.

In contrast, a substantive theory of technology holds that there are value issues inherent in technology use, such as a concentration on efficiency, which "does more than streamline our ways of getting the things we always wanted; it changes those things" (Feenberg, 1991b, p. 3). Winner (1980) has argued that technologies are not merely tools,

but have political and social meanings built into them through the ways we design, define, and use them. In a substantive view, technology is saturated with political and social meanings or values and is, therefore, a vehicle for cultural domination. Technical progress changes the social environment, our goals and our actions.

In 1934 Lewis Mumford, among the first to describe this, focused on how technology (specifically the clock) "had altered consciousness, and thus the patterns of human relationships" (Bowers, 1988, p. 29). Jacques Ellul, in The Technological Society, 1964, and Martin Heidegger, primarily in The Question Concerning Technology, 1977, also made major advancements toward understanding how "technology mediates and thus transforms human experience" (Bowers, 1988, p. 30). For example, Turkle (1984) points out that language used to describe the computer has been reflected back to form a discourse that depicts humans as thinking *machines* who *process information* and who can be *programmed* to carry out certain instructions. Through this discourse we come to see ourselves differently than ever before in history. In this regard, Anderson and Damarin (1996) observed, "to the extent that media and technology contribute to social language, norms, and requirements, they also shape the postmodern subject" (p. 271).

Technological Determinism

Jacques Ellul described technology as advancing on a set path to which social institutions must adapt, and which humans are more or less powerless to change (Feenberg, 1991a; Kerr, 1996a). Technology itself determines the course of future developments and the best that can be hoped for is to contain or guide technology by setting boundaries or rules. But as technological development takes place on multiple fronts with no overarching regulation, this fatalistic view of technology makes it

"difficult for many to see how to restore to human beings the power to exercise political and moral control" (Bowers, 1988, p. 30). Not even reversal seems possible; whatever is possible, will be. Heidegger held that technology's drive for progress and efficiency essentially transformed the entire world, people included, into raw materials to be utilized in technical processes, and that technological innovation was now an end in itself (Feenberg, 1998a, 1998c; Thiele, 1997).

Non-neutrality of Technology

Jean-Francois Lyotard proposed that the extension of computerization into all parts of society has had the effect of changing the nature of knowledge since "if it is to fit into the technology and become operational, [it] must be translated into quantities of information" (Bowers, 1988, p. 37). Such a change reinforces or privileges certain ways of knowing and a rational, purposive mode of thought. Bowers held that converting information to digital form commodifies knowledge and relationships and marginalizes moral values that are encoded in the language. This change in the nature of knowledge again asserts a substantive value bias and refutes the view of the computer as a neutral tool or neutral technology.

Bowers (1988) defines the non-neutrality of educational technology in terms of how it amplifies or reduces certain aspects of representations of the real world in which people live, and how that might alter the learning process by framing, through language, the student's perception of the world (p. 24). For example, he maintains that the computer cannot be neutral because it "strongly amplifies the sense of objective facts and data-based thinking [and] serves, at the same time, to reduce the importance of meaning, ambiguity, and perspective" (p. 33).

Jurgen Habermas regarded the non-neutrality of technology through the lens of ideology. In his view, modern technology had become a source of oppression because it has invested in it a political orientation and merely employing technology necessarily involved taking a stance in favor of that orientation. The particular configuration of the science and technology of an age is realized in certain ways of thinking and specific forms of technological applications that are privileged by the dominant society (Feenberg, 1996). Technology therefore is not seen as neutral since it has a substantive value bias. As Feenberg noted, "the use of technical alibis to justify what are in reality relations of force [such as technical changes in the workplace] is a commonplace in our society" (p. 7). It is such normative dimensions of technology that critical theory would bring to public consciousness in order to question and change.

In their discussion of the non-neutrality of technology, Moll and Froese-Germain (1998) used principles presented by E. J. Lias in Future Mind relating to communications media. These principles were 1) new media reshape societies and their institutions as they change the patterns of our lives, 2) new media create their own existence and market as our dependency on them grows, and 3) new media introduce metaphors that change social values. Moll and Froese-Germain held that an example of the third principle, resulting from the use of computers, is the increasing value placed on speed of response and a logical approach (flowcharting) to problem solving. Kerr (1996b) and Nichols and Allen-Brown (1996) pointed out that the fundamental assumptions of educational technologists included a discourse that posits a view of the world in which a scientific, analytical approach is considered precise, efficient, and value neutral, and therefore

appropriate for all educational problems. This discourse affords little concern for critical or ethical understandings or considerations.

Neil Postman has long been active in the study of information environments in order "to understand how technologies and techniques of communication control the form, quantity, speed, distribution, and direction of information; and how, in turn, such information configurations or biases affect people's perceptions, values, and attitudes" (Postman, 1979, p. 186). It is Postman's position that "the computer redefines humans as 'information processors' and nature itself as information to be processed" (Postman, 1992, p. 111). He contends that throughout history technological change has always produced benefits for some at the expense of others (Postman, 1995b). In the examination of educational technology, Postman and other researchers have concluded that it needs serious continuous evaluation, with some deciding that the disadvantages may outweigh its advantages (Barnes and Strate, 1996; Burbules, 1996; Larson and Clift, 1996; Postman, 1994; Montgomery, 1996; Turkle, 1997). Selman (1994), however, asserted that it is possible to have "an ethics of technology which recognizes that we have choice yet does not imagine that our technologies are simply neutral instruments which can be detached from social context" (p. 2).

In his extensive discussions of technology, Marx criticized both the goals for which technology was employed and the methods of its application. However, Marx also tried to show that the technological condition of society was not an ontological or existential (or determined) state. Marx considered current situations to be the results of historical conditions that were consequences of human choices and activities (Bernstein, 1971; Feenberg, 1991a). This concept influenced Foucault's archeology of knowledge.

Marx believed that because current conditions were the result of human volition and were contingent on social interests, such conditions could be changed through revolutionary praxis. The more thoroughly understood were historical contexts (the more clearly discerned the dynamics of the situation), the more likely that current conditions could be changed. This thesis holds that different social contexts can produce different paths for technological developments.

Such a possibility of transformation provides an opportunity to contradict the fatalism of technological determinism. It is based on this opportunity to change the path of technological development through examining the history and political dynamics of social conditions that critical theory can be employed to critique educational technology.

Critique of Technology Use in Schools

There is a political dimension to research on technology that many educators have not readily acknowledged. Most educational researchers have not approached their work from the perspective of the politics of the educational content (power, control, and benefit) or of the discourses that circulate through the conjunction of education and technology (Kerr, 1996a; Nichols & Allen-Brown, 1996). Many have been concerned with the effects (i.e., What effect is educational technology having on employment, test scores, and learning?) and with resolutely searching for proof of the effectiveness of educational technology so that decision-makers should be persuaded to support some method or program.

The literature of educational technology generally reflects quantitative and descriptive research; very few researchers have used historical, qualitative, critical or

philosophical methods. However, some theorists have argued that research ought to be expanded from instrumental approaches to include those that are critical and emancipatory (Bromley, 1998; Nichols & Allen-Brown, 1996; Petrina, 1998). The remainder of this review involves such work. It represents the substantive theory of technology since it holds that there are value issues related to the use of technology.

The search for work critiquing technology in education has been difficult. Not only has there been a relatively small amount of such work carried out, but most of it does not originate from within the field of educational technology. Additionally, some of those educational theorists from outside the field have operated from a more sociological perspective. Many of them do not specifically mention postmodernism/poststructuralism or critical theory. However, I include them because their topics are often the same as those researched by critical or postmodern/poststructural theorists and their methods include a critique of mainstream educational technology viewpoints that results in their pointing out the contradictions, inequalities, and oppressions. As I have previously mentioned, there is much overlap between the sociological research and more critical works in educational technology; therefore I have not kept each of these sets of works completely separate but rather have included each in the discussion where necessary for coverage of the topic of investigation.

Sociological Studies

When considering educational technology, sociologists and philosophers alike insist that the purposes of schooling must be examined and that the purposes should go beyond the transmission of knowledge to recognize "that education is fundamentally a human, not a technical or economic, activity" (Kerr, 1996a, p. 16). Other researchers

have made the same point as well (Bowers, 1988; Postman, 1995a; Yeaman, Koetting, & Nichols, 1994). Some, such as Postman and Bowers, hold that education cannot ignore the cultural transmission of values. Others insist on a critical consciousness that is attuned to issues of representation and privilege (Anderson, 1994; Burbules, 1996; Muffoletto, 1994a; Yeaman, 1994b). Ursula Franklin's (1990) critical work on technology rejected the production model of education and employed the metaphor of "careful nurturing of growth" (Selman, 1994, p. 2). Each of these views of the purposes of education might lead to different understandings of which technologies might be used in schools and of how to use them.

Kerr (1996b) stated that in the United States, education in general and educational technology specifically "has been studied almost exclusively through the disciplinary lenses of psychology" (p. 145). He pointed out the need to consider educational technology as a general social phenomenon that calls for sociological investigation, focusing on the effects on groups and interactions between people.

Sociological Considerations of Structural/Organizational Issues

Nichols and Allen-Brown (1996) stated that while it is common to view technology's role as a catalyst for change within "inertia-bound bureaucracies," that role may ultimately "depend more on the internal assumptions we ourselves bring to thinking about its use" (p. 150). An example of this might be the expectation that educational technology will inevitably change the role of teachers from dispensers of knowledge to that of learning facilitators. Such an expectation could be said to ignore the reality of the school as an organization that not only is bound by its bureaucratic structure and by historical conditions, but also must respond to problems and demands of teachers,

students, parents, employers, and politicians, all of whom may have different visions of the purpose of schools. In this section, I will discuss the literature dealing with such issues.

Kerr's *Toward a Sociology of Educational Technology.* One of the most important compilations of research in the field of educational technology is the Handbook of Research for Educational Communications and Technology, published in 1996 as a project of the Association on Educational Communications and Technology. This extensive volume attempts a review of nearly the entire field of educational technology. It consists of a collection of overviews which evaluate the research and research methods of various topics in educational technology and also suggest issues that need clarification. Although several chapters from this work will be cited in this literature review, one of the most pertinent is Kerr's *Toward a Sociology of Educational Technology.*

Kerr described one concern of sociology as a focus on the ways people interact as members of groups or organizations and how that membership affects how they live and work. He then reviewed how technology has been seen to affect organizational structure, reporting the difficulty of keeping technology under social control and the difficulty of predicting what consequences might be expected. For instance, some have predicted that information technology will provide for more democratic action as organizational hierarchies are flattened and members' roles are redefined through increased access to information. Others have responded that such changes may be resisted through the relative power and position of the various actors involved (Zuboff, 1988).

Kerr (1996b) then related this concern to the study of schools as organizations. He pointed to the need to study an organization such as a school as a part of an environment

or a context that involves both a resources-information aspect and a "cultural surround [context] that determines and moderates the organization's possible courses of action in ways that are more subtle, less deterministic" (p. 148). With regard to educational technology, the resources and information processes of schools have been studied by those interested in the availability of equipment and in teacher training in technology and its integration (Newsom, 1996; Westbrook & Kerr, 1996). Fewer researchers have investigated the values and assumptions of supporters or critics of the use of technology, or the various pressures from outside social groups and from political and economic structures (Nichols & Allen-Brown, 1996).

In addition to suggesting the need to consider the purpose of education, Kerr (1996b) proposed three central questions for investigation regarding the sociology of education and technology: 1) the level of acceptance of technology that redefines the role of teachers, 2) the effects of technology on educational practices in classrooms and schools, and 3) analysis of schools as organizations under conditions of technological implementation. (I would submit that my study has investigated each of these three questions, as well as understandings of the purpose of education at High Plains.)

Meyrowitz's *Taking McLuhan and 'Medium Theory' Seriously.* Another collection of sociological works in educational technology is Technology and the Future of Schooling: Ninety-fifth Yearbook of the National Society for the Study of Education, Part II. Published in 1996, this volume includes work intended to raise questions about the field and how educators in America perceive it. Topics of study include considerations of the purpose of using technology in education, the ideology of technological progress, issues of funding for technology, how technology has driven

justifications for its own use, and why technology must be seen as a part of larger historical process of social reproduction (Kerr, 1996c). This book also includes Meyrowitz's examination of McLuhan's Medium Theory regarding how forms of communication influence what is perceived.

Meyrowitz's chapter focused on how communication technologies have and will influence learning by breaking down boundaries between various social groups' access to information. Meyrowitz held that diminished differences between what knowledge is held by children versus adults, students versus teachers, and teachers versus administrators, also diminishes status and hierarchical distinctions between the groups. Meyrowitz suggested that innovations in the social structure of schools such as shared decision-making, cooperative learning, opening of the traditional canons of the curriculum, and a more individualized understanding of learning through multiple intelligences might result from the growth of mass media that allows the same information access to all. This process would suggest that technological changes might eventually result in a restructuring of education.

I would contend that Meyrowitz has made a very strong case for claiming diminished distinctions between social groups with regard to their roles in society as a whole. However, despite some small but notable changes such as shared decision-making, within the historically bound, bureaucratic organizational structure of schools, differences between groups such as students and teachers, and teachers and administrators, are more difficult to break down. This topic is taken up in the work I discuss next.

Hodas' *Technology Refusal and the Organizational Culture of Schools.* Hodas (1993) addressed such issues as the organizational mechanisms and the expectations and assumptions of faculty and of administration within the bureaucratic structure of schools. He probed the conflicts induced by the introduction of educational technology and examined the ways in which the role of the teacher may be affected through the formal and informal redefinition of job responsibilities. Hodas held that for a technology to be widely adopted in classrooms, it must be easy to use, must maintain respect for the role of teacher, and it must not threaten the existing principles and order of schools, such as hierarchy of authority and the transmission of the norms and values of the dominant society. Hodas claimed that teachers were subject to pressure from societal expectations to adopt educational technology, but that from an organizational standpoint, such change could work to loosen the bureaucratic structure and could be seen as a disruption of the norm. Due to the resulting conflicts between personal and organizational needs, Hodas held that adjustments demanded of teachers and changes in educational systems are not easily accomplished.

Cuban and Others. Other researchers, such as Cuban (1993) in *Computer Meets the Classroom: Classroom Wins*, have also found that the cultural and social norms that bind teachers' roles are not redefined quickly or easily (Cohen, 1987; Sheingold and Tucker, 1990). Although many researchers have discussed the resistance of teachers to embrace technology, Cuban (1999) suggested teachers have valid reasons for hesitancy including 1) challenges to traditional classroom authority, prestige, and ways of working and relating to others, 2) contradictory advice from experts, and 3) unreliable and

intractable technologies. As a result of such reasoning, instructional practices often remained traditionally teacher-directed (Cuban, 1983; Hodas, 1993).

Warschauer's *Technology and School Reform: A View from Both Sides of the Tracks.* I conclude this section on sociological research with a report on an interpretive qualitative study of educational technology that has similarities to my own work, since it is a critical empirical school-based study. Warschauer's (2000) work, *Technology and School Reform: A View from Both Sides of the Tracks*, took place in Hawaii in an elite private school and an impoverished public school, both of which had reputations for excellent use of new technologies.

Through interviews and observations carried out in the schools with students and teachers, Warschauer concluded that though the process of school reform appeared to have introduced educational technology similarly, social and cultural differences relating to resources and expectations for students produced dissimilar consequences. Both schools had implemented interdisciplinary and team teaching, collaborative and apprenticeship learning, flexible scheduling, and support for teacher initiative and involvement. However, access to technology that students had at home and at school differed significantly between socioeconomic levels, as did the goals toward which the school reforms were directed. At the lower socioeconomic school, technology was used to prepare students for the workforce, whereas at the upper socioeconomic school technology (and the entire curriculum) was designed to produce academic and professional leaders. Thus, both access to technology and expectations for student use of technology, channeled students into different social futures. Warschauer asserted, "even

in those cases where the computer 'beats' the classroom, it doesn't necessarily beat the system" (n.p.).

Critical Theory of Educational Technology

The last two to three years have seen an increase in the publication of work employing critical theory to examine educational technology. Prior to that time, little research had been done in this area. While this research varies widely in the topics explored, the tenets of critical theory most applicable to this discussion of educational technology include, 1) the need to reveal the contradictions, social inequalities, and social dominations that oppress people, and 2) the challenge to the notion of pure reason, since it is held to be inherently embedded in culture and power (Lather, 1991). However, almost no critical research has investigated the practice of educational technology at the local, school-based level (Nichols & Allen-Brown, 1996).

Feenberg's (1991b) Critical Theory of Technology stated that "technologies have to be understood as social constructions in a social context" and "wherever there are technical systems there is politics" (n.p.). Feenberg built on Heidegger's position that technology can be understood "only through our specifically technological engagement with the world" (n.p.) and proposed that technology will be in the center of cultural and political change in the future. Employing this sociological perspective emphasizes the view that educational technology is more than hardware or software, or even the technology of instructional design. Educational technology is said to include the social effects it brings about and "the ways in which technology gets into learning and schooling without anyone taking much formal notice" (Nichols & Allen-Brown, 1996, p. 226). Bruce (1996) claimed that:

> A technology is a system of people, texts, artifacts, activities, ideology, and cultural meanings. It doesn't so much determine, as become social practices. Our task then must be to consider critically what those social practices are now and what they can become in the future. (n.p.)

Forms of Educational Technology

Works that analyzed connections between critical theory and procedural factors relating to educational technology have dealt with a variety of issues. The following typical efforts are some of the best known. Streibel (1986) and Bromley (1992) discussed how certain formats such as drill-and-practice and tutorials limited personal responsibility for learning. Koetting (1983), Bowers (1988), and Nichols (1991) related the intrinsic rational-technical philosophic views of technology to various forms of educational technology and proposed that such views disregarded holistic, experiential, and aesthetic ways of knowing. In 1991, Streibel discussed the need for instructional designs that did not emphasize skills and programmed learning. Another set of works has used critical approaches to understand the societal relationships affected by educational technology.

Social Factors

Those works relating to critical examinations of the social foundations of educational technology overlap somewhat with those described above in the section reviewing the sociological investigations of structural and organizational issues. However, the critical works may approach the topic from a somewhat more political/ideological perspective, such as Apple's (1993, 1998) work on teaching and technology in which he claims that educational technology has changed the means but not the goals of education. Apple held that *banking education* continued, as teachers

imparted information and students received it. Similarly, Koetting (1993) noted that because schooling itself served to maintain the status quo in society, without deep systematic reform, educational technology could not bring about a change in educational practice. Persell and Cookson (1987) found that computer literacy was viewed as a form of cultural capital that ensured protection of class interests. After studying the social implications of educational technology, Preston (1992) proposed an orientation that ensured that computers became empowering tools for students, students became aware of the social effects of computers, and questions of equity were addressed.

In the vein of work investigating the non-neutrality of many educational practices with regard to gender and race (Apple, 1993; Giroux, Penna, & Pinar, 1981; Lather, 1991; McLaren, 1994), some researchers from outside the field of educational technology, have examined how educational technology may either contribute to such problems or to the solutions. Examinations of these social practices have led several authors to claim that the introduction of educational technology into schooling is not guided by theories of learning but rather by ways of thinking oriented to economic progress and the production of skilled workers (Apple, 1986; Bowers, 1993; Damarin, 1994; Koetting, 1983, 1994; Muffoletto, 1994b). These and other critical theorists seek to expose the assumptions of educational technologists that (as discussed earlier in the section on the non-neutrality of technology) all educational problems can be solved through the application of precise, scientific reasoning that often disregards social effects or ethical issues.

Within the field of educational technology, most studies have ignored the critical issues of what constitutes appropriate technology use with regard to race, class, and

gender, and researchers have generally aligned themselves with business or economic interests (Nichols & Allen-Brown, 1996; Sloan, 1985). The relative scarcity of educational technologists working on the critical issues relating to educational technology can be gauged by the results of a search of an online database listing all dissertations produced at the 55 universities in the nation offering graduate programs in instructional design and technology. From 1977 through 1999, of more than 2500 dissertations, fewer than ten employed critical or postmodern/poststructural approaches (Caffarella, 2000).

Gender. The trade literature and the professional literature have both increasingly reported on differences in the use of technology by males and females as several recent studies have addressed these issues (Becker, 1983, 1986; Bromley, 1998; Brunner, 1997; Damarin, 1991a, 1994; Kerr, 1990; Sutton, 1991; Turkle, 1984). However, Kerr's (1996b) discussion of the sociology of educational technology highlighted the continued need for studies that examined the issues of the effects of access and types of experiences of educational technology on various social groups, including gender groups and racial/ethnic minorities. In addition to differences in amount of use, early studies (Becker, 1983, 1986) found that girls tended to focus on word processing and collaborative activities while boys played games and other competitive computer activities. However, Ogletree and Williams (1990) suggested such differences were related to the amount and type of prior experiences of each group. Kerr (1996b) suggested that as women move more firmly into the economy, and the use of technology is no longer perceived by young women as masculine, such changes in society will bring about changes in curriculum which may with time eliminate these differences.

Suzanne Damarin's work (1988, 1989, 1990, 1991a, 1992a, 1992b, 1994,) has discussed a variety of topics with regard to gender and educational technology, including computer anxiety, instructional and curriculum design, evaluation, computer literacy as related to gender equity, and the application of feminist ethics to educational technology. She held that considering the teacher to be a facilitator of students' technology based learning served to undermine teacher control by removing responsibility for delivery of content and replacing that with responsibility for technical maintenance of computer-based instruction. Damarin has also held that the reform of sexist science and math curricula through appropriate use of computers could open the fields of science and math to women and girls.

The Digital Divide. Becker (1983, 1986), Sutton (1991), and Doctor (1991) noted that not all students have equal access to technology, indicating a widening literacy, fluency, and wealth gap between different economic classes in the United States, but more dramatically between the developed and developing world. While racial disparities in access to computing resources and technology have received relatively little coverage in scholarly journals, the topic has attracted significant attention through trade publications and surveys by foundations and by state and federal governments (Kerr, 1996b; "National Center," 1998; Nichols & Allen-Brown, 1996; Trotter, 1997c, 1997e). Novak and Hoffman (1998) reported continuing inequities in *Bridging the Digital Divide: The impact of race on computer access and Internet use.* Based on a Nielsen survey, Novak and Hoffman determined that white students were about twice as likely to have a home computer and to have used the Internet as African-American students.

Native Americans and Technology. Even such statistical information as that just reviewed regarding equity in educational technology seems to be lacking for races other than African-Americans. What little available literature there is relating to Native Americans and technology seems to come from Native people's own communities and expresses a critical concern for the role of technology, especially with regard to its effects on the environment. An Internet document provided by the Assembly of Native Educator Associations, the *Alaska Standards for Culturally Responsive Schools*, includes standards for what this group considers to be appropriate use of educational technology for Native Americans. This document makes clear an intention toward the emancipatory use of technology by stating that students should be able to "identify appropriate forms of technology and anticipate the consequences of their use for improving the quality of life in the community" and calls for a curriculum that "makes appropriate use of modern tools and technology to help document and transmit traditional cultural knowledge" ("Assembly," 1998, n.p.).

Mander's (1991) book, In the Absence of the Sacred: The failure of technology & the survival of the Indian Nations, includes an excerpt from *A Basic Call to Consciousness: The Hau de no sau nee Address to the Western World.* This address was delivered at the 1977 UN Conference on Indigenous Peoples and calls for (among other things) a holistic view of the political, economic, epistemological, and spiritual effects of technology on the earth and its people, and for a reversal of the processes that bring about technological destruction of the ecology. Mander held that computers are changing the content of education from relational to objective, scientific knowledge, a change that is at

odds with traditional ways. He claims that Native people "remain our most clear-minded critics" (p. 195).

Blacker (1996) has also looked at the issue of non-neutrality of schooling that espouses a worldview of technology, comparing it to a religious worldview. And works by Bowers (1988, 1993), Orr (1992), and McLaughlin (1995a, 1995b) have employed critical theory to discuss the detrimental ecological repercussions of the scientific and economic discourses dominant in educational technology. These researchers argue that such discourses so emphasize the desirability of efficiency and stress the importance of technological progress and economic leadership that they overshadow and discount concern for sustainability and environmental protection.

Some of the foremost concerns of critical theory with regard to educational technology have focused on 1) how the specific form of technology employed affects social relationships, and structural and organizational issues, 2) the oppression of gender and racial social groups, and 3) the ecological effects of the use of technology and the discourses surrounding that use. There is much overlap between the sociological research and more critical works in educational technology. Similarly, many of the topics researched by postmodern/poststructural theorists are the same as those examined by researchers who use critical theory, although they vary more widely. Like critical theory, they often are critical of mainstream educational technology and point out contradictions, inequalities, and oppressions.

Postmodern/Poststructural Research

The importance of using postmodern and poststructural theoretical lenses to examine educational technology is that they bring to light previously hidden or ignored

social, political, and epistemological issues that work to shape the use of educational technology, as well as the identities of those that use it. Their use also emphasizes the multiple and unstable perspectives constructed through language or discourse. The following discussion demonstrates not only the variety of topics but also the relative shortage of postmodern/poststructural research in educational technology.

Landow's (1997) book, Hypertext 2.0, highlights the non-linearity of computer and communications technology. He pointed out that the reader/learner is confronted with multi-linearity, nodes, links, and networks of text that encourage individualized paths to reading/learning (the Internet exemplifying this most noticeably). This perspective of technology suggests multiple ways of viewing the use and purpose of educational technology. Hlynka quoted McDermott that postmodernism "signals a crisis of confidence in the benefits of technological progress" and stated that "postmodernism is not to be perceived as a negative, Luddite phenomenon, but rather a shift away from an overzealousness" (Yeaman, Hlynka, Anderson, Damarin, & Muffoletto, 1996, p. 256).

Hlynka & Yeaman (1992) question the positivistic, scientific approaches to applying educational technology and suggest that a postmodern approach, where there is no one best way, can have a positive effect on the field of educational technology. Other such postmodern discussions of educational technology include: Paradigms regained: The uses of illuminative, semiotic and postmodern criticism as modes of inquiry in educational technology (Hlynka & Belland, 1991), Muffoletto and Knupfer's edited book, Computers in education: Social, political, and historical perspectives (1993), and Koetting's *Postmodern thinking in a modernist cultural climate: The need for an unquiet*

pedagogy and other articles in the February 1994 special issue of Educational Technology.

Poststructural research in educational technology generally has been based on the notion of representation, in this case understood as meanings or definitions that are constructed by the surrounding discourse. Like families, religions, and education, social institutions such as mass media and educational media "present narratives that inform us and position us in relationships to others and social institutions" (Yeaman et al., 1996, p. 268). Our sense of self and our knowledge of the roles we inhabit are formed and re-formed by our repeated social experiences, including those involving educational technology. Damarin (1991a, 1991b, 1991c) and Sofia (1998), feminist researchers who have produced research in educational technology using a poststructural approach, have questioned the scientific, militaristic, or sexist language used by the field of educational technology. Such language has constructed a masculinist and patriarchal discourse surrounding educational technology that through normalizing social regulation shapes those who use technology and marginalizes women and those seeking emancipatory educational reform.

A Critical Postmodern/Poststructural Study

Although Bryson and de Castell (1998) have titled their research *Telling Tales Out of School: Modernist, Critical, and Postmodern 'True Stories' about Educational Computing*, I propose the authors could be said to have used a critical postmodern/poststructural framework in the manner of Lather's (1991) work. By deconstructing the language of educational technology and analyzing the discourses surrounding its use, Bryson and de Castell examine the ways meaning is produced and

regulated. This privileges certain understandings of educational technology and thereby prescribes the limits of computer use in schools and helps to maintain inequities between social groups, including race, class, and gender, as well as teachers and students.

Bryson and de Castell first constructed a modernist tale of the computer as tool. Employing an instrumental view of educational technology, this perspective was described as a technicist, skills-based understanding of its use and purpose. This view was exemplified by a focus on learning to use technology. Bryson and de Castell then presented a critical tale of educational technology that sought to expose the hidden curriculum produced through the values inherent in the use of technology. This tale probed how educational technology affects relations between dominant and marginalized groups within the school community. This critical tale focused on learning about technology and the social consequences of its use. Finally, they put forward a postmodern tale that pointed to the contradictory and inherently political implications of the use of technology in schools. This tale emphasized the potential for reconfiguring technology use to make possible new forms of resistance that could restructure power relations within the classroom. This view focused on learning through technology to produce a changed society. Bryson and de Castell hold that each of these tales is a true story but that they are not the only possible stories, and that what is needed is to maintain an open but reflective attitude regarding innovative possibilities for educational technology.

How My Study Fits Into This Literature

My study sought to examine the curriculum of a school that emphasized the use of educational technology, as well as the perceptions of teachers and students working and

learning with educational technology in such a setting. I sought to gain an understanding of the values and meanings these participants attach to the use of educational technology. Thus, my study consisted of an empirical exploration of an educational environment that exhibited the influence of the prevailing discourses of educational technology discussed in this review. These included justifications for educational technology 1) as the need to provide students for entering the workforce of the future, 2) as a way of enhancing student learning, and 3) as a way of increasing student motivation for learning (Brunner & Tally, 1999; Carnegie Mellon University, 1994; "Getting America's," 1996; McGrath, 1998; "Summary of the Improving," 1994).

Additionally, my study addressed Kerr's (1996b) three questions for the investigation of the sociology of education and technology. I specifically examined the level of acceptance of educational technology that worked to redefine the role of teachers. I also investigated the affects of technology on educational practices in classrooms and schools. Pressure from integration of technology has changed the expertise (and therefore, power) between students and teachers resulting in a changed pedagogical approach (Cuban, 1983; Kent & McNergney, 1998; Kerr, 1989; Newsom, 1996; Viadero, 1997b). Furthermore, I analyzed the structural organization of a particular school with regard to its implementation of educational technology. Both Hodas (1993) and Cuban (1999) had reported that for a technology to be adopted by teachers it must be easy to use, must maintain respect for the role of teacher, and must not threaten the existing norms and values of schools. High Plains also revealed that teachers were subject to pressure from organizational and societal expectations to adopt educational technology (Cuban, 1999; Hodas, 1993; Kerr, 1996b).

Using critical theory encouraged me to investigate the perceptions of various social groups, including racial, ethnic, and gender groups, in order to gain some understanding of the meanings students and teachers constructed in response to the emphasis on educational technology at this school (Anderson, 1994; Burbules, 1996; Damarin, 1989, 1998; Muffoletto, 1994a; Yeaman, 1994b). It also necessitated exploring how the historical, political, economic, and cultural contexts worked together to produce this particular school with its particular characteristics, and how these factors impinged on the meanings participants constructed (Bromley, 1998; Nichols & Allen-Brown, 1996; Petrina, 1998).

The use of a postmodern/poststructural lens provided a way to theoretically account for the effect of the multiple and contradictory identities of students and teachers, as well as for the ways the discourses surrounding educational technology at this site prescribed appropriate computer use (Bryson & de Castell, 1998; Hlynka & Yeaman 1992; Yeaman, et al., 1996). I would contend that this study adds to a woefully small amount of empirical, school-based research dealing with such issues (Nichols & Allen-Brown, 1996).

Summary

In this review, I have discussed prevailing discourses within the field of educational technology itself: preparing students for the future, enhancing learning, increasing student interest and motivation, reforming a school's pedagogy, and using distance education to increase students' opportunities. Then I presented alternative discourses from within the literature of the philosophy and sociology of technology in

general, including instrumental and substantive theories of technology, technological determinism. These discourses provide the basis for a theoretical, as well as a social critique of the use of educational technology. While sometimes overlapping the research employing critical theory, the body of work representing the sociology of educational technology provides insight into the social and economic structural changes that take place in schools and communities due to the use of educational technology.

Next, I reviewed the work of some of the few researchers making use of critical theory in order to expose the social inequalities, and social dominations that accompany the use of educational technology. Finally, I have pointed out some of the postmodern/poststructural investigations of educational technology. This body of work is focused on providing new insights and multiple perspectives on educational technology and the discourses surrounding it. By showing how such discourses operate and whose interests they serve, this work seeks to disclose the complexities and contradictions involved in the implementation of technology in schools.

CHAPTER THREE:

METHODOLOGY

A Qualitative Study

Qualitative research seeks to examine the world in all its complexity, refusing to reduce that experience to a small set of facts or figures designed to capture the essence of the whole (Glesne & Peshkin, 1991; LeCompte & Preissle, 1993). Qualitative research arises out of several disciplines including anthropology and sociology, and involves the use of multiple methods to obtain an in-depth, interpretive understanding of human experience (Denzin & Lincoln, 1994). It is an endeavor that contradicts scientific research traditions and questions the unquestioned. For this reason, it is especially appropriate for my interest in investigating the complex relationships among educational technology, schooling, and the self-understanding of inhabitants of a technology-enriched school. Questioning the new technology embraced by educators and the public alike is most often automatically assumed to be a negative stance. I have not meant it to be such. Since in my daily activities I am significantly involved in using and encouraging students and teachers to use educational technology, I seek understanding not negation. Qualitative research provides the tools for my quest.

The use of a qualitative approach involves a study of the phenomena in the natural setting and attempts to investigate it in terms of the meanings or interpretations employed by those who inhabit that setting (Denzin & Lincoln, 1994). In a naturalistic study, the researcher seeks to personally see the activities and operations in context, to interview

those who are participants, and to provide a dense, reflexive, richly detailed depiction. At the same time, qualitative research adopts a postpositivistic stance that holds that "reality can never be fully apprehended, only approximated" (Guba, 1990, p. 22) since all observations are filtered through the socially situated perspectives of language, race, class, and gender of both the participants and the researcher. Research must rely on the verbal and written expressions of the perspectives of the participants studied and of the researcher, and therefore the results reflect choices made by the researcher regarding questions deemed worth asking, data perceived and recorded, and reports produced (Denzin & Lincoln, 1994).

A Case Study

As a case study, research is confined to the examination of a specific, bounded system such as an event, a person, a group of people or an institution. It is this choice of object to be studied, not the methods used that distinguishes a case study. This study was undertaken in order to better understand the particular situation at High Plains Public Schools and to provide insights into the issues surrounding educational technology at that site. Framing inquiry as a case study allows the researcher to wrestle with questions that are integrally tied to the social context which is conceptualized as a complex entity composed of interrelated physical, economic, historical, and ethical issues (Stake, 1994). The holistic study of these complexities is the basis for a qualitative case study (Glesne & Peshkin, 1991; LeCompte & Preissle, 1993).

A Critical Postmodern/Poststructural Theoretical Framework

Although little critical postmodern/poststructural research has been done in schools on issues involving educational technology, a variety of researchers have theorized that popular culture and the expanding use of information and communication technology in society increasingly direct: 1) the patterns of social relations, 2) the social frameworks within which power is wielded, and 3) the formation of individual and collective identity (Poster, 1995; Tapscott, 1998; Turkle, 1995; Wexler, 1992). In bringing a critical postmodern/poststructural orientation to bear on an examination of the cultural and social processes surrounding the use of educational technology, I attempt to foreground issues often overlooked in favor of the now omnipresent discussion of the benefits of educational technology for students and teachers in schools. I hope to assist in broadening the field of considerations for examining the ways teachers and students construct meaning about the use of educational technology in their everyday lives. I needed to use a theoretical framework that could account for the contradictions of postmodernism, as well as for the inequalities evident in the material and social conditions of our postmodern information-based society. However, at the same time, I recognize that "multiple interpretations and criticisms are not likely to triangulate on a new 'truth'" (Cherryholmes, 1988, p. 167).

In 1995 Pinar, Reynolds, Slattery and Taubman anticipated a burgeoning of research that focused multiple theoretical lenses on school life. They likened it to a cross-fertilization and hybridization, and called for such efforts in order to increase rather than decrease the complexity of curriculum theory. As an example of this complexity,

McCarthy (1990) pointed out that race, ethnicity, class and gender issues in curriculum operate in continuous contradictory fashion with each other and are fundamentally intertwined/interrelated and non-separable. Pinar and others proposed that "current boundaries [in curriculum theory] result from being close to the parent disciplines which themselves are boundaried" (Pinar, et al., 1995, p. 853) and evidence an immaturity in curriculum theorizing. Pinar, Reynolds, Slattery, and Taubman held that research using multiple lenses, particularly school ethnography, is transitional to this new synthesized complexity and may help serve to assuage the debate over the theory/practice split in the field of curriculum by making theory explicit in the depictions of school life and "explicit depictions of school life in theory" (p. 854). Examples of hybrid works are Lather's (1991) *Getting Smart* and Wexler's (1992) *Becoming Somebody*, both of which combine a critical stance with postmodern/poststructural theoretical frameworks.

Examples

Lather's (1991) work, *Getting Smart*, sought to explore the combination of critical theory, postmodernism/poststructuralism, and feminism in research, to develop a critical social science, and to contribute to the theory and practice of liberatory education. She then applied these theoretical considerations to an examination of the implications of her own efforts toward emancipatory pedagogy. Because she held that knowledge is socially constructed and constitutes power, Lather considered the questions asked in research just as important as the results of a study in formulating what is taken as knowledge. By deconstructing what it means to do critical research, Lather (1991) laid open the hierarchy inherent in the act of research carried out even by those who sought to empower the economically and socially oppressed. Scrutiny of the issues of power and

politics in research help avoid reinforcing the status quo of dominant power relations, by emphasizing that research itself can never be a value-free process (Beyer & Liston, 1996; Kincheloe & McLaren, 1994; Lather, 1991; Pinar, et al., 1995). Of particular significance is Lather's discussion of the use of a priori theory. Lather maintained that research data and theoretical frameworks must be allowed to work together in a dialectical manner to generate theoretical propositions that "grow out of context-embedded data" (p. 62).

Philip Wexler's (1992) research blended the "new sociology formulation of reproduction and resistance" (p. 6) and a postmodern/deconstruction to produce what he called a social interactionist understanding in the tradition of the American Pragmatists. Such an understanding maintains that ideas are social concepts that have an ontological (or observable) basis but are understood via particular, socially predisposed frameworks. Wexler held that these *predispositions* prepared the field of perception with which he approached the empirical study. His comparative ethnography of three schools sought to demonstrate how the institution of school is an integral part of the production of identity through cultural and social processes which give rise to students' identity formation. While he faulted critical theory for degenerating into rhetoric, and postmodernism for losing meaningful political commitment and capacity for social analysis, he found insights from each helpful in making sense of everyday social life. He explained that theory neither expressly drove the research nor derived from it but rather came as a fusion of horizons between the researcher's analysis and the contributions of participants.

Not claiming allegiance to any single theory, I wished to explore ideas and concepts such as gender, power, culture, social class or economic status as intervening conditions that influence perception and behavior surrounding the use of educational

technology by teachers and students. It seemed more suitable to me to open up possibilities for revealing elements from multiple theoretical frameworks than to adopt one particular way of framing reality. In *The Art of Fieldwork* (1995), Wolcott held that the explicit use of theory is only one way to do research and that insistence on explicit theorizing is a carry over from the scientific paradigm. Wolcott proposed that theoretical pluralism, or "thinking of theory in multiples helps keep it off the pedestal that has made it so formidable" (p. 188). He stated that theory "addresses the issue of sense-making" (p. 184). Wolcott held that the researcher should "introduce theory into the final account in whatever role it *actually* played during the field research and write-up...where a self-conscious but genuine search for theoretical implications and links *begins* rather than ends" (p. 187, italics in original). This pragmatic approach corresponds to Wexler's contention that theory should not drive the research.

Theoretical Issues in the Critical Postmodern/Poststructural Framework

Pinar, Reynolds, Slattery, and Taubman (1995), ask, "if the postmodern is characterized by the discrediting of metanarratives and if poststructuralism and deconstruction constitute a challenge to notions of identity and the subject, how does Lather employ Marxism and feminism" (p. 504)?

The Project of Critical Theory

One shared assumption of critical theory, poststructuralism and postmodernism is the view that all knowledge and experience is socially constructed; that through interaction with language and culture, knowledge is produced not apprehended (Kincheloe & McLaren, 1994; Lather, 1991; Pinar, et al., 1995). Both critical theory and

poststructuralism acknowledge a coupling between knowledge and power. "Knowing is thus something like being able to interpret or provide meaning to a text/experience" (Beyer & Liston, 1996, p. 141), which is an act of power. For critical theorists, acts of conferring truth or meaning in society result in dominating structures of oppression, privileging some social groups (for example, races or classes) over others. Critical theory seeks to make problematic the taken-for-granted power structures in a culture in order to help ensure social justice for the oppressed. While feminism is not directly of concern in my discussion, the emancipatory interests of feminism have a related tenet in the political activist orientation of critical theory. This insistence on emancipatory action has been termed the project of critical theory.

Similarly, poststructuralism seeks to uncover the normalizing discourses that attempt to define truth within a culture and holds that it is impossible to say what is 'truth.' Crichlow stated, "the undeniable political import of these [poststructuralist] practices are their 'denaturalizing critique' of prevailing cultural representations" (as cited in Pinar, et al., 1995, p. 296). By exposing structures of meaning within a culture to questioning, these structures can be shown to be constructed and not naturally occurring. This theorizing is then itself political, an act of power that creates a space for changed understandings of cultural and social relations of power (Lather, 1991; Pinar, et al., 1995). Since postmodern and poststructural theorizing holds there is no one single truth or correct understanding of reality, that includes that held in critical theory. However, rather than denying critical theory's underlying foundation and the possibility for social and cultural betterment, postmodern and poststructural thought would allow it as one possible understanding. As Lather held in Getting Smart (1991), postmodernism's

discrediting of the metanarrative of Marxism served only to reposition critical theory as one discourse among many.

Agency

Social construction of knowledge implies that people have some capacity to determine their own existence, which makes possible a resistance to oppressive social structures or forms of culture (Beyer & Liston, 1996; Kincheloe & McLaren, 1994; Wexler, 1992). Pinar, Reynolds, Slattery, and Taubman (1995) theorized that the influence of postmodernism on critical theory could have the effect of moving it toward the consideration of "poststructuralist categories such as identity and subject formation as central organizing ideas" (p. 308). It is on the basis of human agency that critical theory endeavors to confront social injustice with emancipatory actions (Kincheloe & McLaren, 1994; Pinar, et al., 1995). However, in poststructuralist theorizing, the self is continually redefined as each individual is seen to occupy multiple and conflicting, shifting positions with regard to identity (Pinar, et al., 1995; Poster, 1995). We simultaneously and subsequently occupy a variety of positions of race, ethnicity, class, gender, adult/child, teacher/student, and so forth, each position defined through inconstant social relations. Since poststructuralism shows the subject to be provisional and contingent rather than unified or stable, then there would seem to be no epistemological basis from which to propose knowledge, truth, or action. As regarding action by the subject, Lather (1991) points out poststructuralism demands a "rethinking of agency within a context of the unknowable" (p. 121), which requires that we reconceptualize agency to avoid totalizing identity categories and focus instead on the plurality of meaning. Again, rather than

denying human agency, postmodern and poststructural thought would allow for it but only from multiple, conflicting, and conditional subject positions. Lather states

> What has "died" [with poststructuralism's attack on the subject] is the unified, monolithic, reified, essentialized subject capable of fully conscious, fully rational action, a subject assumed in most liberal and emancipatory discourse. Such a subject is replaced by a provisional, contingent, strategic, constructed subject which, while not essentialized, *must* be engaged in processes of meaning-making given the bombardment by conflicting messages. (p. 120, italics in original)

Postmodern Irony, No Resolution

In their discussion of the theoretical issues regarding a critical postmodern/poststructural approach, Kincheloe and McLaren (1994) suggested that one reason for research that combines the use of a variety of other theoretical lenses with critical theory for ethnographic work is the decline in popularity of Marxist theory. However, they contended that equating Marxist thought with an essentialist view of society and an account of history that acknowledges only a single causative force belies a postmodern view and ignores much in the Marxist tradition. They pointed out that critical theorists have not "developed a unified approach to cultural criticism" (p. 138).

Nevertheless, for Kincheloe and McLaren there remains the problem of combining the postmodern/poststructural contingency and indeterminacy of what can be said of truth and the emancipatory project of critical theory. The postmodern/poststructural argument is one of epistemology, our inability to know reality. Critical theory's postulate that society consists of dominating structures of oppression which require resistance through emancipatory action has provided "warranted assertable

claims and rationally acceptable conclusions" (Kincheloe & McLaren, 1994, p. 141), or a methodological explanation of social life. Kincheloe and McLaren claimed it a "category mistake" to confuse these epistemological concerns and methodological explanations.

In similar fashion, Lather (1999) termed this conflict between epistemological and ontological work the *stuck place* of social research across paradigms, and pointed out that it required researchers to admit a kind of humility since validity of findings is always partial, situated and temporary. She called for a proliferation of such research that "interrupts long familiar habits of referentiality in the production of knowing" (p. 3).

In other words, these are questions that may never be resolved once and for all. It seems not only sufficient but also essential to proffer ideas and beliefs that provide us with workable or satisfactory direction, since it is not possible to gain correct, dependable, or comprehensive understanding. Critical theory and postmodernism/poststructuralism do not merge but rather balance each other and are much more powerful taken together than when considered separately. The strength of each perspective is the shadow of the other; the critical approach may lack the ability to explain the complexities and contradictions of social interactions, whereas the postmodernist/poststructuralist approach may lack the ability to deliver practice-implementable *truths* due to its complexity. I feel it is this somewhat pragmatic stratagem that allows theories with sometimes conflicting philosophical assumptions to work together to produce powerful understandings of social and cultural practices.

Research Claims in a Critical Postmodern/Poststructural Framework

The poststructuralist assertion that knowing is an act of power and the postmodern insistence on multiple perspectives, are issues that affect what can be said by researchers. As Wexler (1992) explained,

> We write social and cultural studies as if there were a clear analytical bridge between an unambiguous object of vision and a mechanical procedurally correct or purely conceptually ideal seer. The discomforting alternative is to recognize that the multiplicity and simultaneity of channels, media, and messages characterizing postmodern culture is also the condition of social research. (p. 4)

Wexler held that with careful attention, research can produce a "real story," however, he problematizes the research act itself. To avoid the totalizing claim of objectivity requires the explicit acknowledgement of the complexity and complications that inhabit the social and cultural spheres, and the researcher's fallibility in constructing an accurate representation of reality (Kincheloe & McLaren, 1994; Lather, 1991; Pinar, et al., 1995; Wexler, 1992).

This admission of the uncertainty of the outcome of inquiry is scorned by those of the traditional scientific research paradigm. Positivism asserts that only scientific knowledge, gained through experimental manipulation, is genuine knowledge. Critical theory, poststructuralism and postmodernism, as mentioned previously, reject such claims of rationality, objectivity, and totalizing truth, and instead hold that all knowledge is socially constructed and inherently subjective (Kincheloe & McLaren, 1994; Lather, 1991; Pinar, et al., 1995).

How My Study Fits a Critical Postmodern/Poststructural Framework

It was in Wolcott's (1995) sense of using theory's orienting function "in whatever role it *actually* played during the field research and write-up" (p. 187, italics in original), that I chose to employ theory in my research, and from this vantage point that I proposed a framework that used the multiple lenses of critical theory and postmodern/poststructural theorizing. Following Lather's (1991) categorization of forms of postpositivist inquiry according to their purposes, my research would fall into a space between critical theory (to emancipate), and postmodern/poststructural (to deconstruct) (p. 7). This theoretical framework, operating at the conjunction of critical theory and postmodernism/poststructuralism, provided a way for me to make sense of the complex and contradictory interplay between the use of educational technology and the social milieu in which that use takes place.

Lather (1999) asserted that "being 'inbetween' paradigms can keep us from being impositional" since we must maintain "a recognition that we all do our work within a crisis of authority and legitimation." Pinar pointed out that critical theory informed by poststructuralism and postmodernism brings about a decentering that "undermine[s] what many see as the latent authoritarianism of the political perspective, including its thinly concealed self-righteousness and its employment of class guilt (manipulated by a false identification with the working class)" (Pinar, et al., 1995, p. 308). This was a particularly significant point for my work since 50 % of the participants in my study would be considered members of an involuntary minority using Ogbu's (1987) classification of racial minorities. My position as a white, middle class, adult female researcher called for watchfulness against what Wexler (1987) called "a socially inauthentic identification

with 'the working class' or with *the triadic oppressed groups of 'class, race and gender'"* (p. 181, italics added).

My research sought to examine the social experiences and interactions surrounding student and teacher use of educational technology in school rather than merely focusing descriptive efforts on the well documented disparity in the distribution and character of the use of educational technology with regard to race, ethnicity, class and gender. As one viewpoint among many, my understanding and interpretation is not any less cogent than another, but the worldview and meaning-making of the research participants can never be fully accessible to me. At the same time, the issue of the crisis of representation exposed by poststructuralism makes clear that as researcher, I select, transform, and present *reality*, and thereby cannot completely avoid giving the appearance of objective truth even through a struggle to interrupt stable, unambiguous meanings (Lather, 1991; Pinar, et al., 1995). My work seeks to raise questions rather than to provide totalizing answers.

My Position Within the Study

> Self-reflexivity involves professional self-critique, in which the researchers own up to their values and how they are present in their work as interested people. Self-reflexive material gives readers a chance to learn how the personal interests of researchers might shape research questions, approaches, and findings. (Anderson and Damarin, 1996, p. 273)

Having worked in secondary public schools for ten years, beginning as a classroom teacher, I bring to this study a strong commitment to social justice and equity

in public education. As a graduate student, I have carefully thought about the ways curriculum and the bureaucratic structures of schooling serve to promote or hinder students' educational opportunities and the very nature of our society. I continue to be convinced of the complexities involved in school reform issues and in pedagogy itself. However, I am also convinced of the importance of grappling with these issues as we strive to imagine and design schools for the future.

Since this study will examine issues related to educational technology, my own relationship to the subject must be made explicit. I began using computers with students in an educational setting in 1991 as a library media specialist. This work has consisted of assisting students with research using the automated library catalog, CD-ROM databases, and word processing, as well as with educational software games. Since that time, Internet research has made a tremendous impact on the nature of library use in public schools and on the nature of the position of library media specialist. I have been responsible for overseeing the use of software that assesses and tracks student reading progress and the district's distance learning classroom, as well as serving on technology committees charged with researching software for use in classrooms and with planning for school-wide networks.

My seeking a doctorate began as preparation for entering the field of public school administration. As one who would be responsible for the administration of educational technology in a school and as an educator who uses technology daily in a public school, I am nevertheless suspicious of unquestioning acceptance of such a highly touted educational innovation. My experience has led me to suspect that there might not be a definitive judgment about the appropriateness of the use of educational technology

without examining how teachers and students negotiate meaning about themselves, school and their world within specific settings.

Struggling to Speak without Oppressing

I must continually be mindful that my work is an act of power and has the possibility of inflicting injury on the community or the participants in the research. This has presented me with several problems. In addition to the struggle to ensure privacy, I must grapple with composing a text that highlights the complexities and contradictions of the situation and avoids claiming the one authoritative perspective. Also, I have tried to keep in mind that I cannot avoid inscribing others through my representations of their lives and their understandings.

Researcher/Researched

Kerr (1996b) stated that, "Most of the studies of attitudes and opinions that have been done in educational technology assume that the researcher stands in a neutral position, 'outside the fray'" (p. 144). However, such a claim to objectivity has been challenged by a multitude of scholars. We have no way to step outside our perceptions to gain an independent place from which to evaluate our knowledge (Kincheloe & McLaren, 1994; Lather, 1991; Pinar, et al., 1995). This shift from a foundational philosophy and the traditional objectivist ideas of knowledge and truth impinges on what I can say about the situation and those upon whom my research focuses. Lather insists that researchers must engage in self-reflexivity which "bring[s] the teller of the tale back into the narrative, embodied, desiring, invested in a variety of often contradictory privileges and struggles" (p. 129).

Viewed through the postmodern/poststructural lens of multiple realities, issues that are interpreted as oppressive by critical theorists may not be interpreted as such by the participants whose lives are being examined. I feel I must strongly emphasize the multiple viewpoints regarding interpretations of such matters in an attempt to avoid disrupting what is perceived by many participants as a more progressive direction for education in their community. At High Plains, it was commonly understood that the intent of the school system and faculty was to provide equal treatment of all students and to provide equal access to educational technology. It was held that their efforts had resulted in improvement of student learning. In particular, this new direction 1) had been hard won on the part of the community, 2) included a genuine care and concern for the welfare of the students, and 3) was one in which many inhabitants could be justifiably proud.

However, the researcher is accorded a position of power that endows my words with an authority not granted to those studied (Lather, 1991). As shared understandings and assumptions are questioned, power shifts in favor of the researcher who finally walks away whereas the participants remain vulnerable. Thus to present critical theory issues as necessary and essential for consideration in a specific situation, may be seen as reproductive of relations of domination and therefore oppressive in and of itself (Ellsworth, 1989). By disrupting the use of third-person voice and by acknowledging my own observations and opinions, I hope to mitigate the oppressive, authoritative voice of researcher.

I feel the conditions in which Ellsworth (1989) and Lather (1991) propounded their beliefs in the need for reciprocity and collaborative generation of meanings in

critical research were very much different than those at the site of my research. Ellsworth and Lather both worked at the university level and therefore with adult students who were generally not permanent residents of that location. Students at High Plains were younger teens, and teachers were dependent on close, positive relationships with employers who were convinced of the positive effects of educational technology. Ellsworth's and Lather's works were carried out on university campuses that addressed issues of diversity, and involved students who voluntarily enrolled in Lather's class on Feminist Scholarship and Ellsworth's on Media and Anti-Racist Pedagogies. Additionally, these situations involved communities with much larger numbers of people and therefore afforded much more anonymity than in the High Plains community.

Unfortunately, due to time constraints, I was not able to collaborate with interviewees on theory construction during the data collection phase. Because of the difficulty in scheduling interviews at participants' convenience, it was necessary for me to conduct interviews with teachers and students through the last week of the school year. Although I began analysis soon after I began collection of the data, the distance I had to travel to the research site and the time and energy required for such a study, as well as for my full-time job, made it difficult to reflect deeply about the various possibilities of meaning while still in the data gathering phase of the study. It was not until after I left the field that I had access to the entire data set, including the transcriptions of all interviews, and was able to gain a holistic perspective that allowed me to be certain of the direction of the analysis.

However, since I am well aware that my sense-making of their situation is and can only be limited at best, my attempts at reciprocity in this research project consisted of

1) being open and honest with all participants about the purposes and methods of the study, 2) using participants' questions about the study as vehicles to discuss the rationales behind the research questions, 3) discussing critical issues with interviewees when such arose naturally in conversations, and 4) sharing my descriptions, analysis and opinions with those involved in the study since I often was asked about my own perceptions of issues pertaining to technology use. By engaging participants in thoughtful conversations about their current beliefs and behaviors, I was able to encourage them to reflect on the meanings they drew from the use of educational technology.

Othering of Native Americans

A struggle that has arisen for me in this research relates to how I unavoidably inscribe the Others of my research. My own sense of self as White, middle class, female, teacher/student/researcher has shifted as I have studied qualitative research and current philosophical movements. I also agree with Lather's (1991) assertion that these "totalizing categories like 'women' and 'blacks' and 'third-world women' are most usefully conceptualized as heuristic rather than ontological categories" (p. 121). We all continuously occupy multiple, shifting and conflicting roles. As in the case of the researcher/researched above, such categories are saturated with power issues that result in inequalities, giving one more power and authority than the other. In research, power and authority are used to legitimize interpretation. The issue of interpretation becomes particularly problematic since half of the inhabitants of the site of my study were from a culture different from my own.

I recognize that no matter how long I worked, I could never understand Native culture the way Native people do. Additionally, as a member of the educational

community implicated in the "civilizing" of Native American children, just as Cleary stated, I was unavoidably a "representative of part of the larger dilemma. I was a non-Indian person, carrying the aura of a missionary and burdened with generations of well-deserved mistrust" (Cleary & Peacock, 1998, p. 15). Since I cannot fully *know*, it is not appropriate for me to speak authoritatively for or about Native Americans. Neither is it appropriate for me to presume that as researcher/writer I have the authority to bestow the power of speech upon Native Americans. "Spivak asks that researchers stop trying to know the Other or give voice to the Other (Scott, 1991) and listen, instead, to the plural voices of those Othered, as constructors and agents of knowledge" (Denzin & Lincoln, 1994, p. 75). I have tried to be mindful of this advice in my analysis and to approach my consideration of race issues from a position of respectful questioning rather than pronouncement.

In recent years Native Americans have become increasingly vocal about the problems relating to non-Natives researching and writing about Native Americans. Many have become adamant that only Native Americans should do such research and writing, citing the volumes of misinformation and misstatements made, even by those who claim to have Native Americans' best interest at heart. In addition to the problems of Othering as described above, some of these issues include: 1) overgeneralizations of the culture, traditions, and world-views of Native American tribes resulting in inaccurate representations and distortions, 2) discounting oral history and tradition, 3) excluding Native American perspectives, 4) unilaterally profiting from research and writing on/about Native Americans, and 5) inscribing and entrapping Native Americans in descriptions of victimization and hopelessness (Mihesuah, 1998; Peshkin, 1997).

Mihesuah (1998) makes the following suggestions for lessening these problems in the work of non-Native researchers/writers. Non-Natives should not publish sensitive information not intended for textualization, should not speculate on Native Americans' motivations and world-views, and should not use authoritative voice regarding Native American issues. They should acknowledge their limitations as non-Native researchers/writers. While I aimed to accommodate these suggestions, my success in doing so can only be judged by Native American readers.

Additionally, analyses must include Native Americans' versions of events and explanations. By including Native Americans' (and other High Plains participants') portions of dialogs, as well as comments I have received regarding their readings of this work, I have attempted to meet this criterion. Researchers/writers should also be able to explain why they chose their projects and how findings will benefit Native Americans. The site of my study was chosen because of its reputation for having successfully employed educational technology to benefit students' learning to the extent that it had been deemed a leader in the state. The fact that half the student population was Native American was incidental to that choice, although propitious for an examination of how technology plays into the social experiences and interactions surrounding its use by students and teachers. For the Native American inhabitants of High Plains, this study may help provide knowledge of how technology not only influences students' learning, but their sense of themselves, their tribal affiliations, and the world. As a significant, newly emerging mass media, the Internet has become a significant factor in their lives and their local community; therefore a greater understanding of the relationship between the Internet and cultural matters would seem essential. Finally, I hope this study will

encourage questions about how decisions regarding the implementation of educational technology can be designed to meet Native Americans' own goals for their youth and their tribes.

Methods Used

Lather's (1991) integration of postmodern and poststructural thought into the research act extended and redirected the concept of triangulation. Rather than employing triangulation or the use of a variety of data sources and methods in an attempt to pinpoint a single true understanding of a situation, a postmodern/poststructural approach emphasizes the use of multiple sources and methods to help uncover and explore the inconsistencies and contradictions of social reality. The use of the multiple methods of observation, interview, and document analysis provides a greater body of evidence for the researcher to use to understand the social phenomena under study. Such evidence, whether consistent or contradictory, allows a more complex depiction of the research findings (Mathison, 1988).

In seeking to examine the complexity of the use of educational technology at High Plains, I employed multiple strategies for data collection which included 1) observations and interactions with teachers, students, and administrators, 2) loosely structured, in-depth interviews with teachers, students, and administrators, and 3) document analysis of the school's Vision Statement, Technology Plan, and other official information, samples of class and staff development assignments, an example of a recent school yearbook, and pages from the school's Internet web site showing students' published works and teachers' curricular materials.

Being in the Schools—Observation

One of the major sources of information for this study was the field notes that I made after observations and conversations with High Plains faculty and staff. Marshall and Rossman (1989) stated that observation could disclose the behaviors of participants and the meanings that participants attach to those behaviors. These behaviors are an expression of the participants' values and beliefs.

I visited a minimum of one full school day per week in the field for a period of 5 months, spending on average 7 hours per day. The day of the visit varied each week and generally began with the arrival of the school busses since few students drove to school. Occasionally, after students left I stayed to visit with or interview teachers, though most of the teachers lived 30-35 miles from the school and worked to finish their tasks in order to travel home.

After a brief introductory talk with the administration on my first visit, I was encouraged to make myself at home and go where I chose when I chose, and talk to anyone I wished. While I avoided disturbing classes, I observed students, teachers, and school activities through out the day and through out the building, including school routines such as lunch breaks and a pep rally. Such observations did not intervene in the daily activities of those being observed (Denzin, 1989). I secured permission from and observed in the classrooms of 15 of the 23 teachers in the school. I also recorded field notes from observations of informal conversations and interactions between and among faculty and students in halls, cafeteria, commons, computer labs, and the library. Since the teachers' workroom was furnished only with a copier and a few other materials such as a table with a paper cutter, teachers either ate their lunches in the cafeteria or in their

rooms. Planning periods were generally spent in their classrooms in preparation for lessons. My observations also took me to the in-school suspension center, the auditorium for a program for students, and on several occasions I walked through the attached elementary school. Twice I drove through the three tiny communities, at some distance from each other, which make up the school district.

I often crossed paths with other visitors to the school, but generally they were accompanied by a student or an administrator to see some particular technology in operation. My repeated visits and being unaccompanied set me apart from these visitors, and in the small school most students and the faculty knew about my study. However, due to the number of visitors this school attracted, students and teachers had become at least somewhat accustomed to the presence of observers.

When I began my observations in the halls and cafeteria, I did not have specific questions to be answered. After observing the interactions and events that took place, I found a quiet place to make notes on my observations. Often this was the commons area during class time, since I saw no one except occasionally a custodian. My observations became more focused as I began to develop specific questions. For instance, it was during these beginning observations that I came to wonder about the exemplary student conduct at High Plains. Subsequently, I carefully noted student interaction and behavior during class changes and at lunch.

During classroom observations I sat either to the side or to the rear of the students. Sometimes the teacher would introduce me to the students, but often I was ignored by teachers and students. I took notes openly during this time, writing down a description of what students and teachers were doing and often recording what was said. Students rarely

acknowledged my presence in the classroom but during the first few days that I visited a few teachers asked about my study. Most seemed to unquestioningly accept the idea that their school was the subject of research.

Interacting with Participants—Interview

Another major source of information for this study was the interview. Qualitative, in-depth interviews are typically informal talks that seem more like conversations than interviews and comprise an interaction between the interviewer and the interviewee. (Marshall & Rossman, 1989). The informal, semi-structured interview does not necessarily follow a prescribed sequence and generally allows open-ended questions that permit the interviewee more latitude to answer than a formal, structured interview. The informality of this interaction, and a willingness for self-disclosure on the part of the interviewer can help to break down the hierarchical position of the researcher over the researched (Anderson & Damarin, 1996). Unfortunately, due to time constraints, I was not able to conduct more than one interview with a participant, although I did have subsequent substantive informal conversations with several interviewees. Immediately after these conversations I recorded field notes on the discussions that took place.

Most of the interviews took place during the school day since generally neither students nor teachers were available before or after school. Teachers were most often interviewed in their rooms on their planning periods. Student interviews were scheduled when teachers agreed to allow students to be released from class as students finished their work. Students were interviewed in the library, the cafeteria, or a teacher's office. All of the interviewees permitted me to make audio recordings of the interviews.

Most of the interviews averaged 40 minutes, but they ranged from 20 minutes to over an hour depending on when the interview could be arranged. Interviews with students were generally 20 to 30 minutes in length. Only one student interview was conducted with more than one student at a time. In this case, three students were interviewed at once.

I interviewed 21 teachers, all except two of the entire faculty. (Time constraints did not permit me to interview these last two.) This group ranged from first year teachers to those with 28 years teaching experience and included the library media specialist and the school counselor. There were 9 males and 12 females. I interviewed both of the Native American teachers in the school. Seven of the 21 teachers interviewed at the secondary school had taught at High Plains at the time technology was introduced (eight years or longer). I also interviewed four administrators and six staff members (two of whom happened to be parents of student interviewees). The staff members included school secretaries, custodians, and technical support personnel. These interviews provided me with their perceptions of how educational technology was used and of the meanings constructed by the school community and by individual students.

My interviews with nine high school students provided me with individual student's perceptions of their use of educational technology and how they constructed meaning about themselves, school and their world in a computer enriched environment. The high school principal volunteered to write a cover letter to students and their parents, which summarized the study and requested their consent. Most of the signed Informed Consent forms were returned within two weeks. These nine interviewees were not randomly selected but rather were basically self-selected since they consisted of the seven

students who returned the permission form signed by their parents, and two 18 year olds who could sign the permission form themselves. Teachers who knew I had wanted more student interviews had suggested to these two students that they could consent to be interviewed. Only one other student, a middle-school student, returned the signed permission form. Difficulty in scheduling did not allow me to interview this last student. The high school students ranged in age from 14 to 18, though most were seniors, and included six boys and three girls. Two were Native American.

Origins of the Interview Questions

I began this study with nineteen interview questions for teachers and administrators and fifteen questions for students (see Appendix A and Appendix B). These questions originated from topics garnered from literature on educational technology or, in some cases, from a lack of research on certain topics.

Trade literature on the implementation of educational technology often proposed that the use of educational technology could result in significant benefits for students (Fatemi, 1999; Kent & McNergney, 1999; "Study shows," 1997; Viadero, 1997b). It would follow that an environment that was more advanced in the possession and use of such technology would likely display such benefits to students in a more pronounced way. The questions that began the interviews (numbers 1-5) were designed as ways to investigate how technology was used in such a technology-rich environment and how students and teachers perceived this use.

One of the claims in the literature on educational technology was that it can permit and even encourage a transformation of the curriculum from a traditional survey of subjects to a potent means of stimulating critical thinking in more motivated,

independent learners who were aware of and participated in a global community (Carnegie Mellon University, 1994). By examining the culture of a group of people (language, attitudes, values, behavior patterns, shared beliefs and historical experiences), I hoped to gain some understanding of the ways in which people saw themselves and their choices in relation to educational technology. Jackson's (1992) definition of curriculum as "all of the experiences, planned and unplanned, that occur under the auspices of the school" (p. 8), in this case would then include all experiences and interactions of students with educational technology. This broadening of the definition of curriculum draws on sociological issues such as what kinds of knowledge were valued and included and what meanings participants made of their school experiences. Looking at curriculum in this setting also provided an opportunity to investigate what changes may have been made in the formal curriculum and what meanings students and teachers constructed in response to this change (Kerr, 1996b). Questions 6, 7, and 13 were created to examine these issues.

Most schools across the country have incorporated educational technology to varying degrees and for varying purposes (Trotter, 1997e; Viadero, 1997a). The expense and effort incurred in making High Plains a leader in educational technology would indicate that strong factors were at work. Kerr (1996b) proposed

> It would be more helpful in the larger scheme of things to know why school boards, principals, and teachers wanted to buy those devices, how educators thought about their use as they were introduced, what they were actually used for, and what real changes they brought about in how administrators and teachers worked together in schools and districts. (p. 152)

An understanding of the contexts in which these factors work would serve to illuminate the interactions of participants, as well as the everyday realities and cultures of students and teachers. Therefore, I wanted to know how the historical, political, economic, and cultural contexts worked together to produce this particular school with its particular characteristics, and how these factors impinged on the meanings participants constructed.

In the statement from the school's web site, "Educating students to succeed in a technological world is one of the primary goals," I had an indication of a focus of the educational philosophy of the school. I also had an indication of some of the kinds of knowledge held as valuable and some of the things I might have expected to find in the formal curriculum. However, sociological research has shown that in addition to the formal curriculum, schools teach through unstated, implicit curricular goals embedded in classroom practice (deMarrais and LeCompte, 1999). This hidden curriculum may even be at odds with the formal curriculum.

I designed questions 4 and 5 to uncover methods of teaching or of assessment, types of assignments, and forms of classroom management. These were examined for comparison to the articulated educational philosophy. These comparisons may allow understandings of the beliefs and values regarding educational technology shared between and among members of the faculty and the administration. Although individuals interact with each other and their environment in order to make meaning and these meanings are played out in their classrooms, it is the shared beliefs and behavior patterns that form the basis of the unstated or implicit curriculum of the school as a whole.

Educational technology has provided an especially prominent platform for discussion of the adoption of change by teachers, particularly curricular change due to

pressures from outside the classroom. The literature suggests that many teachers have little experience with computer technology and find it difficult to integrate technology into their classroom routine (Cuban, 1993; Hodas, 1993). Some teachers resist the use of educational technology for a variety of reasons. It would follow that a significant portion of faculty members in any given school would have trouble adapting to a curricular emphasis on educational technology. An investigation of the perceptions of the participants should help provide an understanding of the historical background of the process of change undergone in this school, as well as the current conditions related to expectations of differing levels of use of educational technology.

Another group of interview questions (numbers 8-10) related to differences in how people from various social groups in the school constructed meanings about educational technology. All people have multiple roles that link them to various social groups. Social roles within the institution of school impose constraints on behavior (Meyrowitz, 1985). Roles may include such things as race, ethnicity, social class and gender, as well as those based on interests and activities. It is the interaction between and among all the roles that inform the positions of the participants within an institution. The role of educational technology user also interacts with other social roles to affect a student's sense of self. Expectations imposed on students as technology users may influence the meanings students construct as they interact with various other roles in which they find themselves (Kerr, 1996b).

Shared perceptions of various social groups may differ from each other in response to the expectations and obligations of the social roles they occupy. The literature holds that female students interact with technology differently from male students, and

therefore may not benefit to the same extent and in the same ways as males (Becker, 1983; Bromley, 1998; Brunner, 1997; Damarin, 1994; Sutton, 1991). (There seems to be a gap in the professional literature with regard to Native American students and the use of educational technology.) An investigation of the perceptions of these groups may serve to explicate another set of understandings of the meanings students have constructed in response to the emphasis on educational technology at this school.

One question in particular that was a part of my original set of interview questions, had to be reworded because it and the intentions behind it were misinterpreted. In an effort to clarify to whom I was speaking, I asked: Of the ethnic or racial groups here at this school, is there one that you would identify yourself as a part of? Nearly everyone asked this question assumed I was asking which particular ethnic or racial groups they would choose to affiliate themselves with, and most refused to give a definitive answer. When worded in the following manner, no one hesitated to answer. The reworded question became: If you were filling out a census, which box for race or ethnicity would you check?

Other questions were replaced when it became obvious that they were producing little significant information. One of these was: Do you use educational technology differently with any classes, students, or groups of students? An added question, drawn from topics brought up by participants in interviews, became: What do students think about teachers who do not use technology?

Entering the Field

Glesne and Peshkin (1991) suggested that in deciding on a site, the researcher must look to the needs of the study. Because of its accessible size, its ethnic makeup, and

because it was recognized to be in the forefront in educational technology, High Plains Public Schools offered the opportunity to interrogate how teachers and students negotiated meanings regarding educational technology across a wide range of curriculum areas, grade levels, and social and cultural issues. Chapter Four consists of a thorough description of the setting, and the socioeconomic and historical context of the district of High Plains.

Having briefly met Mr. Washington, the superintendent, at a conference, my initial contact with him was by a phone call during which he immediately accepted my suggestion that I conduct a study of technology at High Plains. Upon arrival the first day, I was given total freedom within the school. During the entire five-month period, since visitors were common, no one questioned my presence, or my movements around the school. As I visited with teachers and observed in classrooms, I explained what my study was about and encouraged teachers and their students to participate and assured them of anonymity and confidentiality. During the third week, I began interviews with teachers and interviews with students began during the third month of the study.

During the writing of this study, I have struggled to maintain the anonymity of High Plains and its participants. The smallness of the community, and its widespread reputation, have required particular care with this issue. In some cases, specific facts and citations have been omitted for this reason. For example, when citing state laws in Chapter Four, the correct number was provided but the name of the state has been left off intentionally.

Analysis of the Data

The process of data analysis is the process of shaping meanings from the research data. It is a recursive, inductive process in which theoretical categories and relational propositions are shaped through interactions between the researcher and the data (Lincoln & Guba, 1984). This is most often an ongoing process, spread throughout the study. Early analysis in a study may lead the qualitative researcher to different questions or may alter the focus of the study (Stake, 1994).

During my two-hour drive home after a day in the field, I either listened to interview tapes made that day or I tape-recorded any further comments and descriptions of observations. I also expanded upon ideas relating to the data or discussed observations conflicting with those conducted previously. This theorizing included the examination of inconsistencies in responses to interview questions or the initial analysis of the meanings of certain comments or behaviors. I transcribed these recordings each evening into a word processing document to create memos that helped focus my attention for the next day of data collection.

An example of early data analysis that led to the exploration of topics that I had not included in my initial questions, is the questioning of observations I made during the first day in the field regarding student conduct. This had been so striking that it immediately became a topic of investigation, though at first I had no idea whether it actually related to the use of technology in the school. Another observation that first day that helped to focus my research was a conversation that took place on the phone in my presence. The person talking on the phone expressed a conspicuous sense of pride in High Plains schools being recognized as "leaders in technology." Though these themes

did not emerge as significant for some weeks, these insights and the memos that resulted helped guide my study in directions I had not anticipated.

As I identified themes in the data, I sought further examples that might support or contradict the emerging concept. For instance, as I came to believe that participants at High Plains considered themselves members of a unique community, I questioned whether this was the case for all groups.

After collecting all the data, I began the process of transcribing the 36 interviews. Data included these interview transcripts, as well as the field notes, examples of completed student assignments from the Internet, documents such as the school's Information and Communication Plan (which included the Vision Statement, Philosophy, Technology Goals, Internet Use Agreement, and a Teacher (technology) Competency self-survey), and other district documents. In order to manage this massive amount of material, I used a qualitative data analysis document management computer software package, Atlas/ti. This program allowed me to break these documents into passages as I read and reread the data (Lather, 1991).

As I repeatedly reviewed each document, I selected passages and assigned descriptions and comments that evolved into codes for data. This was the equivalent of making handwritten notes on the margins; however the program allowed me to then search those codes and notes. By comparing similarly coded segments, I then developed categories for related topics in the data. Examples of some of the early categories that I used to describe fragments of data included: addressing student needs, becoming proficient with technology, benefits of technology for students, comparisons to others, methods of teaching, providing access, and philosophy of education. Some of the

categories were derived from topics that participants brought up. Others were directly related to specific questions I asked during interviews.

As I repeatedly read, coded, and categorized the data, I returned to the literature to examine topics that piqued my interest. For example, I reviewed material to help me understand the significance of place as it operated in the lives of the participants. Also, Hodas's (1993) work on the sociology of technology refusal helped explain the ways teachers adapted and accommodated to expectations at High Plains. Rereading the literature as I worked with the data also helped me collapse the original 183 codes and categories into 12 themes that spoke to the contradictory nature of educational technology use. These themes included the relationship of technology use to place and sense of self, implications of the Internet in the curriculum, connections between the hidden curriculum and technology, communicating expectations, and teacher resistance to technology use.

Though the frameworks of postmodernism, poststructuralism and critical theory are interrelated and intertwined in this research, I used each to fashion a particular focus which I then used as a lens for a separate reading of the data. For instance, the first reading focused specifically on how technology related to race and gender issues in operation in students' and teachers' lives. Another reading focused on the conflicts and contradictions that arose due to the implementation of technology.

It is this interpretative explanation derived from the interactive transactions among the data, the researcher's perception of the data, and theoretic understandings brought into bear on the data, that forms the basis of data analysis in qualitative research (Denzin and Lincoln, 1994). Thomas (1993) stated that data analysis or interpretation is

"never final, but only partial and always subject to rethinking. If done well, intellectual reflections create new ways of thinking" (p. 45).

Trustworthiness of the Research

Postpositivism has rejected the concepts of validity and reliability as belonging to the epistemological debates of truth. While some researchers such as Lincoln and Guba (1984) have argued for concepts comparable to the major principles of scientific rigor, Lather (1991) maintained that as qualitative researchers, "Our best tactic at present is to construct research designs that demand a vigorous self-reflexivity" (p. 66).

To establish a trustworthiness of the data, I sought to demonstrate the inclusion of multiple data sources, methods, and theoretical lenses used to analyze the data. Data sources included student and teacher interviews, field observations in multiple time periods and multiple settings, student assignments, district documents, the student yearbook, and other documents relating to software used by the district. My methods included observation, document analysis, and informal interviews. Additionally, I used the multiple lenses drawn from the theoretical frameworks of critical theory and postmoderism/poststructuralism, to follow Lather's (1991) and Kincheloe and McLaren's (1994) suggestions to examine the data by performing multiple readings while holding different expectations foremost in mind.

Next, through the use of a audit trail consisting of memos and journal notes, I described how my understanding of the logic of the data worked to shift my use of theoretical constructs, what Lather (1991) called "systematized reflexivity" (p. 67). This elucidation of the process of research, along with explicitly naming and describing the

theoretical frameworks and methods used, is designed to help show the relationship between the empirical work and a priori theory. Also, by including my story as part of the study to illuminate the ways it has influenced the research, I have sought to acknowledge the role of the researcher along with the roles of the participants and published scholars.

Finally, I have attempted to include the voices of participants when possible, drawn both from interviews and from formal and informal member checks, in order to provide a sense of the data and to emphasize the multiple realities present in such research. Lather (1991) claimed that "postmodernism destabilizes assumptions of interpretive validity and shifts emphasis to the contexts in which meanings are produced" (p. 44). Given all of these perspectives on the trustworthiness of this research, the reader is left to decide the usefulness of this case study for her purposes.

Summary

This chapter provides discussions of the research paradigm and the theoretical framework I used to conduct the study. Following the guidelines for postpositivist research, I have included my own position as it has played a role in this work. I have attempted to explicate the reasons for asking particular questions of particular individuals. I have also explained how I analyzed the data in order to provide the reader with increased insight to this study and with the tools to help interrogate my work with more understanding.

In Chapter Four, I provide a thorough analysis of the setting, and the historical and socioeconomic context of High Plains. It also includes an interpretive analysis of the realities of this school site as expressed by the participants. Chapter Five presents a

critical postmodern/poststructural analysis of this study. It is an explication of the conflicts and contradictions surrounding the use of educational technology in a school in enriched with technology.

CHAPTER FOUR:

HIGH PLAINS: THE HOUSE THAT EDUCATIONAL TECHNOLOGY BUILT

This chapter is to serve as an historical and interpretive understanding of High Plains Public Schools. Its function is also to provide background information for the next chapter in which I employ critical theory and postmodern/poststructural concerns to examine the use of educational technology at High Plains. Lather (1991) has described such interpretive efforts as stories that assume a found world or empirically knowable world, but she also described the ways in which she worked to avoid claiming this objective authority. These measures included using quotes to document as well as to provide diversity of viewpoints, pointing to the ambiguity inherent in constructed texts, and resisting totality and closure. In this chapter I sought to employ these measures. I propose that the stories told in the next chapter serve to resist the totalizing assertions of this one.

This is a story constructed about High Plains Public School's use of educational technology, told from the point of view of those who worked there during the period of my research. That is not to claim that all, or even one participant, would completely agree with this version of the events described (Schwandt, 1994). Though it is constructed from interviews, and quotes are used to explicate parts of the story, as a researcher I can never produce a complete or objective interpretation since I cannot escape my own prejudices, or pre-understandings. I am limited by my own language, both in understanding and in

representing the worldviews of others (Kincheloe & McLaren, 1994; Lather, 1991; Pinar, et al., 1995; Wallace, 1993; Wexler, 1992). Therefore, I make no claim that this text contains the "real" meaning of events and conditions at High Plains; it is but one of many stories possible to construct. It is however, my compilation and interpretation of how participants told their own story.

In the following pages I will first describe the setting in which this story takes place. Then I will explain the historical factors that operated to influence the decisions of the school district. Next, I will reconstruct the events and reactions to those events that introduced educational technology at High Plains, including a changed sense of self for inhabitants brought on by recognition gained as a model school for technology. Then I will describe the curriculum resulting from the interactions of educational technology and the philosophies of the faculty and administration. Finally, I will introduce a student who came to symbolize the success of the model school.

The Setting

Range land with a few cattle and fewer trees. An isolated house here and there, surrounded by scrub pastures dotted with hayfields and a few scattered fields of winter wheat. The drive to High Plains was long and monotonous. Then, out of the open, rolling prairie loomed a massive coal-fired power plant with two tall smokestacks.

Another five miles brought into sight the other two imposing structures that grew out of this prairie and dominated the wide, open countryside. The tall, white cylinders of a large grain elevator stood at a distance behind a large, low, earth-bermed, modern styled building with blue metal roofing that housed the entire K-12 school. These three

buildings represented a significant portion of the recent history of this area. The grain elevator, built in 1950, obviously had served a vigorous farming community. The power plant, built in 1978, had brought in jobs to replace those lost to the mechanization of farming. It had also brought the tax revenues that, in 1984, built the sleek school. This community had seen the impact of technology. Now it was seeing another wave within the school itself. Educational technology.

High Plains Public Schools, located in a midwestern state, is a very small district which, as a part of a consortium, received one of a very few 1998 National Challenge Grants for Technology in Education and recognition as a "national educational benchmark" in the use of educational technology. The district's reputed success with infusing educational technology throughout the curriculum resulted in making it a model that draws many visitors and educators interested in implementing educational technology in their own districts.

The rural district of High Plains has just fewer than 200 students in 7^{th}-12^{th} grade. The elementary, middle school and high school are housed in separate wings of a building on an eighty-acre campus that also includes a large agricultural shop, an alternative education center, a baseball field, a softball field, 2 tennis courts, a water tower and wastewater treatment plant, and eight ranch style houses for faculty and administration. There is no grocery store or business other than one convenience store located 10 miles from the school. The nearest town is 25 miles away.

The district is exceptionally well funded due to taxes generated by the power plant. Per pupil expenditure was almost double the state average. In contrast, nearly two-thirds of the students received free or reduced school lunches, which made it one of the

lowest income school populations in the state. Fifty percent of students' homes did not have phones. Fifty-one percent of the student population was Native American with the remainder almost all White. The racial/ethnic composition of the faculty, however, was nine percent Native American and ninety-one percent White. Several informants spoke of a past that included dissention among groups of inhabitants, some of which were related to racial issues, but all seemed to indicate that many differences had been resolved and the result was a more unified community. One teacher explained

> *When we won a State Championship a couple years ago in basketball, that was probably one of the most unifying events that has happened to this school. And that is because the different races came together with benefits to recognize the kids.*

In 1990, one year after taking his position as superintendent, Mr. Washington began promoting the use of educational technology (used here to mean computers and computer-based technology) as a solution to the problem of low student achievement test scores that had resulted in High Plains being declared a low-performing school. Having access to an unusually generous budget, he introduced computer technology at High Plains as a way to facilitate the individualization of instruction and to focus attention on providing the best possible opportunities for students. This was a first step in what became a redefinition of the school and its inhabitants as leaders in the use of technology.

To understand this redefinition we must examine how historical, economic, political, and pedagogical processes were inextricably connected to one another, and how together they produced a specific educational entity. First I will describe how state and local politics helped create the occasion for the introduction of technology to High Plains.

Next, I turn to the perspectives of various groups regarding the use and purpose of educational technology. Then I place the emphasis on educational technology in context by investigating the ways that implementation came about at High Plains. Finally, I explore the particular configuration of the curriculum that evolved as influenced by educational technology at High Plains.

Politics and Power Set the Stage

State Laws and Consolidation

Within a national climate of calling for accountability in public education, state laws were enacted to monitor school performance. The Iowa Test of Basic Skills (ITBS) was mandated for third and seventh grades statewide, and these scores were employed to determine school quality. Those schools in which the student average score was in the first quartile of the range for the state and below the national average score were declared low-performing schools. State law provided that such schools were allotted three years to improve their performance or control could be taken out of the hands of the local school board (State Law 70-1210.541). At that point, the State Department of Education would then decide whether to operate the school itself, close the school, or consolidate it with another district.

Other state laws dealing with the structure of state funding for public schools had been amended to help equalize funding levels, although certain exceptions continued to permit specific inequities allowing home districts to keep some of the funds from local valuations of statewide utilities and industries (State Law 70-18-109.7). Impetus to amend these laws had come from lawsuits by other districts in the state seeking to share

in these funds. High Plains School District contained an electric power plant that provided a large tax base relative to the size of the school population so that per pupil funding was unusually high. According to the Department of Education State Aid Office, the average state per pupil expenditure in 1998 was $4956 while per pupil expenditure at High Plains was $9804. High Plains and certain other districts were envied as "rich districts" and were begrudged their generous funding. These two sets of state laws, impinging on the local control of education, set the stage for the developments at High Plains.

In 1987 two neighboring rural districts, Marble and Tyler, were placed on the low-performing list. Neither that year, nor the next, was either district able to reach the necessary level of improvement. During the 1989-1990 school year, these two tiny districts consolidated to form the High Plains Public School District, and a new superintendent, Mr. Washington, was hired. Consolidation temporarily postponed the threat of losing local control of the schools to the state. By forming a new district, administrators and faculty were in effect given another three years to improve student test scores. Marble had been the district with higher student scores, a very low funding level, and a larger percentage of White students. Tyler had lower students scores, a high funding level, and a larger percentage of Native American students. The struggle to unify the new district, complicated by a necessary reduction in force, was remembered by a teacher

> *The very first year that they brought Marble in and made High Plains Schools...there were some rumblings at that time about ability level and things*

and what not. The first year was a really rocky year. Tyler had always done it this way. And, by golly, Marble did things this way. And that was a hard year.

Mr. Washington described it this way

We eliminated thirteen faculty members after that first year so you know that was kind of a.. that was a trying experience. There was a lot.. lot of anxiety. High anxiety level here and a lot of stress because everybody was wanting to know who was going to be RIFed and who wasn't....So, we went through a kind of little bloody transition there. And, because of all that stress, there was not a lot emphasis placed on the curriculum.

Not surprisingly, the district remained on the low-performing list.

Introduction of Educational Technology

It was evident that the district had to place greater focus on somehow raising student achievement test scores. Mr. Washington recalled, *"I went to the board at the end of that spring and told them we needed to make a major transition in the way we instructed kids;"* he had put together a proposal to bring in an extensive educational technology system. The board unanimously backed the decision and funded a computer network that supported five computers in each K-8 classroom. One of the functions of technology was to facilitate the individualizing of instruction for all students. The district began preparing to implement the new philosophy and methods the next school year. Mr. Washington stated

I told the teachers back in 1990, March of '90, we were going to be a technology-based learning institution from that point on. And if they couldn't cope with that they needed to either resign or develop the mind-set that they could adapt. And

two resigned.. that year. They were stressed and upset but they resigned. And the reason we did it.. is because I feel like it's best for kids.

Within the next two years teachers were expected to use not only student instructional software but were required to perform administrative tasks by using computers as well. A school secretary explained, *"Our school calendar, all of our forms, our school policies,.. eligibility lists, grades, everything is done electronically on a computer."*

Reactions

As might be expected, this sweeping change was not welcomed by the entire faculty. The use of technology required teachers to employ and interact with computers with which many were unfamiliar and uncomfortable (Turkle, 1984). Although some teachers welcomed the opportunity for change, a few refused to learn to use the computers and, in time, some chose instead to resign. When I explained that I was interested in finding out how teachers felt about technology, one previous teacher exclaimed, *"You want to know what effect it's had on teachers?! I'll tell you! It made me retire two years ago!... I'm just here subbing... They said you have to use these things and I said watch me!.. You can't just TEACH!"* (motioning outward with both hands as if addressing a group).

When I asked him about teachers who preferred not to use technology, Mr. Washington said

The teachers that you mentioned...they have to do it whether they like it or not because the system drives them. And I have found that this year... is the first year that I have had.. basically 100% participation, active participation with the technology. It took.. it's taken a good five years to get everybody really on board.

Not surprisingly, students apparently reacted more positively. The teacher who said that technology had made her retire remarked, *"The kids loved it!"* Others reported what the literature on educational technology claims, that students are motivated through using the computers to spend more time and effort on academics (Brownlee-Conyers & Kraber, 1996, p. 34; Viadero, 1997b). A senior boy admitted

> *You're pretty willing to want to come to school so you can use the computer.. use the technology. We know its here for us and we're just.. I think the attendance has come up a lot since they started using the technology.*

As is the case in many educational situations, several explanations for test score improvement have been put forward by the people involved though there was little actual proof for any particular explanation. Some believed it was due to the individualized instruction students received on the computers. Others thought it was a result of teachers being required to teach a uniform, prescribed curriculum. Still others felt it was because students responded to a change in school climate and expectations. Nevertheless, by the end of the 1990-1991 school year, test scores had improved so that High Plains Public School district was taken off the low-performing list.

Making sense of students' scores is always problematic, especially since comparisons can easily be misleading through implying connections and relationships that are unfounded. In this case, the populations of the two districts in existence prior to the introduction of technology bear little resemblance to the population of High Plains Public Schools after consolidation. Therefore, I would hold that the most meaningful indication of student achievement is the decision itself, made by the State Department of Education, to remove High Plains from the low-performing list. At the time of this

research, documents from the Iowa Test of Basic Skills showed the district's average student scores for each grade were either at or above grade level in every subject almost without fail. By 1998, this had been the case consistently for a minimum of six years.

Reshaping the Image

This early adoption and apparent success of educational technology began the process of High Plains becoming a leader in technology. Other schools looked to it as a model and sought assistance for their own concerns about implementation.

One of the teachers described High Plains' previous image: "*High Plains had money... you know, they used to be considered a rich school that didn't get.. anything out of their students. They were low-performing, low-achieving students.*" Because the district per pupil expenditure was nearly double the state average, the poor academic performance was newsworthy. Mr. Washington remembered the year after consolidation.

> *At the end of that year I had [4 television stations, 2 statewide newspapers] and some other local newspapers up here, and two legislators on me because we were a low-performing school and had money. You know that just proved that money didn't solve the problem.... [But] After that first year [of using technology] we were no longer low-performing. Nobody called me back. Not one call from [either newspaper],.. No congressmen called me. You know, no news is good news in that respect.*

However, word got out within educational circles about High Plains' academic turnaround, and High Plains soon found itself the center of interest for educators with similar problems.

Recognition from other school districts for pioneering the student use of educational technology in the classroom and improving academic performances of students helped create a new image. This new sense of self was also influenced by society's perception of technology.

> The computer is important not just for what it does but for how it makes you feel. It is described as a machine that lets you see yourself differently, as in control, as 'smart enough to do science,' as more fully participant in the future. (Turkle, 1984, p. 20)

Needless to say, such an improvement in reputation was welcomed by High Plains. As one teacher acknowledged, *"The recognition that the school has.. having a reputation such as 'the leader in educational technology' is very important to students. It gives them a sense of pride that is very beneficial. Recognition for anything like that is beneficial."* Students came to see themselves as skilled and competent members of a special community and regularly exhibited their use of technology at the request of visitors. One senior boy said, *"At our school, I think that computers are so.. used so much that you really don't.... I don't really think about any of that. It just comes to me instantly."* A freshman girl explained

> *It's a great opportunity for us to have all this stuff. It's very...we have so much technology at this school I don't know even think half of the kids know that we have as much as we have... It's just making the school very.. I mean, people realize that.. people know us for the basketball team and for the technology. That's like the things we're mostly known for.*

The biggest dilemma that had faced the new High Plains School District and its superintendent, Mr. Washington, had been how to improve student achievement test scores and get the district off the state's low-performing schools list. My informants attributed the problem to a variety of factors. Poverty and its attendant disadvantages, a lack of a cultural valuing of education and a lack of focus on the curriculum were among the explanations proffered. However, Mr. Washington addressed two main points relating to the school system: expenditures and individualizing instruction.

Expenditures That Focus

The district's unique funding situation made possible the large expenditures for implementing educational technology on a school wide scale. The consolidation had brought together a "poor" school and a "rich" school, and Mr. Washington described the situation he found at the time he was hired:

> *[Marble] didn't have any money and they were focusing more on survival in [Marble] than they were curriculum. And they were focusing.. they.. [at Tyler] teachers were buying things just to have in their classrooms. When I first.. the first.. when I first took this job I had want lists turned in by.. by teachers from the [Tyler] school that ranged anywhere $1,500 to $13,800.00, just for that individual teacher's want list. Because they'd been able to buy things they wanted to go in those classrooms. They had stacks of games, stacks of bristle blocks, and stacks of.. learning centers. There was no way they could utilize all of it.*

Procedures were introduced to realign spending guidelines. Mr. Washington continued

Every decision we make in this school district is student-driven. Before we purchase a computer, before we purchase.. software, even tables and chairs, we look at how this is going better serve the needs of our kids. And even if you're.. when buying an office computer, "How is this going to help better serve the needs of the kids?" "Well, it's going to be able to do this quicker, easier, and more efficiently." When you look at everything in that perspective, it changes.. it'll change your purchasing procedures a lot. I mean, you become more streamlined and more focused on your vision for the district.

This policy gave new direction to the entire organization. Focusing attention on providing the best possible opportunities for students became a part of the school culture that could be observed in many areas. When I questioned a staff member about changes in the school, he provided the following explanation:

The biggest factor I would have to say here is the attitude of the teachers and staff in caring for the kids. You see a custodian around here walk along and if they see a piece of paper on the floor, they'll pick it up. You don't see anything that's not well kept around here and it's not because we have a surplus of people or a surplus of money; it's their attitude.

Individualizing Instruction

The second related point Mr. Washington addressed in order to improve academic performance was what he perceived as a lack of attention to the needs of individual students. Mr. Washington explained

We took every student, identified their level in reading and math, and taught them at that level. Now, some teachers didn't accept it so they didn't do it right. But

everybody is doing it right now. And uh.. the teachers that did it.. we had some real gains in some student's scores using technology, and the fact those kids were glad to work at their level.

When I asked a teacher who taught at High Plains at that time to talk about what had been done to individualize instruction, she described it this way.

Instead of taking the group and saying, "Ok, this is a seventh grade class and so we're going to do seventh grade reading and seventh grade this and that," they looked at each student individually and said, "Ok. Where are you?" And they took them from where they were and they taught them from that point.... So I think part of it was we switched approaches as far as our teaching. We are expected to individualize.... Of course, we got the technology and that was part of the individualizing. The kids were on the computers.. they had a lot of practice, you know, in their activities. Because they could go in and everybody could do their work on their age.. not age, but educational level.

An Integrated Learning System

In order to help facilitate this move to individualized instruction, to relieve some of the curriculum planning and bookkeeping for teachers, High Plains installed 5 networked computers in each classroom from kindergarten through eighth grade. They used the Jostens Integrated Learning System to present a packaged curriculum to students and also to evaluate students' progress through the sequences of lessons.

In the early 1990s computerized educational technology was becoming more well known to educators through the development of integrated learning systems (ILS) which were touted as the solution to many of public education's ills (Tyre, 1990). An ILS is a

union of sequenced courseware and management software, running on networked computers, covering one or more curriculum areas for specific grades, with tracking and reporting of student progress provided by the management software. As they continued to be developed, ILSs not only provided tutorial instruction for students, but also became multimedia platforms for simulations and for providing tools for student exploration and research.

Mr. Washington described the way the ILS worked at High Plains that first year:

In the curriculum areas, it.. it gave us a standard from which to teach K-8. I also...integrated [individualized instruction] into the system that first year.... So there is more than just technology that helped...I think that is really the key that made the difference.. is individualizing the instruction and having the curriculum there that would address their needs.

Technology Possibilities

With time and the acquisition of newer, more powerful computer technologies, the look of educational technology use at High Plains began to evolve. Since subsequent student scores had allowed the district to be removed from the state low-performing schools list, the pressure was off, and there was more freedom regarding just how the ILS could be used. Teachers could choose which units from the computerized curriculum to assign students, and gradually they began to integrate chosen lessons with those of their own design. The district purchased additional software programs, and some teachers integrated those as well.

High Plains Public Schools, as a small school, had an amazing amount of educational technology equipment available for student and teacher use, including a

fully-equipped video production lab, additional video editing units, a phone-operated video delivery system available in every classroom, a satellite communication system, a live-broadcast channel, a video surveillance system, a distance learning classroom, as well as one Internet capable networked computer workstation for every two students. Video-based and computer-based packaged curricula and many other networked software programs including an extensive periodical and magazine database were also available.

Computer Curriculum

High school students were required to take at least one computer class to graduate. Computer classes were designed to teach office applications, generally consisting of word-processing and desktop publishing, with an introduction to spreadsheets and presentation software such as PowerPoint. Students designed and produced school district documents such as play handbills, basketball game programs and student handbooks. The middle school reading classes used a computer program called Accelerated Reader to evaluate student performance. Also, as a part of the computer curriculum, an option had begun to be offered for students to participate in ThinkQuest, an Internet-based contest for instructional materials produced by teams of students. Two computer classes, video production and advanced computer projects (which included creation of Internet web pages and the set up and upgrading of computers) were available to select upper level high school students. In keeping with current trends in secondary education that emphasize the use of the computer as a tool for business applications, the school provided no computer programming classes; however, students were offered the option of building their own web site on the district's server.

At the time of the development of the World Wide Web, the district began to expect all students to use the Internet to access information for research projects for many of their classes, and to be able to produce those projects using the application skills learned in computer class. A central goal of the school and faculty was stated on the school's web site:

> *Understanding that this world is moving ever closer to a day when a student's livelihood will depend on their* [sic] *ability to collaborate with their colleagues, create new approaches to problems and integrate technology into their professions, our teachers attempt to expose each student to the real life application of technology which will be demanded of them upon graduation.*

Jason: Model Student in a Model School

One senior boy had become the school's most striking success story, one that nearly everyone told me about. Jason was a personable young man, confident and willing to talk about the meanings that educational technology at High Plains schools had in his school career and in his life. His story parallels that of the school's.

High Plains' students had consistently scored in the first quartile on achievement tests and had been labeled as low-performing. Jason had been considered a slow student. His special education teacher said he *"had to work really hard"* at his school subjects. During his senior year, he was still in a special education class for one class period during the school day.

Although he had used computers in school for some time, Jason's ninth grade computer class sparked his interest. His talent for learning about and using computers

was recognized then, and he was allowed the freedom to move at his own speed, teaching himself to use applications more quickly than the rest of the class. One teacher said Jason had an intuitive understanding of how computers worked, that *"his mind worked like a computer."* Soon Jason was known as a "computer wizard," a term used at High Plains for students especially talented in using educational technology. He became a semi-official assistant to the school's Network Administrator and Technology Director. He was given extra privileges and was constantly in demand to help teachers with computer problems. At the time of this study, Jason was already working part time as a phone representative with a company in a town 25 miles away as a trouble-shooter for Gateway Computers.

Jason, who a teacher described as *"not a student everybody would pal around with,"* admitted he had been shy (his teachers described him as painfully so), but he said that learning to use computers had helped him get over that. As his achievement with computers had grown, he had blossomed socially as well. His own sense of modesty and humility allowed him to handle the reputation he gained among students for his technology knowledge. Through taking advantage of opportunities to help other students (such as volunteering time for the yearbook production class), Jason was able to parlay that reputation into a social confidence that won him friends. He was soon considered one of the most well liked students in the school. He became the model student.

In an interview with Jason's mother, she said he was unsure whether his career interest was in computer hardware or software, but that *"this school has provided the means for him to pick up and go with everything that he's wanted."* Jason's success as a model student mirrored that of the High Plains students. Jason's sense of self had been

dramatically altered, just as the sense of self of High Plains students had been. Jason and the High Plains students became comfortable demonstrating their technology skills to the public and had gained reputations as leaders in technology, Jason as a computer wizard in his school and the High Plains students as a model school in the educational community at large. Knowledge of the use of educational technology was sufficiently valued, both at High Plains and in society, that it became a stepping-stone out of the shadows into the forefront.

Summary: A Model School

High Plains Public Schools reputed success with infusing educational technology throughout the curriculum made it a model that draws many visitors interested in implementing educational technology in their own districts. The rural district of just fewer than 200 students in 7^{th}-12^{th} grade is exceptionally well funded; per pupil expenditure is almost double the state average. However, with a student population evenly represented by Native Americans and Whites, it also has one of the lowest income school populations in the state. State laws enacted to monitor school performance and laws designed to help equalize state funding levels for public schools had direct effects on High Plains schools. Low student achievement test scores had resulted in High Plains being declared a low-performing school, but adequate funding allowed the district the option to purchase expensive educational technology in an attempt to address their problems.

In 1990 the new superintendent began promoting the use of Josten's integrated learning system as a solution to the problem of low student achievement test scores by

using computers to individualize instruction and focus attention on providing the best possible opportunities for students. Although some teachers implemented technology gladly, a few refused to learn to use the computers and, in time, some chose instead to resign. Within one year, test scores had improved so that High Plains Public School district was taken off the low-performing list. This early adoption and apparent success of educational technology began a redefinition of the school and its inhabitants as leaders in the use of technology and by 1998, High Plains had an amazing amount of educational technology equipment available for student and teacher use. This recognition helped create a new image for students as other schools looked to High Plains as a model to be studied and emulated. This remarkable success story is reflected in the story of the school's model student, Jason, whose sense of self was also redefined through the use of technology.

This chapter presents an historical and interpretive understanding of High Plains Public Schools in order to provide background information for the next chapter. The complexities and contradictions arising within this chapter will be examined further in Chapter Five. By particularizing the setting for a critical postmodern/poststructural analysis, I hope to prepare the way for the argument that to fully comprehend the use of educational technology, we must examine the local understanding and application of such technology in schools.

CHAPTER FIVE:

CONFLICTS AND CONTRADICTIONS

This chapter stands at variance to the previous chapter's unified story of High Plains Public Schools, which includes a discussion of the setting and history. Here I use critical theory and postmodernism/poststructuralism to bring to light other alternative and oppositional readings of the use of educational technology at this place. These new ways of seeing conditions and events are intended to illuminate contradictions exposed through multiple views. They are not and cannot be exhaustive understandings, since they arise from my perspective as researcher, which while no more (or less) valid than that of others is necessarily limited. I cannot possibly know completely the experiences and understandings of other participants in this research. I cannot claim a more accurate view of reality, nor can I escape my own implications in the unequal power relationship of researcher/researched. I cannot change these; I can only acknowledge that my knowledge, my analysis, is partial, is in my own interest, and is potentially oppressive to the participants in the research (Ellsworth, 1989; Lather 1991; Wilson, 1998).

Some parts of this analysis may sound (and be) critical of the High Plains school community and of the use of educational technology. However, the reader should understand that I began this research project ambivalent about the use of educational technology in public schools, and I remain so. I would hope that my presence and my questioning may have encouraged those at High Plains to (re)consider some of the issues surrounding the purposes and implementation of educational technology—a

thoughtfulness that could help them employ educational technology even more advantageously for their students, particularly those marginalized by race, class and gender. While I find much that has occurred at High Plains to be very encouraging, I find the value of research lies in the questioning and in reminding us that we all must continually choose.

I will begin this chapter with a discussion of the significance of the characteristics of the historical and physical location that helped characterize the High Plains community as a model for the use of educational technology. The discourses (habits and practices that include ways of talking, listening, acting) of a community are influenced by the characteristics of the place in which it exists. Therefore, I will attempt to show that we cannot separate the experiences students and teachers have with educational technology from the context in which those experiences are embedded, both physically and historically. Next, I will demonstrate the interrelated and complex ways educational technology has interacted with curriculum and pedagogy at High Plains. I will also examine the ways students made sense of their experiences with technology within a specific educational environment. Last, I explore how teachers' understandings are situated within the prevailing discourse surrounding the use of educational technology at this school. I conclude this chapter by arguing that, like students, teachers come to understand the world and themselves through expectations conveyed by language and social practices. In the process of exploring the meaning of the use of educational technology, all of these issues serve to illustrate ways in which conflicts and contradictions characterize postmodern schooling for students and teachers.

A Pedagogy of Place

Significance of Place

I approached this study with guiding questions that could have been asked of participants who used technology in any school setting. However, as is often the case in qualitative research, issues arose as the study progressed that were essential to an adequate understanding of the phenomenon and that I had not anticipated. Questions of place and sense of self seemed to permeate the research from the first days I spent in the field.

The purposes and consequences of the use of educational technology, if questioned at all, have seldom been addressed from the standpoints of attention to social context or the holistic education of particular students (Hannafin, et al., 1996). Such a holistic view of education corresponds to a definition of curriculum as being "all of the experiences, planned and unplanned, that occur under the auspices of the school" (Jackson, 1992, p. 8). Since the curriculum experienced by students at High Plains issued from the habits and practices of the local educational community in a specific place, grounding the abstraction of curriculum theory involved connecting it to the natural setting in which it occurred. This rephrased the questions to ask, "How does it work *here*?"

Kemmis (1990) stated that, "To in*habit* a place is to dwell there in a practiced way, in a way which relies upon certain regular, trusted habits of behavior" (p. 79, emphasis in original). People as individuals do not constitute a community, rather community requires people to engage in deliberate acts which define them as a social group in relation to the real, identifiable place they inhabit together. These acts are the

discourses that create a community's culture, sense of place and way of life, and are influenced by the characteristics of the physical place (Kemmis, 1990; Smith, 1997). In the educational community these habits and practices include inhabitants' perceived "sense of self" and understandings of responsibilities and appropriate behaviors for teachers, students and others.

In light of the view of curriculum as the sum of students' experiences, I began to investigate how the discourses of this educational community were related to the characteristics of its specific place, and how a sense of place helped determine participants' understanding of High Plains and educational technology. The understanding that emerged from this perspective helped highlight as well as explain other elements in the analysis as described below. As pointed out by Kincheloe & Pinar (1991), theory informed by place, allows integration of parts with the whole, and thereby confers meaning and significance to details and fragments.

In the next three sections I will discuss how characteristics of the specific place of High Plains interact with how students and teachers think of themselves, how sense of place relates to considerations of race, class, and gender, and how all this produces a specific curriculum for students.

Place and Sense of Self

> What 'we' do depends upon who 'we' are (or who we think we are). It depends, in other words, upon how we choose to relate to each other, to the place we inhabit, and to the issues which that inhabiting raises for us. (Kemmis, 1990, p. 41)

Uniqueness

Historical, political, economic and cultural circumstances interacted at High Plains to create a particular setting and a broad awareness that, as a teacher observed, *"This place is unique. It doesn't do things like other schools."* Another teacher remarked, *"This place is a freak of nature. Someone ought to come out here and see what it's like."* Factors which were often described by participants as those that made High Plains unique included: 1) the racial makeup of the population, 2) the socioeconomic status of the community, 3) the relatively well funded schools, and 4) the widespread reputation as a model school for technology.

Statistics for the student population of less than 200 showed that 51% were Native Americans and the remainder were almost all White. The racial/ethnic composition of the faculty, however, was nine percent Native American and ninety-one percent White. Sixty-two percent of the students received free or reduced school lunches and breakfasts, which made it one of the lowest income school populations in the state. Fifty percent of students' homes did not have phones. However, High Plains Public Schools were exceptionally well funded, as per pupil expenditures for 1998 were nearly twice the state average.

Other factors were occasionally mentioned that also suggested High Plains was different from most schools. Isolation of the area's small population helped to blur the distinction between school and rural community. An easing of racial tensions in the community in the early 1990s, helped to establish the school as a central meeting place for many kinds of activities from church functions to baby showers. Also, students' homes were rather far apart so that students seldom visited each other, and students of all

ages generally reported that they did not get to see their friends except at school. The combination of all these factors in a single school ensures that it is different from most other schools in the country.

In addition to the comments mentioned earlier that High Plains was a *"freak of nature"* and *"didn't do things like other schools,"* other teachers agreed it was a school district that was different from most. In an interview, a teacher reflected:

> Teacher's comment: *I have not been at a school like this before. It's different.*
>
> My response: *I've heard people say it is unique. Is that because it is constantly having visitors?*
>
> Teacher's reply: *Yes, among other things. It is a show school. But it's also because of the small size and the kids have gone here all their lives. Everyone knows them and they have lots of support from people who lift them up when they fall, and really care about them.*

When I asked another teacher whether the district was special or unique, she responded:

> *I think it's unique because of the different culture we have here as well. The Native American population, the technology, the nice facility.. It's unique in that we are expected, I think, to produce and perform more than other schools, and teachers.*

Administrators also indicated that the High Plains community considered itself unique. One asserted:

> *We are unique in the fact that we have.. we are totally technology- driven and most schools aren't. Now some schools are...doing a lot with technology,...But,*

overall like we have it.. there are not too many that are like we are. In that respect, technology-wise and curriculum software.. we are unique in that respect.

Another administrator stated, *"I don't think there's anybody like us, or close to it,"* and cited the ethnic diversity and disparity between the wealth of the district and the socio-economic status of the community.

While adults included race and socioeconomic factors, students focused on technology as the reason their school was different. A senior explained: "*Technology is more advanced here than even at most of the colleges. The colleges have labs. We have a computer in every room.*" Another student explained why she chose not to transfer to live with her father in another district: *"A lot of schools are less fortunate and I know I'll be put behind with that if I go to a different school."* Part of students' awareness of the uniqueness of their school situation derived from the presence of the many educators who visited to learn about educational technology.

Becoming a Model School

Widespread interest in using computer technologies in schools has become intense (Bromley, 1998; Ely, 1995b; Harp, 1997; Kerr, 1996b; Muffoletto & Knupfer, 1993; White, 1997). A conspicuous lack of critical examination of this eagerness for the installation of computers in classrooms has led one author to call it "compulsory enthusiasm" (Roszak, 1996, p. 12). (Later in this chapter, I will present the reasons why I believe this is the case at High Plains.) Those schools that could afford to implement technology on a large scale found that they had become very high profile as other schools sought information about how to emulate their accomplishments. High Plains schools hosted unusually high numbers of visitors. An administrator reported

We have a lot of visitors from other schools, from other districts coming in to view all the technology that we have in place. Uh, its not uncommon to see groups of teachers from other schools once or twice a week viewing the school, going into the classroom to see what the kids are doing and how they are doing.

The students had become accustomed to having visitors. I found that, other than politely acknowledging my presence in the classroom with a glance, students worked, talked and moved around the school with no difference in behavior between those times they knew I was watching and those times when they did not know I was around.

In talking to participants, I wanted to know what being a model school meant to them, how they understood it. In an interview with Mr. Washington, the superintendent, I asked: *"You have a lot of visitors through this school. When visitors come, what is it that you hope they will see?*

He explained: *We feel fortunate in the fact that we have a lot of technology in curriculum that.. many schools don't have. We know we're fortunate in that respect. But we have.. our goal is to try to provide the best educational experience for our kids that we can. And we do some.. several pilot programs with curriculum software and hardware. And in doing that, we look at the good and the bad and what we hope to provide the people that visit us is real information that would be beneficial to them.*

This view, that a model school evaluated and demonstrated hardware and software as a benefit for others, was one of several offered by participants. Others understandings included the recognition that concurrent with helping others, advantages accrued to the High Plains district and to its students due to being seen as a model school (Holloway,

1996). Knowledge of—and experience with—various hardwares and softwares was viewed as a valuable asset. Besides the marketability of these skills, the most important aspect of this was the value of the reputation the students gained. Through this discourse, students had begun to think of themselves differently. Recognition from other school districts for pioneering in student use of educational technology in the classroom and for improving students' academic performances helped confer a sort of power that allowed the creation of a new image for High Plains and its students and teachers.

A Shifted Sense of Self

A teacher explained the significance of the change in how students thought of themselves: *"The recognition that the school has.. having a reputation such as 'the leader in educational technology' is very important to students. It gives them a sense of pride that is very beneficial. Recognition for anything like that is beneficial."*

An administrator described High Plains' previous image: *"People from outside out district viewed our school as a bunch of trouble makers. And they may have had a right to that view. But those days are gone."* Another teacher told me: *"High Plains had money... you know, they used to be considered a rich school that didn't get.. anything out of their students. They were low-performing, low-achieving students."* (Conflict over unequal state funding of schools meant that the distinction of being a "rich district" was itself viewed negatively among inhabitants of other districts in the state.)

An administrator, who came to High Plains during the first year technology was introduced, gave this account of the change:

> *When I first came here, kids just wore anything to school... Now you start to see kids.. and it has nothing to do with you know the money factor, now you start to*

see the kids take a little bit of pride in their appearance, I guess is the way to put that. Before there was very little pride in the way they presented themselves, the way they felt about themselves. And that's, uh.. boy, that's really come a long way. Most of our students really come to school looking sharp, feeling good about themselves.

Repeated observations seemed to confirm this description. Dressed in casual teenage attire, students typically wore tee shirts and jeans or athletic gear and were clean and neat. A few boys wore jeans, boots, and western shirts.

This reported shift in self-perception, having a positive reputation to uphold, was interrelated with students' improved academic achievement and with teachers' acquisition of technological proficiency. Becoming known as a model school for technology may have been the first time this area has been presented in a positive light. Turkle (1984) reported that computer knowledge "makes [computer users] feel a part of something that is growing and that the society at large really cares about. It can mean new feelings of empowerment" (p. 169). As with Jason, a student identified as having learning disabilities who came to be viewed, and to view himself, as talented with technology, this empowerment allowed students to situate their understandings of themselves within the local context and within society at large. Both students and teachers viewed themselves as members of the unique community of High Plains and as *"leaders in the state"* in the use of technology.

Leaders in Technology

Students, as well as teachers regularly exhibited their use of technology at the request of visitors. In fact, I found students seemed to be completely comfortable with me

observing their work with technology or observing their classes. These were commonplace occurrences for them. However, there seemed to be the assumption that visitors only wanted to see how to use the computers in class. Teachers were used to talking about how they used technology in their classes but seemed surprised to be asked what using technology meant to the students or to themselves as teachers. Also, students seemed less comfortable when I wished to talk to them. Few volunteered to be interviewed and several refused their teachers' invitations to talk to me. Cleary and Peacock (1998), and Spring (1996), reported that Native Americans may have more reason than most to mistrust people involved with schools (such as myself), and are culturally less likely to volunteer information. However, other students were not anxious to be interviewed as well. I wondered if this was because most visitors simply observed or talked only to teachers.

Such social roles as "leaders in technology" (the display of a set of behaviors exhibiting use of educational technology) come to be in response to social situations that, in general, have been bound up in physical places. That is, the sense of place of members of the High Plains school community grew out of the surrounding discourse that resulted in repeated social experiences that occurred in a particular, unique context. This contextualization helped to construct the social identities and the shared understandings of appropriate behaviors (Meyrowitz, 1985). From this emerged a common perception of High Plains students and teachers as leaders in the state, and a school culture that is illustrated in the words of one teacher, *"Everybody wants everybody else to think that this is the Mecca."* (It was ironic that technology was seldom a part of the curriculum in this particular teacher's regular classroom.) Even the 1997 school yearbook was organized

around the theme of leadership for the future. It's subtitle was *Developing Leaders for Tomorrow's Future,* and the first four pages were devoted to the double-page spreads of *The Ongoing Process of Becoming a Leader* and *Students Develop Their Own Curriculum and Improve Their Learning by Using Technology.*

How culture and sense of self affected schooling at High Plains played out in various ways. At the school's expense, students and teachers were encouraged not only to attend, but also to make presentations at technology conferences such as Technology Day at the state capitol, regional technology workshops for administrators from other schools in the state, and technology competitions for students. Being recognized as representatives of High Plains carried prestige and at the same time helped maintain the school's reputation as a leader in the state in technology. Most teachers and students did not object to such recognition. However, a teacher commented,

> *What they want me to do is.. they want me to be visible. They want me to be out there. In uh.. competitions and.. and they want us to put in a good showing at these things....Your status around here has nothing.. not nothing.. but very little to do with what you actually do in the classroom. But if you get your butt out there all over the state promoting High Plains, you've got it made.*

Students were expected to use computers in their classes and, like the adults, they believed that technology literacy was a valuable and necessary skill. The view of themselves as leaders in the use of technology appeared to carry over into students' conduct, academic performance and career goals. Thus characteristics of the specific place of High Plains (i.e., isolation, socioeconomic status, and school funding) interact with how students and teachers think of themselves. High Plains had become the central

"place" in their world, a place that gave meaning to their lives—it was one way they understood who they were. Computers were the most prominent features of that "landscape."

Place and Race, Class, Gender

An understanding of a specific place requires comprehension of the ways the inhabitants of that place think about the world. It is informed by a particular history and a particular set of social relationships—relationships that are shaped by race, class, and gender.

Concern for Equity

A commitment to all students and a sense of community seemed evident through observation as well as through comments such as the following examples. Although several teachers volunteered such sentiments, one observed

> *Sometimes I think it's more like family. Everybody here cares about everybody. And you know, it's like when we had the death of a student here. That was devastating to everyone in this whole community, because it was just like it was, you know, all relatives. Because everything is based on a personal.... it's a caring community.. a caring school.*

A teacher new to the district stated that because of her previous experiences in other districts, she had expected to see prejudice against certain children due to their race or due to their family's economic status. However, she asserted

> *I have not witnessed any prejudice with teachers with children. Whether it's by ethnicity or social status.. I see none of that. And that has been phenomenal for me to witness. They love these kids. And it doesn't matter and they give them all*

the same opportunities and I don't see any meanness from anybody. It's just not there. And I expect, I guess, to find it. But I haven't found it. So, that's very impressive.

Concern that students received equal opportunities from technology was also apparent in an administrator's answer to my question about what he thought the district wanted visitors to see:

High Plains wants them to see.. they want them to see that our kids that mainly come from low-income families can probably perform just as well as those kids who come from a larger income family. That the result of that background that they have can show that any kid can succeed. And I think that's what we're proved.

He went on to explain that improved achievement tests scores and an improved *"quality of education"* were evidence that students were succeeding.

High Plains required at least one regular class credit in computer science for graduation. This was based on a general understanding and agreement that all students would benefit from a knowledge of technology and indicated a concern of the administration and teachers in trying to ensure equity. A principal put it this way

Many of the teachers here, including myself, and including our superintendent.. we see technology as a tool by which we can enhance learning. Technology is not a replacement of learning at all. It's an enhancer. It's an equalizer. And that's what it is doing very well here.. is equalizing opportunity because we have such a large segment who are [sic] *in poverty or extreme poverty. So it's equalizing their opportunity for a good education and also a chance at a job when they leave here.*

His comment reflected a general concern that students would be prepared to find employment after high school or to go on to further their education. Some teachers and administrators reported that traditionally students had remained in the community where there were no employment opportunities because they were not academically prepared to obtain employment elsewhere.

Concern that all students were benefiting from technology was often part of the answers to other questions, such as when I interviewed an administrator.

> I asked: *In the groups [of students] that we've talked about, do you see any difference in the ways that they think about computers or the things they use them for?*
>
> He replied: *Everybody, from freshmen on up, from Native American, non-Native American, boys, girls, it's been a part of their education now for eight years. And they.. I think they pretty well perceive it the same way, they use it basically the same way.*

Similarly, a teacher responded that, *"Everybody's treated the same, given the same exposure, the same access, the same lessons. There's no difference between what they learn, how they feel, what they do."* Even students answered my question in the same way, *"I think everybody uses it just about the same."*

The district's commitment to ensuring equity for all students was an apparently recent improvement in race relations and, therefore, was to be commended. However, as Cleary and Peacock (1998) and other theorists in multicultural studies would point out "this mistaken sense that everyone is equal and should have an equal voice is oblivious to the reality that little of what makes up schools is inclusive of its American Indian

students" (p. 70). These theorists would seek to include the "differences" of all cultures rather than to subsume all into a homogenized sameness, which inevitably results in the domination of mainstream values of American society. Though most teachers at High Plains truly cared about students as individuals, I would hold that the emphasis was on inclusion and equality rather than an in-depth understanding of cultural differences.

Discrepancies

Despite consensus that there was little or no difference in student use of educational technology, circumstances that I observed indicated some inequities in results if not in intentions. From my classroom observations, a non-representative 80% of special education students were Native American, mostly male. Though it was not a self-contained program, the special education classroom was the only one with older non-networked computers. These were not suitable for access to the Internet or to newer applications and were used exclusively for computer games to reward completed assignments. This differentiation has been shown to be typical of inequalities observed in other schools (Becker, 1983; Doctor, 1991; National Center, 1998; Sutton, 1991). It also reflected the teacher's pedagogical concern with following each student's Individual Education Plan (IEP), as well as the teacher's personal discomfort with using computers.

The computer projects or advanced computer class, on the other hand, consisted of seven male students, three of whom were Native American. Additionally, though I did not observe the video production or media class, the teacher told me it was limited to only those selected by the teacher as especially responsible, trustworthy students. The class could only accommodate about 10% of the high school students per school year so many students never had the opportunity to take it.

Gender. All of the students interviewed indicated to me that they thought they would be using computers in a future career and that their skills with technology gave them an advantage over other students. However, male students intended to go into the fields of technology or electronic communications (higher paying, higher skilled careers) that were not available in the surrounding areas. Female students' aims were generally business or clerical in nature, in preparation for jobs that involved the use of technology but which could be found in communities within commuting distance. These differences existed despite the fact that these same female students assured me that all students used computers the same at High Plains. Such discrepancies between male and female views and usage of technology are typical, having been observed elsewhere (Becker, 1986; Bromley, 1998; Brunner, 1997; Damarin, 1994; Sutton, 1991).

It would seem that even in a place that has emphasized educational technology to such a degree for all students, intentions to ensure equity have not outweighed dominant ideology which creates "socialization patterns that lead to different and unequal expectations for males and females in this society" (deMarrais & LeCompte, 1999, p. 290). In fact, I found that most of the faculty expressed genuine care and concern for all students. This is to say that such observed inequalities were the result of cultural and structural issues in the broader system of education and society, not that administrators or teachers purposely discriminated against students on the basis of gender or race ("Falling," 2000; "Information," 1999; Novak & Hoffman, 1998).

Race. Teachers and administrators often spoke of equity issues, but it was also common for them to speak of the entire student body as if all students were Native American. This appeared to me to be a way individuals tried to deal with cultural

conflicts that had in the past caused dissention within the district. However, it seemed inadequate as a response since it tended to obscure diversity issues rather than to address them openly. Thus, it seemed defensive rather than proactive. I am led to this understanding in part because it was typical for teachers 1) to interpret some of my interview questions to be strictly about race and 2) to assume that my intentions were to negatively critique the school and its inhabitants. I acknowledge that these attitudes were not unreasonable expectations given the local history of racial strife, criticism of the district for being a "rich school," and education's frequent bashings by media and politicians. (Rewording questions helped clarify what information I sought and subsequently my inquiries were received with less suspicion by the faculty.)

High Plains public schools had taken steps, beginning with elementary students, to help ensure equity and to reach out to all sections of the community. One of these steps was to send Sony PlayStations with LightSpan CD-ROM curricular materials to all K-4 students' homes in order to encourage parent connection with the student and the school, and to equalize access. An administrator noted

> *What average kids in society have access to is so much further above what these kids have access to. Fifty percent (50%) of our homes don't have phones. You know, they don't even have phones so they can't have computers. They all have televisions, that's why we went to LightSpan.*

This was reportedly an incentive for students to spend out-of-school time on academic pursuits, and it allowed and encouraged parents and other adults in the homes to interact with their students about educational matters in ways that had not previously been typical. It was said that some adults learned from the materials along with their children.

I would also point out that it transformed television from a mass media format into an educational instrument, although it could be argued that it more narrowly defined the meaning of education and learning. The instructional benefits of television itself were discounted, while the presentation of specific sets of facts and experiences was deemed educationally superior. Just as these questions raise conflicts and contradictions for what is considered appropriate education by the dominant, White society, their analysis may pose even greater problems for what education is considered culturally appropriate by Native Americans—especially if this is viewed as another way of urging them to "become White" (Cleary & Peacock, 1997; Peshkin, 1997; Spring, 1996). In this area, I would suggest that it must be left to Native scholars and other thoughtful researchers to further analyze this extension of school into the home.

While I conducted this study to explore the ways students and teachers construct meanings about educational technology at this place of High Plains, in using a critical theoretical framework, I cannot avoid addressing how students and teachers negotiate meanings differently according to race. In Chapter Three, I discussed strongly held objections to White researchers speaking for and about Native Americans. Acknowledging the obstacles to my understanding of such as a White researcher, and the biases which are inevitably present because of my position as researcher and my dependence on published documents, I offer the following discussion for consideration, since to do otherwise would in itself be an act of oppression (Fixico, 1997; Swisher, 1997; Wilson, 1998). As noted by Denzin and Lincoln (1994), "If we recognize race, class, gender, and sexuality to be socially and historically contingent (Hall, 1991), then silence, retreat, and engagement all pose ethical dilemmas" (p. 81).

Place for Native Americans

Place has historically been of great importance to Native Americans. White Americans were unable to appreciate the intense attachment to specific homelands which each of the Native American nations identified as their own. This was partly a result of the misunderstanding of a culture that lacked the Euro-American concept of individually owned land and partly wishful thinking since Whites desired the land for use as an exploitable natural resource (Kemmis, 1990). Native history was "etched in the landscape in place-names commemorating people, deeds, visions, and disasters" (Wishart, 1994, p. 13). As a crude summary of the explication in Wisdom Sits in Places (Basso, 1996), I interpret the bond to place to include the use of places themselves to function as prompts for recalling important moral lessons. In a Native American author's discussion of the Internet, he stated, "Native cultures were never merely oral. There is instruction etched on rocks, animal parts, or told through stories about a particular piece of land. These writings are eternal, housed in libraries that remain a part of the landscape" (Trahant, 1998). The loss of homeland entailed, then, the loss not only of place but also of history and culture. "Without the familiar landscapes...their stories lost their contexts and lapsed when the old people died" (Wishart, p. 214).

Local Tribal History. What follows here is included in order to provide some background on local history, however meager, and to foreground some of the previous injustices dealt Native Americans of the area. It does not represent a Native American viewpoint of the events. Though the student body had representatives of at least 27 tribes, the largest proportion came from one tribe whose lands were contained within the school district. The members of this tribe had called themselves Jiwere (jee-WEH-ray) or

Chiwere (chee-Weh-ray), translated as either 'Arrived at the Place' or 'People of this Place'. Wishart (1994) stated that many of the tribes of eastern Nebraska, the traditional homeland of the Jiwere, were affected earlier and more strongly by westward expansion of White settlement than others of the midwest. The expulsion from their homelands, followed by the stripping of the first lands allotted to Native Americans in the United States, and the subsequent removal of these tribes set the general pattern for all tribes of the midwest. Displaced to reservations in the mid 1800s, the tribes were again forced to relocate in the 1880s, but within forty years little of their newly allotted lands remained under their control (Wishart). During this time, schooling for Native American children was mandated by the federal government and often consisted of boarding schools, which were designed to inculcate literacy and to replace Native language and values with those of White society (Lomawaima, 1995; Spring, 1996).

Cultural Discontinuities. The displacement of the ancestors of the Native American students at High Plains might be said to be exhibited in the students' lack of knowledge of their own tribal stories (Mander, 1991; Wishart, 1994). In the high school Native American Studies class that I observed, of nine Native American students only three acknowledged knowing any Native American story. Only one student said she knew more than one story. The class assignment then was for each student to find at least five stories. There is some irony that in a place where half the population is Native American, students use the computer lab to access the Internet to gather Native American stories.

A student later observed in an interview that to learn accurate tribal ways she could still ask the elders or those of the tribe who knew, which is the traditional way of

passing down Native American culture. Another commented, *"the tribe.. they don't like the Internet as much. They're like, 'Well, it's not in the old ways' and all this. They are all caught up in the old ways."* This placed some Native American students in the contradictory position of having to choose between adhering to the cultural standards of their elders and their tribe or meeting the educational expectations of the school for the use of technology. For these students, the Internet has at times permitted the consultation of elders to be bypassed or circumvented. This lack of guidance prompted a Native American author to write, "Point-and-click is nothing new: Tribal cultures have always told stories that way, but on the Net, there are no elders" (Trahant, 1998).

The Internet and other mass media have increased access to social information and to the patterns of behavior of others. Some theorists hold that the additional exposure of students to pop culture and other worldviews tends to accelerate the trend toward cultural homogenization (Meyrowitz, 1985; Simonelli, 1993). Though this importation of cultural trends may be particularly characteristic of rural education, it seemed paradoxical for a community with a large proportion of Native Americans whose past included a loss of place that resulted in near annihilation and whose recognition of the connection between place and identity is expressed in their name, the Jiwere – People of this Place.

Conversely, some Native American leaders believe that computer technology can be instrumental in preserving and teaching Native traditions and may be helpful in educating the wider society in Native ways (Assembly of Native Educator Associations, 1998; Simonelli, 1993). High Plains provided an example of this viewpoint through this same Native American studies class. The students had developed a web site that helped disseminate information about Native Americans to other tribes, as well as to non-

natives. The site was graphically appealing, with beautiful colors and images, and seemed well organized. Dissemination of detailed information and communication with interested users were carried out through easily accessible email links.

Everyone that I talked to at High Plains schools indicated that they thought proficiency in the use of technology was an essential step in preparation for the future. However, some reported objections from their parents, and others reported finding inaccurate and inappropriate information about Native Americans on the Internet, some of it published by Native Americans themselves. Emphasis on the use of educational technology may therefore be embedded in an unaddressed cultural conflict. An administrator, while defending the provision of Sony PlayStations in students' homes for homework, remarked with a seemingly altruistic attitude, *"What's wrong with that? So they get to be just like everybody else, like people in Lincoln City and Kenton,"* that *"what it has meant to them as a person* [sic] *is exposure to what the rest of the world takes for granted."* However, what may be intended for social equity may also be interpreted as a sense of cultural superiority and an attempt at assimilation (Lomawaima; 1995; Mander, 1991; Spring, 1996).

Despite processes that may operate to diminish tribal culture, Damarin (1998) held that, "denial of literacy and information has been a tool of oppression throughout history; to deny marginalized and oppressed children computer literacy and access to the World Wide Web is to participate in the continuation of their oppression" (p. 14). To its credit, High Plains attempts to provide just such access to its students. And as Kerr (1996b) suggested:

> The actual outcomes from use of educational technology in education may be less critical here than the symbolic functions of involvement of minorities with the hardware and software of a new era, and the value for life and career chances of their learning the language associated with powerful new forms of "social capital" (p. 155).

As I have tried to present, there were indications that there were contradictory opinions within the Native American community at High Plains about the benefits of the use of educational technology.

Weakening Bonds of Place

Teachers and administrators at High Plains consistently spoke of their intent and desire to use the technology curriculum to provide students with up-to-date job skills and to prepare them for college. An unfortunate side effect of this discourse for the community may have been to unintentionally contribute to the weakening of the bonds of place for students, possibly even encouraging them to leave the community altogether. From one perspective, it could be said that at High Plains educational technology has created a brain drain as the best and brightest students are siphoned off into jobs that take them far away from their community. A senior, when asked if he would be staying in the community in coming years quickly replied, no, *"I don't like being out here in... Weed Country."* Focusing education on an overtly globalizing technology such as the Internet may at times seem problematic in that it could result in a loss of sense of local community and a loss of a sense of place for Native Americans and for Whites alike (Hodas, 1993; Smith, 1997; Starkey, 1998; Streibel, 1998; Tapscott, 1998; Turkle, 1995).

Communications technology itself has been said to carry a bias that can exacerbate the concentration of economic power into the physical and cultural centers of a society, and therefore, can increase the gap between prosperous and less prosperous regions (Fabos & Young, 1999; Gillespie & Robins, 1989). W. H. Melody (as cited in Gillespie & Robins) claimed that telecommunications technology may provide a system for drawing away economic opportunities that might otherwise have been generated in a region. High Plains found itself caught in the contradictory position of preparing students for individual success while hard pressed to improve the prospects of success for the community.

Isolation and lack of economic opportunity had in the past served to increase tension in the community over education in general, which affected the community's racial groups differentially. Some students and faculty indicated that there was at least some concern among the local tribe about the effects of the youth moving away from the community and failing to maintain their particular Native American culture. When asked about the youth of the community leaving, a teacher responded,

> *Each kid is more important. And they* [sic] *have to make the decision. Many kids will decide to stay. But, to prevent them by trying to save a community.. to prevent them from making those decisions is not our decision. It's theirs.*

While laudable from the non-native point of view, and though Native American cultures and attitudes are greatly variable, this teacher's opinion may conflict with Native cultures in which individualism is not valued. It also may indicate a lack of understanding of a Native American culture, which may stress the tribal concept of the unity of the group (Cleary & Peacock, 1998; Locust, 1988; Peshkin, 1997). Such conflicts point up the

value differences between Native and non-native cultures regarding how progress and success are defined (Deyhle, 1995; Kinlicheeny, 1995; Mander, 1991; Peshkin, 1997; Spring, 1996).

For Howley and Howley (1995) the interaction between technology and place is particularly important for rural locales. The opportunity technology provides for participating in mainstream American life may come at the price of sacrificing traditional community values. These values include a community life that is rooted locally in a physical place where every child and adult has a stake in each other's lives (Streibel, 1998). In their critique of the unquestioning acceptance of the use of technology in the nations' schools, Howley and Howley claimed that "the displacement of local economies and local cultures is not an accident of progress, it is integral to progress" (p. 129).

Incongruity between being proud to be a High Plains educational technology leader but desiring to move away from the place, between being proud of one's Native American heritage but learning from a global perspective, between acquiring skills that provide better job opportunities but that encourage separation from traditional cultural values. It is such interplay among sense of place, race, and sense of self, as well as the use of educational technology that appears to be significant in understanding what it means to be educated at High Plains.

Place and Curriculum

"Places and the social processes and social relationships they embody also affect how... technological systems are designed, implemented and used" (Gillespie & Robins, 1998, p. 1). Sense of place or a certain understanding of High Plains appeared to have given rise to a particular vision for educational technology.

Curriculum Transition

The goals that shaped how educational technology was used were derived from the shared understandings of the administration and teachers of High Plains as a place. Originally, technology was introduced to regain control over a system that had been labeled by the state as a low performing school. This labeling had defined High Plains as a place in which students were at risk academically. One of the original functions of technology was to facilitate individualizing instruction for all students. The superintendent explained

> *We took every student, identified their* [sic] *level in reading and math, and taught them at that level...We had some real gains in some students' scores using technology, and the fact.. those kids were glad to work at their level. Now, that's what Jostens did. It fit right in with what we.. with my concept. Is that.. you could let kids test out and they could move right up to their challenging level.. in the curriculum and work at that point.*

Jostens is an integrated learning system (ILS) that uses computers to present a packaged curriculum to students and also to evaluate students' progress through the sequences of lessons. Integrated learning systems have been said to be "particularly well suited to the needs of special students" since "pinpointing deficiencies and supplying remediation is a featured capability" (Tyre, 1990, p.1). The use of Jostens at High Plains changed the focus of the school's curriculum as well as the methods of delivery of instruction. Classes were no longer taken to be homogeneous masses but rather, classes were redefined as composites of students who learned at different levels and rates. The capability to match the questions to the level of competence of the student was the operational definition of

individualized instruction. Thus, by automating the process through the use of the integrated learning system, the administration accomplished its goal of implementing individualized instruction. Automation required minimal cooperation and effort from teachers since they did not have to produce redesigned lesson plans or rework their methods of teaching.

However, that students are presented identical curriculum material in a drill and practice format varied only by the pace at which they proceeded might hardly seem to qualify as truly individualized (Van Dusen & Worthen, 1995). Teachers no longer determined what content would be taught or how lessons would be presented. In effect, control of the curriculum had been wrested from them through the introduction of technology. They were to function as technicians doing technical jobs. Criticism of this view of teaching with technology includes such comments as, "You can't separate the content from the pedagogy" (Fatemi, 1999, p. 7). Though it may not have been used for such in this particular setting, the data produced by the use of an ILS, meant for individualizing instruction for students, at the same time made available a measurement for evaluating and regulating teachers' work (Apple & Jungck, 1998). Hodas (1993) held that, "Computer-based technologies of the kind described above (ILSs) are hardly 'neutral.' Indeed, they are intensely normative and send unambiguous signals about what school is for and what qualities teachers ought to emulate and model" (p. 20).

As would be expected from reports in the literature, many teachers objected to the adoption of a technology-driven curriculum. Many of them were unfamiliar with computers and were quite uncomfortable that they were required to use them. Some chose instead to resign. In addition to being required to adopt different instructional

methods, the loss of autonomous control of the classroom was for many unacceptable since "having exclusive control of a bounded physical space is an important part of a teacher's identity within the school" (Nespor, 1997, p. 122).

Adoption of Technology

Over the years the function of technology changed, as most teachers became more comfortable with computer use. Some appropriated and embraced the changes in instruction, and began to reestablish some autonomy by participating in designing curriculum as described by the superintendent:

> *Teachers now...are far beyond that. They take.. they don't use Jostens, per se. They use parts of Jostens. They may say, 'Okay, I want to reinforce these prefixes, word prefixes, so I'll use..' They pull that lesson off of Jostens for word prefixes. But they don't just go through the whole process. And then they may bring in some other information that they've got from another software package or from the teacher's text themselves. It's not.. it's just not... it doesn't drive us like it did originally. The teacher drives it now.*

With three 20-station networked computer labs and a 15-station business computer classroom, in addition to five student network stations and a teacher network station in almost every classroom, along with other high tech equipment, the High Plains Public Schools were uniquely fortunate to have the financial means to be able to provide most of the hardware and software teachers desired to use with their students.

"Going out on the Internet"

Relative isolation, limited economic opportunities for employment in the community, and the school district's unique financial circumstances combined to produce

an educational focus that encouraged students to *"look outside High Plains,"* to *"find out what's outside."* A significant number of students in the district were said to have traveled no further than to the nearest two towns, and it was said that technology could show them a bigger world and their place in it. A staff member suggested, *"But these kids with the technology.. You stop and think,.. this may be the only way for them to find out what else is out there as far as culture and socialization."* In reference to the way educational technology came to be used in most of the subject area classrooms, teachers and students continually spoke of doing research by *"going out on the Internet"* and *"going out and finding information."* The assumption seemed to be that information or knowledge was located somewhere other than at High Plains and one had to reach for it. However, when asked about the terminology "looking outside," a teacher who designed lessons using a more constructivist or learner-centered orientation, objected saying, *"I think about it more in terms of 'bringing in' things for students to see."*

The Internet was generally used as a substitute for the library and a vehicle for providing unlimited resources for student research. Often the information and the experiences that the Internet provided were lauded as though students had not previously had access to broadening influences of television and radio. A staff member maintained,

> *They can get on that Internet and they can go anywhere. They can see what is going on. They can get on there and see job opportunities... things, that if they did not have the Internet they wouldn't know that it existed out there.*

The library media specialist explained that since teachers had Internet in their classrooms high school students seldom came to the media center. Two senior boys assured me they had not been into the library media center at all during their senior year, and had done all

their research for school assignments on the Internet. One of them expressed concern that he might be at a disadvantage if required to use a college library that was not as well equipped with technology as his high school.

Summary: Pedagogy of Place

The habits and practices, or discourses, that create a community's culture, sense of place and way of life, are influenced by the characteristics of the physical place. These include inhabitants' perceived sense of self and understandings of responsibilities and appropriate behaviors. The characteristics of the specific place of High Plains produced a community that viewed itself as a model school—in which students and teachers thought of themselves as leaders in educational technology. This reputation helped induce a sense of pride and a revised sense of self. Students and teachers knew High Plains to be unique because of the history and isolation of their community, the socio-economic level and racial makeup of their population, and the level of funding for the district. However, as leaders in technology in a model school, they were seen as exemplars whose decisions and actions regarding technology could be studied for purposes of replication in any and all locations.

Though the population was composed of members of more than one culture, with different values and practices which might be expected to result in dissimilar needs and uses for technology, these differences in culture were disregarded in an effort to ensure equity for all with regard to knowledge of technology. Such an emphasis on technology appeared to weaken the bonds of place for students, resulting in drawing many of them away from the community. Additionally, the implementation of technology in this model school would seem to have failed to address issues of gender equity and the needs of

special students. However, the discourse that framed High Plains as a model school for educational technology had become so dominant that in a sense it rendered such considerations invisible to its inhabitants.

The understandings of place and self that gave rise to such conflicts and contradictions, worked to shape a specific technology curriculum for students that emphasized the use of the Internet to gain access to information from "outside" the community. It is this distinctive curriculum that I take up next for discussion.

The Look of Implementation

In this portion of the chapter, I will describe and discuss the shape of the curriculum at High Plains as influenced by educational technology. First, I discuss the conflicts and contradictions between the written curriculum and how curriculum played out in classrooms. Though district goals emphasized the need for students to process and evaluate information through advanced technology, much of the use of computers in the classroom was merely related to accessing information. Next, I explore the significance of the Internet in the curriculum and reasons for its use. I contend that the prevalence of the use of the Internet at High Plains is a consequence of issues relating to the bureaucratic organizational structure of schools and to the nature of teaching. Last, I examine aspects of the hidden curriculum and how use of technology at High Plains plays out in diverse aspects of students' lives.

Written Versus Enacted Curriculum.

Few students or teachers in the United States have access to the amount and variety of educational technology to be found at High Plains Public Schools. At the time

of this study, the district possessed a fully-equipped video production lab, additional video editing units, a phone-operated video delivery system available in every classroom, a satellite communication system, a live-broadcast channel, a video surveillance system, a distance learning classroom, as well as one Internet capable networked computer workstation for every two students. Video-based and computer-based packaged curricula and many other networked software programs including an extensive periodical and magazine database were also available.

District documents stated that *"how a student is able to interface with the technology to process and evaluate information will determine their* [sic] *success in life,"* and that it is the district's responsibility to *"implement and integrate the state of the art technologies and instructional designs"* in order to prepare students to meet the demands of an information society. The written technology curriculum at High Plains Public Schools documented an extensive list of requirements for educational technology use by students. (See Appendix C for Student Technology Goals.) The district's web site asserted

> *Understanding that this world is moving ever closer to a day when a student's livelihood will depend on their* [sic] *ability to collaborate with their colleagues, create new approaches to problems and integrate technology into their professions, our teachers attempt to expose each student to the real life application of technology which will be demanded of them upon graduation.*

All of these statements form a discourse that reflects corporate influences on assumptions about the purpose of school: developing job skills and preparing students for work. The definition of the High Plains school community as leaders in technology speaks to the

extent to which these assumptions have been adopted within public education (Bettis, 2000).

On the other hand, a constructivist view of the nature of learning and of schools can be seen in the district's Information and Communication Plan which formally stated that teachers would "*comprehend, accept, and evolve into the role of an educational facilitator[s]*" and would "*master the use of information and communication technologies in order to create an environment where students become active, self-directed, life-long learners.*"

Ironically, neither corporate influences nor the constructivist view of learning seem to have been able to change the structure and feel of the organization. My research journal disclosed that my overall impression of this model school for educational technology was, for the most part, "school as usual." Hodas (1993) reported that "even when the tools (technology) are used, classroom practice—the look-and-feel of schools—remains fundamentally unchanged" (p. 2). Cuban (1993) noted similar situations. Classes and instructional methods at High Plains tended to be traditional teacher-directed, textbook-dependent, whole group instruction (Cuban, 1983). Educational technology in most classes functioned mainly as an add-on rather than as an implementation of innovative instructional design.

Most of the teachers required the use of general applications software such as word processing and PowerPoint for reports. However, I saw only one student access the periodical database available via the school network. Most of the research was drawn directly from the Internet. During interviews, several of the teachers mentioned having assigned students technology projects. One told of teaching a unit from a CD-ROM

curriculum. The following is an excerpt from my field notes about the description of that lesson.

> *The hyperlinks and software idiosyncrasies caused the students to take much longer to get through the material and to NOT know the material as well as if taught without educational technology. The teacher mentioned benefits such as: the kids enjoyed it, learned to work together in groups, dealt with the problems that arose, etc. The teacher wondered if the software was used more often, the novelty of the program would wear off and allow the students to focus more on the content.*

It was curious that this would be an issue of concern. Since the students at this school seemed to have so much exposure to educational technology, it could be expected that they would more likely be able to ignore the educational technology and concentrate on the content.

Another teacher described a successful project that met the stated goals of processing and evaluating information and using advanced technology.

> My question: *Can you tell me about a particular lesson that you planned using technology that turned out really well?*
>
> His answer: *...In [a science class], instead of me lecturing to them and giving them topics of this and that, I wanted them to create a PowerPoint presentation that would be set up, say, in the library...They were to find the graphics from the Internet.. put those graphics in a PowerPoint file and relay all the material from that topic through that PowerPoint presentation. So, instead of me standing up lecturing to them, they could sit down and look at this PowerPoint presentation.*

Or, instead of them lecturing to you, they would say, "Here, go through this PowerPoint presentation. You don't listen to me. Here it is. This is all the information."... Overall I wasn't looking for great PowerPoint presentations. I was looking for them to get the material. A lot of them couldn't put it on PowerPoint, but they did get the material, which was my goal.

These two assignments occurred during the school year in which the research took place. However, most of the efforts teachers described to me in interviews had taken place in years prior to my research. The following was such an example.

I think it was last year or the year before, we had some students that became really interested in the Holocaust. And so in our combined efforts with research, and the social studies teacher and our computer teacher, at the time, also...we ended up doing a little bit of Linkway projects.

Linkway was a program that allowed students to construct hypertext documents—that is, text composed of blocks of words (or images) linked electronically by multiple paths. Thus, it seemed a relatively few teachers had recently attempted to meet the school's stated goal of integrating advanced technology.

The video production class was one of the few exceptions to the argument that High Plains carried out school-as-usual and technology was treated as an add-on. However, while moving around the school between classes, I observed only one assignment being produced. This is an excerpt from my field notes:

As I walked out into the hall, there were 8-9 students gathered in front of a large display case just outside the library. A high school boy was videotaping middle school students who were introducing themselves and identifying their

papermache volcano projects there on display. The students helped each other with their introductions and practice sessions were shot before the video to be kept. When they finished they went back to class.

Another exception to the school-as-usual scenario was a grant funded, high school gifted and talented class, which consisted primarily of Internet research on colleges and college applications. Although it was atypical, of the previous year's class of 24 students, it was reported that 20 had enrolled in local colleges. I also observed a trigonometry class conducted by a High Plains teacher through the distance-learning classroom in conjunction with a local consortium composed of a small group of schools that shared teaching resources. One High Plains student was enrolled in this class.

Technology Education, a career exploration class, was offered to middle school students. High Plains followed the state's suggested curriculum, which seemed ironic for several reasons, one of which was that it involved conforming to what other schools in the state were providing. The curriculum consisted of rotating pairs of students through learning centers, where they followed detailed lesson plans at each station. Although most of the centers involved computers, these were older non-networked computers. The computer programs that various learning centers were designed around included Print Shop, Map U.S.A, and Microsoft Flight Simulator. It was also ironic that in a model school that emphasized the integration of computers into all subject areas, this class seemed to separate out hands-on activities from almost all subjects. During the interview the teacher explained

Teacher: *We spill over into every curriculum that is taught.*

My question: .....*Okay, if it was already a part of somebody else's curriculum how come it was separated off to be Technology Education?*

Teacher's answer: *Well, it's not necessarily a part of somebody else's it just happens that things that we do fall into another area, maybe. Like we have a program that is called Cross Country that is.. they figure out where they are at on the map. They have to learn how to read the map, to find out where they're going, things like that. And every one of them have things related to writing skills. We're using the computer. We have math skills that are involved. We have science things that come about. So, there's not really any subject area that we don't hit on a little bit, where they correlate with some other subject matter.*

My question: *I don't mean to be insulting, this is my own ignorance here. But it seems to me maybe this is just.. uh.. hands-on projects for somebody else's curriculum.*

Teacher's answer: *Uh... Well, we do.. yeah, probably 90% of what we do is hands-on. And.. but it's a uh.. in the process of what they're doing, it's an exploration of what is available. Uh, you know, they don't take an.. they may talk about force and gravity and things like that in science. But actually.. maybe actually seeing how it relates to this airplane.. uh, they don't see that in science classes.*

As is the case in most schools that have technology, the computer teacher emphasized job skills using office applications software. She stated

We try to keep our curriculum so that we are using the programs that they are using in industry. When we do our desktop publishing, we use Pagemaker 6

because that's what they use in industry. At one point we thought about going with Word Perfect but it was really hard for the kids and was not user friendly and I couldn't believe that's what they used in industry. So we switched to Word and now that's becoming the most popular one and it's used a great deal in industry.

Advanced computer projects (which included creation of Internet web pages and computer workstation set up, but no programming) were available to select upper level high school students.

At the end of Chapter Four, I described the student who was continually portrayed as an example of what educational technology could accomplish, the model student. Jason had been considered a slow student but during his ninth grade computer class, his talent for learning about and using computers was recognized. He was then allowed the freedom to move at his own speed, teaching himself to use the software and hardware. He became a semi-official assistant to the school's Network Administrator and Technology Director and was given extra privileges. He was constantly in demand to help teachers with computer problems. When I interviewed Jason, I asked about how he spent his school day.

Question: *How much of your school day do you think you spend working on the computer?*

Answer: *About six hours of it.*

Question: *But you don't spend all day long in front of the computer screen, do you?*

Answer: *Mostly.*

Question: *You really do!?*

Answer: *I do.*

However, no other student had access to the same kind of computer training Jason received. While Jason was allowed the freedom to move at his own speed, other students were expected to move through lessons together. Jason also received individual, hands-on training in maintaining the network and workstations in the school by assisting the technical support personnel. It would seem appropriate in a model school for technology that many more students should have the educational opportunities that Jason did.

Internet in Use

Despite the availability of a variety of educational technologies at High Plains, the Internet had become the most commonly used in the general curriculum at the secondary level. Kerr (1996b) reported, "Initial intentions for a technology often translate over time into unexpected organizational and social consequences" (p. 149). For several of my informants the terms "educational technology" and "Internet" had apparently become synonymous. When asked about the use of educational technology, their responses dealt exclusively with the Internet with a seeming lack of awareness on their part that they had limited their thinking to only that form of educational technology.

Approximately one third of the middle school and high school subject area teachers assigned lessons that used the Internet several times a week. Internet use for these classes centered on research projects, communication, construction of web pages, and learning about the purposes of the Internet itself.

However, one teacher designed lessons employing a more constructivist approach for an applied math class by using web sites that included simulations and other

activities. In this class of four, I observed the students using a simulation program on the Internet to explore concepts in geometry. The following is an excerpt from my observation notes.

> *Students and teacher discussed price of stocks "owned" by students and teacher. Teacher's instructions: "After your stocks you need to pull up your CD-ROM and do the one that matches Chapter 7 in you book. Geometry. Also, there are two Internet sites for you. One teaches how to do a rotating pinwheel. The other has to have Claris Works for tessellations." She sat down at a computer between two students. She talked about polygons. Defined, listed them. Students pulled up the proper lesson but did not acknowledge the teacher's talk. The three boys spent 33 minutes somewhat listlessly designing and redesigning patterns by moving polygons on the screen.*

During that class session they also used a CD-ROM based curriculum that coordinated with their textbook to explain and extend specific lessons.

Though the value of this lesson was not immediately observable, by accident I was later able to witness the results. Two days after sitting in on this class, I passed the open doorway as I walked down the hall. One of the boys I had watched in class, who was again working on the pinwheel simulation, quietly threw his arms up in the air and cheered as the pinwheel began to work properly. Having also observed this boy in other remedial classes, I found his reaction to his success encouraging. This lesson then demonstrated several of the benefits of educational technology that educators have reported in the literature including, 1) providing a variety of resources that integrate additional paths for learning, 2) stimulating student thinking and problem solving, 3)

encouraging students to work more independently at their own pace, and 4) improving students' self-esteem. Unfortunately, this type of lesson appeared to be the exception rather than the rule at High Plains.

Another one fourth, approximately, of the subject area teachers reported using the Internet with students four or five times during the school year. Most of their Internet use was for research papers and projects. These classes sometimes used other computer software such as word-processing.

The remaining secondary level classes, almost one half of all classes, rarely seemed to use the Internet for assignments. Most of these classes very rarely used any computer technology at all. A teacher responded this way:

> My question: *Do you intentionally plan to utilize educational technology in any of your lessons?*
>
> Teacher's answer: *Um.. I have, as far as computer research and using the Internet for research and things. I don't as much as some of the other teachers do. It's just kind of an unspoken consensus around that they use it in social studies and science more so and I try to point out that there is still book.. you know, knowledge to be received from books and each other and, you know, other areas. So that we hope that they have a balance.. and know that.. that it's not just going to be a computer doing your thinking. You still have to figure everything out. It.. the knowledge is just there... more accessible. But.. so I do somewhat, but.. not as much as the others.*

This teacher did not often use technology herself, nor did she especially want to assist students in employing technology. It seemed she found it necessary to justify her

decisions through the rationale of balancing out the emphasis on technology from other teachers.

Special education students (particularly those with poor reading skills) who were assigned research on the Internet in other classes were at a significant disadvantage since they had to rely on the regular classroom teacher having time during class to help them with the assignments. They had no opportunity to access the Internet with help of the special education teacher.

The function of the Internet for the Native American Studies class was unique for High Plains students. This class did not use textbooks but rather conducted most of their class work through oral discussion, which reflects the importance of the oral tradition in Native American society. At times, they investigated relevant topics via the Internet such as through communication with other Native American groups. Because of the cultural issues, these students seemed to be more aware and concerned with the authorship and quality of information that they retrieved on the Internet. As previously mentioned, these students constructed a class web page as a way to reach out to the Native American community and provide what service they could to others. Through their web page, Native Americans felt they were able to share accurate and appropriate information about their cultures with each other and with the world community, as is illustrated in this conversation:

> My question: *I think I do understand. Maybe if I can tell you what I thought you said.. you correct me? That you find a lot of the.. well, some of the sources on the Internet to be more authoritative than others because they are written by Native Americans on the subject of Native American culture?*

Teacher's clarification: *That is correct other than the word authoritative is not.. we're talking about the accuracy, the ethnicity of it, the true definition. That's more what we're seeing as far as what our students are being able to do. Often times, and I'll show you an example.. a definition of a cultural event. Our students are being able to read an article that they know something that they didn't have to research, and if it's defined incorrectly from that article, they realize that someone didn't know what they were talking about. Or, it's inappropriate, or it's not as accurate. So I think that's what, again.. the quality and again, many of our students are being able to, again, understand and be able to come up with that type of conclusion.*

The teacher continued to describe the ways the class negotiated the meaning of the use of the Internet:

It's opened up so many different avenues at one time.. we were just caught up in that alone. Our whole curriculum had to come to a halt because this was a whole new ball game for us as far as what we thought we would be able to accommodate. And it was, yes, information coming from all over the world. And not only that, we were having to provide information also.

This class, then, altered the planned curriculum to employ the access provided by the Internet to respond to interests and needs of students to participate in a broader cultural community. In this manner, it appeared to fully meet the district's stated goals of "process[ing] and evaluat[ing] information" and "implement[ing] and integrat[ing] state of the art technologies and instructional designs."

Another example of a more innovative use of technology was in its first year of implementation. In one of the computer classes, a few of the students participated in ThinkQuest, a nationwide Internet-based contest for teams of students who were to produce instructional materials to be published on the Internet. Participants were required to locate and coordinate with distant team members willing to cooperate on project production. Teams were penalized for having only local members. This was designed to help students develop a broader perspective and to engage in more authentic collaboration activities. I observed 8 boys and 3 girls (none of whom were Native American) working on their projects during two forty-minute class periods. My journal notes indicated that though these students had chosen their own topics, I observed a lack of enthusiasm for these Internet projects when compared to the attitude of attention that students exhibited when accessing the Internet on other occasions and in other classes. It seemed that designing and constructing web-based instructional materials held less interest for them than the stimulation gained from searching the Internet. Perhaps this was due to the more tedious nature of producing materials as opposed to merely browsing or even being entertained by what Postman (1994, 1995b) has described as "dazzling distractions."

Students and their parents were required to sign Internet Access Use Policy agreements in order for students to use the Internet. This agreement stated that students would not access or transmit copyrighted, threatening or obscene materials. The seriousness with which the administration viewed abuse of Internet privileges was illustrated by this comment from a teacher.

Some of the kids that are in trouble now.. that I would classify as potential dropouts.. these are kids that are suspended or in in-school suspension right now.. are kids who have abused their privileges on the Internet. And that's why they are where they are.

It was regarded as a very serious form of punishment at High Plains for a student to be banned from using the Internet. All students were expected to use the Internet for their classes, but less than 25% of students in the district had computers in their homes. This meant that access to the Internet at school was especially important to them. Although it was possible for students to complete assigned research projects in the library without computers, most students very much preferred to avoid that situation.

Why the Internet

With the availability of so much technology at High Plains to choose from, I not only wondered why less than half of the teachers used it. I also wondered why the Internet dominated that usage so overwhelmingly. A typical response from teachers to the question of the value of the Internet to High Plains students was that, *"They are really ahead when it comes to dealing with the technology they are going to see out in the world."* However, after extensive questioning of informants and further research, I concluded that use of the Internet was also related to the characteristics of the Internet as a particular technology and to characteristics of the teaching field.

Perhaps Internet use was important at High Plains precisely because it was not a prepared or "canned" curriculum. Since there is no authority control and anyone can publish on any topic, the Internet may not provide unbiased or necessarily accurate material. Nor can it be depended upon as a source that provides material that is truly

representative of the totality of a body of information since it is dependent on the whims of those who choose to publish there. However, the real value of the Internet in the classroom may be that, as an information source, it requires evaluation and is continually evolving. Also, the openness of the Internet to multiple access points and pathways to information, exemplifies the postmodern perspective of technology (Landow, 1997; Yeaman, et al., 1996; Hlynka & Yeaman, 1992). These characteristics may mean the use of the Internet can provide for more student-centered learning, allowing students and teachers more direction in and control over instructional content. This also can support the teacher's option to act as a facilitator to student learning rather than as a dispenser of knowledge or expertise (Iseke-Barnes, 1997; Tapscott, 1999; Windschitl, 1998). Some classes at High Plains did use the Internet to investigate issues of particular interest to students, such as current events relating to Native Americans or the publication of student poetry.

The now classic image of the teacher who stubbornly refuses to accept computers in the classroom has worn thin. For example, Cuban (1999) cited a variety of valid reasons teachers had to resist technology, including intractable working conditions and unreliability of the machines. However, teachers have also been among the foremost technology advocates. A few of these teacher advocates taught at High Plains. One teacher declared she just didn't think she could teach without the Internet. She used it almost daily in class. Another teacher claimed to use it *"every hour, every day."* In the interview with this teacher, he indicated that although students used computers in his class to search the Internet and access his lecture notes, he spent a lot of time inputting

and organizing his lessons on the computer. When I asked what benefits he saw to using technology, he thought a moment then said

> *...The fact that I can condense a whole roomful of books and files into one satchel, just makes me... just.. I have cold chills. I can have in that one computer everything I need as a professional. I can pick up that laptop case and I've got it. Everything!*

Although the idea that everything a teacher needed in order to teach could be contained in a machine might set off alarm bells for some, because I had observed in his classes I interpreted his statement to mean that the organization of materials in this way allowed him the freedom to concentrate on how students interacted with the lessons he designed for them.

The factors that made the difference in teacher use of technology were often related to the particular form of technology involved. For a technology to be widely adopted in classrooms, it must meet several criteria. It must be easy to use, must maintain respect for the role of teacher, and it must not threaten the existing principles and order of schools, such as hierarchy of authority and the transmission of the norms and values of the dominant society (Cuban, 1983; Hodas, 1993; Kent & McNergney, 1998; Kerr, 1991). To avoid being "shown up" by students in a situation in which the teacher is expected to have expertise, teachers must appear competent in their roles in classrooms (Hodas). A High Plains teacher confided:

> *At this point in time, I feel inadequate because they [students] know more than I do. They've been here longer. And so they're leading me in many cases and uh.. I think it detracts from the respect.. caliber that I need to have. I need to be up*

there with them. I don't need to be in a position where I'm an idiot. (laughing) I mean, there's some value in having them teach you. But, I just think.. as a new teacher, trying to establish myself, I don't need to be stupid all the time. You know, I feel stupid.. a lot.

Several students admitted that students hassled and looked down on teachers who did not know how to use computers.

Students often acquired competence with the Internet by learning from each other or through trial and error, which bypassed the need for much expertise from teachers. And because incorporating the Internet in instruction can be so similar to the use of the physical library, it may feel less foreign to teachers than do other technologies. Thus, assigning reports using the Internet allowed teachers to been seen as knowledgeable and to meet the explicitly stated expectation that they would integrate technology into their classes, while it required little extra time and little change in their own behavior.

Hodas (1993) held that teachers more easily adopted technologies that did not threaten the authority structure of the school (their own authority, particularly), and to which access to information could be controlled. At High Plains, teachers were responsible for controlling student access to the Internet. One reported that sometimes teachers got email from an administrator that said students were accessing things that were inappropriate. She said, *"then teachers wonder if it was done in their room and they weren't monitoring closely enough."* However, teachers were also given specific authority to control student access, as the Internet Access Use Policy agreement the students were required to sign to gain access stated that, *"teachers will deem what is inappropriate use and their decision is final."*

Generally, problems that occurred were of a different sort. During one classroom observation, I watched two students construct school reports by cutting and pasting from the Internet. They did not alter the text other than to format it for their papers. When I asked a teacher about this, she admitted it was very common and definitely a problem that she was trying to combat. Another aspect to the lack of critical examination of the content, which might be of even greater concern, is that of students' attitudes about the value of the Internet (Burbules, 1997; Rothenberg, 1998; Windschitl, 1998). Several students volunteered how much more they learned from the Internet as opposed to books. One explained

> *If they go to the library they have to write it down and copy it. And keep copying it until you get it right. But through the Internet you can take that and put it in your own words and take parts from that. And you actually learn.. I think you learn more, teaching yourself how it's done. You actually.. you just think more about it than actually looking through a book. Cause most people get really tired of reading, they just skim through stuff.*

Another told me

> *It's different because you're looking at it.. It's more of a.. the book is just there. With the net you can actually travel in it, and keep going into it. Learn more about it and you can't.. there's no stopping you. You don't have to stop at the end of the book, you just keep going.*

Since the students did not have the words or concepts to explain themselves further, analysis of these statements becomes more problematic. While some might see this resistance to reading books merely as laziness on the part of the students, others might

explain these statements as reflective of the changes in how people learn in the age of electronic media.

Media researchers have theorized about the potential effects of mass media on social structures and on such issues as the social definition of knowledge and of authorship (Meyrowitz, 1996). Some researchers have proposed that students growing up in the information age develop an electronic literacy versus a print-based literacy. Students come to see the world differently as they almost unavoidably learn through various media and from various perspectives, not depending on the expertise of a single person or author but with a postmodern/poststructural sensibility toward traditional distinctions and authority (Meyrowitz, 1996; Tapscott, 1998).

Issues addressed in the quote above by the first student who thought he *"learned more"* from the Internet could be seen as 1) a desire for a more active and participatory form of learning and/or a redefinition of learning as synthesizing information for one's self rather than taking in what someone else (an author) has already synthesized, 2) a concern for a variety of perspectives as opposed to being limited to that of a single book or work, and 3) a particular sense of authorship. The second student, who felt that "w*ith the net you can actually travel in it,*" (as well as those constructing papers from texts copied from the Internet) also seemed to have a similar sense of the indeterminacy of authorship and a sense that there need be no end to a reading of a topic. Landow (1997) defined hypertextuality, the underlying concept of the World Wide Web of the Internet, as text and/or images linked by multiple paths "in an open-ended, perpetually unfinished textuality" (p. 3). He characterized the notion that there need be no end to a reading of a text, and the sense of authorship that permits the construction of knowledge from that of

others, as examples of Barthes' conception of the readerly versus the writerly text. By their very existence and their ease of use, electronic links both blur the boundaries between individual texts and allow the reader multiple paths. Landow also claimed that hypertext "reconfigures our experience of both author and authorial property" and "promises to affect our conceptions of both the authors (and authority) of texts we study and of ourselves as authors" (p. 25).

Easy access to information on the Internet can be viewed as a strength or as a weakness because it redefines knowledge as what we have access to and because it allows undisciplined, free-associational wandering (Salomon, 1997). However, teachers were instructed by the administration not to allow students to use the Internet for reasons other than school assignments, and most of them did restrict and oversee its use quite closely. Yet as rarely as I saw students having the opportunity to use the Internet, approximately half of their time in nearly all instances was spent accessing email or web pages that were unrelated to the class assignment or school subject. Many of these web pages presented games, graphics, or commercial product sites. Perhaps this indicated a lack of connection with the curriculum—a lack of relevance. Or possibly, students spent the time they had not needed to comply with the teacher's instructions on extraneous "wandering" because they understood schooling to be teacher-directed and felt little responsibility for their own education (Carnegie Mellon University, 1994; Plater, 1995). In any case, it did not occupy significant amounts of class time, and I likened this activity to students quickly passing notes or thumbing through magazines in which they had been assigned an article to read.

The only downfalls students seemed to be aware of regarding Internet technology included destructive activity such as viruses and other criminal use such as pornography and financial cyber-crime. While they voiced concern over safety and privacy issues in interviews, publication of their own pictures on the Internet with information that might be used to identify them seemed to indicate that they discounted this issue. Whether this indicated a sort of narcissism or teenage "invincibility" was unclear. Only one student expressed concern for the possibility of people isolating themselves through technology when she complained that a friend of hers

> *meets new friends over e-mail, so she's like not really talking to anyone here. She just gets on the computer in the morning and talks to her little friends and she doesn't..... Well, she used to be really popular, and have a whole bunch of friends. And she doesn't really talk to anyone.*

"Perhaps most important, the culture that creates the media and develops their symbolic forms of representation also opens the door for those forms to act on the minds of the young in both more and less desirable ways" (Salomon, 1997, p. 379).

Hidden Curriculum

In addition to the written curriculum specified in the Student Technology Goals, a particular hidden curriculum had come about as a consequence of various factors unique to High Plains. The hidden curriculum as defined by deMarrais and LeCompte (1999) is that which is learned by students through their daily routines and interactions in school but which is not explicitly taught. DeMarrais and LeCompte point out that such learning is commonly the unintentional results of school structure and the curriculum of

schooling, however, though it is not overtly taught, it "is often intended and considered desirable by school personnel" (p. 243).

Deportment

One of the most striking manifestations of the hidden curriculum at High Plains concerned students' behavior. Students were quiet and calm (but not withdrawn) as they moved from class to class and interacted amiably with each other and with teachers. When asked about students' quiet, easygoing conduct, most teachers had no explanation. However, two Native American and two non-Native American faculty members attributed the calm, quiet behavior to Native American culture. Though this has been a trait ascribed to Native Americans in the literature, only half the students were of Native American descent, and all the students behaved similarly (Cleary & Peacock, 1998; Lomawaima, 1995; Peshkin, 1997). Another teacher said, *"I just took it for granted that they are and just thought that it's great that they are...In fact, sometimes I wish that they were rowdier. You know, get energy here."* She suggested the students were well behaved because *"all the teachers here really like the kids, really take a personal interest. I mean ALL of the teachers."* Though a warm, personable atmosphere was generally evident among the faculty and students, and many teachers spoke of the school being like a family, this particular teacher was especially concerned about students' feelings and moods. She commented, *"I like to walk into a classroom where there is not a lot of tension. I'm a real good barometer for kids who are having a bad day."*

An administrator spoke of student behavior this way:

They just know what is expected of them, and they just go about doing what they know is.. they are supposed to be doing it. That has come from teachers

developing relationships with the kids. The kids realizing that, "I am here for a reason."

Another administrator replied:

Why they're a little quieter and more calm.. I really can't put my finger on it. I think it has a lot to do with the things they're exposed to, the technology, uh.... The visitors that we see day after day. Nothing really surprises our students, you know, they know what...they're here for.

I spent eight full days in the school before observing anything even vaguely resembling misbehavior. So, it was notable when I finally saw two middle school students run across the student commons at lunch. During class time the halls were deserted; I very rarely saw a student or teacher in the hall except during the 4 minute passing periods. I did not observe any instance of a student being at all insolent to a teacher or to another student, and only witnessed students roughhousing with each other once. In a classroom before the teacher arrived, one boy took another's seat, and the second proceeded to playfully shove the first out of the desk.

Since teachers and students were polite and friendly with each other, and genuinely displayed caring attitudes, I was therefore surprised and disappointed when during a classroom observation one teacher exhibited a disdainful attitude toward the students. This included the teacher walking over to where I was sitting, about eight feet from the students, and saying rather loudly with a glance to indicate that obviously the students could hear, *"I like to do projects like...but these kids can't handle it. They can't behave."* This teacher's behavior was the only negative case of teacher/student relationships that I encountered during my entire time in the field.

Through observations and extensive questioning during regular interviews, I came to believe that the exemplary student behavior resulted from expectations that, at least partially, stemmed from a desire to have the proper model student image projected to the constant stream of visitors. When I asked a staff member about visitors, she volunteered that, not only did they come to see technology but, " *a lot of it is to see how our kids.. cause we are a rural school.. see how our kids manage, behave, act, take care of the school, so forth.*" Being a model is a form of control (even though it may be self-imposed control) – the model's behavior must conform to that anticipated by the viewers. Foucault has explicated this idea of self-regulating behavior through his discussion of the panopticon, or an unobserved form of continuous surveillance. Poster (1995) explains

> Through the workings of the panopticon, a norm is imposed on a population, on its practices and its attitudes, a norm that is a result not of the imposition of someone else's will, as in feudalism, but rather of an anonymous authority that is seemingly omnipresent. (p. 67)

The disciplinary procedures and apparatus at High Plains seemed related to this model student perception. Although faculty members talked about students having received various disciplinary actions, these actions were administered in a very discrete manner that was out of view of observers such as myself. My unannounced visit to the in-school suspension center (generally called the alternative education center) revealed that students were in a restricted but pleasant environment that seemed to be designed to emphasize academic performance. Although the students sat in one of eight individual cubicles that faced into the room, there was a sofa in the middle for their use. The room was carpeted, and there were attractive posters on the walls. The students were provided

one computer on which to work. However, it was not networked, and there was no Internet access. Judging by the six students there at the time, the number of students who were placed on in-school suspension seemed to have been underestimated by most of those I had asked. The location of the alternative education center, on the far side of the campus from the main building (which did have spare classrooms), kept it from the sight of visitors to the model school. This physical separation also conveyed a symbolic message to other students and effectively consigned disciplined students to a kind of nonexistence.

Value of Technology

At High Plains, another facet of the hidden curriculum operated with regard to "what kinds of knowledge exist, which kinds are valued by whom" (deMarrais and LeCompte, 1999, p. 242). Students and teachers had become so aware of the importance of educational technology to High Plains that it assumed a larger-than-life dimension. A teacher remembered a class discussion sparked by a speech given by a senior girl in which she asked if other students were tired of "*sitting in front of a [computer] screen.*" The students came to the conclusion that each of them spent a full two hours of the day using a computer, but at least judging by their actions, they did not appear to be tired of computers. When I asked in interviews about this level of computer use, both students and teachers assured me that two hours a day was an accurate figure. However, I came to the conclusion that it was very unlikely that students spent this amount of time on the computers. After repeatedly walking through the entire school and noting computer use (each time no more than one fifth of the computers were in use), my calculations

suggested the average student might have spent an hour per day using the computers, although a few did spend considerably more.

However, it did seem obvious that, as teachers acknowledged, *"they get it from the elementary all the way through, so this is a way of life for these kids,"* and *"it's like the norm to them."* Technology use was promoted so incessantly that a student remarked,

> *They tell us how much we have to have computers to, you know, get what we actually WANT to do. And I think last year we had a guy* [Alan November] *come and he was telling us how much computers were going to be used in the future and showed us what all we could do with the computers.. (sigh) Almost all teachers talk about it.*

These two instances of student resistance to this discourse, or what could be termed the school's "agenda" for technology, were atypical. As previously mentioned, most students were convinced that they learned more from computers than books and, along with the adults, held that their future would be in jeopardy without their experience with technology. They knew that knowledge of computers brought them prestige and respect, not only within the community, but also from students and adults around the state.

Students were convinced that technology was to be greatly valued. The school's emphasis—including its willingness to spend large amounts of money on technology, as well as society's approval of technology, had together produced a discourse that ensured that most students unquestioningly assumed technology meant progress and that its use was invariably positive. It was this aspect of the hidden curriculum at High Plains that seemed most significant.

The administration had actively sought to encourage students to further their education after graduation by hiring a teacher *"to upgrade the English department program and get the students ready for college."* However, the following conversation indicated that students did not especially welcome or value such preparation.

> My question: *Do all of them [the teachers] have some point in the school year where they talk about careers? When do you talk about those things?*
>
> Student's answer: *The main one that usually talks about careers is our English teacher. That's all she ever does. Everything.. all the work she ever gives us, she tries to make it like where you're in college or you're out of school.*
>
> My question: *Is that.. does that make it uh.... does it make it mean anymore?*
>
> Student's answer: *Yeah, it makes everybody think about it. I mean, they don't like it too well, because they're NOT in college or nothing and they have a problem with that. But I mean, she's teaching us so we'll know what we actually have to do.*

In contrast, the indication that students "*had problems*" with English being promoted as preparation for the future seemed to point to a resentment that was almost never present when technology was promoted as a preparation for the future. It would seem that students might be less concerned with gaining advantages for their futures than they were with their current use of technology or the prestige that such use brought about.

The few students who questioned the assumption that technology use was to be highly valued were seen as anomalies. These included the few students who postponed their required computer class until their senior years, and those whom the in-school suspension teacher described this way:

If you sit down and talk to them they'll say, "I'm not going to college. It doesn't matter whether I know how to use this computer. I don't need this to get by. I can write everything out. My plan is to go and get married and work at Sonic and ... so why do I need this?"

A teacher told me of an instance in which a student, who did not want to use computers, was called into a meeting with his parents and a principal. At the meeting, the principal asked the student, *"Is there anything we can do? What's the problem?"* This incident demonstrated the assumptions that technology was to be greatly valued and everyone should have a desire to become a technology user.

Summary: The Look of Implementation

The written technology curriculum at High Plains Public Schools documented an extensive list of requirements for educational technology use by students. These requirements reflect corporate influences on assumptions about the purpose of school: developing job skills and preparing students for work in order to meet the demands of an information–based marketplace. Also, a particular hidden curriculum had come about as a consequence of various factors unique to High Plains. This involved exemplary student behavior that I believed resulted from a desire to uphold a model school image.

Ironically, the implementation of technology does not seem to have been able to change the structure and feel of the organization. Despite the availability of a variety of educational technologies at High Plains, the Internet had become the most commonly used in the general curriculum. I concluded that use of the Internet was related to the characteristics of the Internet as a particular technology and to characteristics of the teaching field. The value of the Internet in the classroom may be its multiple access

points and pathways to information which can provide for more student-centered learning (Landow, 1997; Yeaman, et al., 1996; Hlynka & Yeaman, 1992). However, use of the Internet may feel less threatening to teachers since it is so similar to the use of the physical library. Thus, using the Internet allowed teachers to been seen as knowledgeable and to meet the explicitly stated expectation that they would integrate technology into their classes, while it required little extra time and little change in their own behavior.

I would suggest that all students should be strongly encouraged to critique the information accessed through the Internet as did the Native American studies class. Also, technology itself should become a topic of investigation and the entire educational community should enter into discussions of the meanings constructed by those who employ technology in education at High Plains. Furthermore, I would propose that discussions about the use of technology could be guided by considerations of the purposes of education and by theories of learning rather than only by issues related to the production of skilled workers (Apple, 1986; Bowers, 1993; Koetting, 1983, 1994).

Prevailing Discourse

> We come to know and understand the world and our position in it through the representations, the stories, we have at hand. The stories we read, hear, and see define who we are by the nature of the discourse employed. If those representations appear to be natural, like the language we use, they also appear to be objective and neutral, free of human intervention. (Muffoletto, 1996, p. 267)

This section will seek to demonstrate how communication of expectations for behavior shaped the adoption and implementation of educational technology at High

Plains. Originating with the administration, as well as with forces within education and the larger society, this discourse, or pattern of communication, came to define the members of this educational community as technology users. This discussion will include examinations of the particular language used, public recognition of those who used technology, marginalization of dissenters, and the shape of particular social practices (i.e., purchasing, hiring, and providing technical support). I will also describe the responses of teachers to these expectations for behavior, including how teachers came to participate in the social practices promoting technology, and how such expectations play out within the organizational structure of the school.

These discussions also form my argument for characterizing High Plains as exhibiting Roszak's (1996) "compulsory enthusiasm" for educational technology (p. 12). The unquestioning approval of technology by students, as well as faculty and administration would seem to exemplify the mindset feared by those whose writings seek to warn us of the inherent biases of technology (Bowers, 1988; Feenberg, 1991; Postman, 1992; Sloan, 1985). The cultural bias that frames new technologies as always progressive and positive prohibits any skepticism which might result in the investigation of these innovations for consequences that may prove damaging to communities, to cultures, or to the environment (Bowers, 1995, 1998).

Language and Power

As previously mentioned, the hidden curriculum worked to produce in students certain attitudes toward technology, as well as a particular sense of self. However, at the same time that students experienced the hidden curriculum, teachers at High Plains made sense of their experiences in the school in terms of history, power and discourse. For

teachers, the particular history of the school, the formal and informal power configurations within the organization, and the discourse surrounding teachers as they carried out their roles as educators also worked to produce certain attitudes toward technology and a particular sense of self.

Communication of expectations was a significant part of the interactions that took place among participants at High Plains. Sometimes this occurred in the form of direct statements such as teachers being instructed to file their classroom inventories through a computerized form on the network, or the superintendent saying the school was *"going to be a technology-based learning institution from that point on."* At other times expectations were communicated through attitudes and assumptions. For example, on my first visit to the school, the principal said he would email the teachers a notice that I was in the building and might drop by on their planning periods. He assumed teachers would use technology to check their email during the school day and would not be surprised by my appearance.

Setting and communicating expectations can be carried out in ways that seem acceptable and non-threatening, even positive. However, Foucault interpreted all such behaviors as acts of power that categorized people into normal and abnormal, those who met expectations and those who did not (Bryson & de Castell, 1998; Smart, 1985). The discourse carrying these expectations was the means by which such norms were communicated. It is to the particular language involved in this discourse that I now turn for an analysis of what High Plains was about.

The language used by the administration to discuss and describe the nature and purpose of schools and teaching at High Plains was that of effectiveness, efficiency, and control:

- *"Eligibility lists, grades, everything is done electronically on a computer and it makes us much more efficient that way."*
- *"I think [they] are probably more productive because they're.. they know how to utilize it as a tool."*
- *"We've got some teachers that are 4 or 5 years behind, but, you know, they're getting.. they're headed in the right direction."*
- *"We've got people now that are more aggressive and.. adapt better to the technology."*
- *"When they leave High Plains they have more experience with computers than probably any other kids in the state. And they're ready. A lot of our kids can leave here can go directly into the workforce."*

For teachers, this language normalized the policies and expectations for the use of educational technology, including the idea that schools exist primarily to prepare students for work. During the interviews, more than two thirds of the teachers brought up the issue of students needing or benefiting from job skills. This included the computer teacher, whose program was designed to use the same programs used in industry. For many of the teachers, increasing students' marketability was the sole rationale for educational technology.

Teachers were also subject to expectations arising from sources other than the administration. One source was the constant stream of visitors who expected to see the

teachers using technology and being able and eager to discuss its use. Another source was the students. The following exchange illustrates students' expectations of teachers. While interviewing a student

> I asked: *What do students think about teachers who haven't learned the technology?*
>
> Student answered: *[We had a] student teacher...He didn't know anything about it... So, none of his kids... they are not taking him serious* [sic] *because he don't* [sic] *know what he's doing.*
>
> I asked: *So they.. kinda look down on him?*
>
> Student answered: *Yeah. Yeah, they do really.*
>
> I asked: *I wonder if that makes it harder for him to learn.. or maybe it makes him want to learn more?*
>
> Student answered: *It's kinda pushed him. Yeah, he's starting to take night classes, I think, on computers to learn how. And he is going to take these summer classes that they have at school. But I don't know.. They just don't take him serious.* [sic]

Students assumed their teachers would be knowledgeable about computer use and they expressed this by adopting an attitude of lack of regard for a teacher who did not meet their expectations. In effect, this gave students a form of power over the teachers, especially in those situations where students were truly expert at using computers or teachers were particularly lacking in computer knowledge.

Another significant source for behavior that promoted computer use was from among the teachers themselves. Teachers often praised technology for helping them become more efficient, while at the same time they bemoaned the time required to hone

their skills or become proficient with newly updated programs. When asked the difference between teachers who used technology and those who did not, no one expressed approval of those teachers who were or had been "unwilling to change" or for their reasons for refusing to use technology.

Silencing

"Postmodernism holds that dominant groups have controlled not only access to knowledge, but the standards by which knowledge is judged valuable and legitimate" (deMarrais & LeCompte, 1999, p. 35). In considering Foucault's examination of social practice as discourse, we must question who controls the discourse, who is authorized to speak and who is not authorized (Cherryholmes, 1988; Smart, 1985; Yeaman, 1994a). The silenced are those who are not allowed to contribute to the discourse because they voice resistance. They are outside the mainstream, marginalized or ignored (Ellsworth, 1989; Lather, 1991; Pinar, et al., 1995).

There were several teachers at High Plains whose actions suggested that they did not want to use technology. They rarely used it themselves, and permitted, but did not require their students to use computers. However, most of those same teachers spoke as if they supported the use of technology. One of those who rarely used technology couched her opinion in a positive manner as she explained, "*I try to point out that there is still book.. you know, knowledge to be received from books and each other and, you know, other areas.*" The mechanism of such silencing is alluded to in the following dialog with an administrator.

> I asked: *What makes one teacher fight through the difficulties [of learning technology] where another gives up?*

He answered: *..Well, it's uh.. kind of a known fact now, that if you are a teacher who can't use it you won't be teaching here very long. That's..*

I prompted: *Fear?*

He answered: *Fear. (laughing) Fear makes you do a lot of things. Now we don't have a teacher on staff here or when I first came that refused to do it and was released because they were not progressing toward that. We didn't have a teacher say, "I'm not going to do it, I'm not going to do it. I won't do it.".. and then leave. We've had teachers to leave but whether that was.. [that] they left because they didn't want to do it; they didn't share that with us.... So, fear might be the word. That might be the term we're looking for. (laughing)*

Those who resisted educational technology at High Plains were categorized and understood as having problems that required solutions; students needed to be shown the value of computers to their futures, and teachers needed to be educated to the value of technology for their students or in how to operate the technology. One of the most telling comments—from a teacher who claimed that she objected so strongly to having to use technology in the classroom that she had retired early—was *"he [the superintendent] wouldn't like you talking to me."*

Other Social Practices

Other discursive and non-discursive practices defined teachers and students as users of technology as well, and thereby helped eliminate the possibility of avoiding technology use. These practices included the message engendered by the presence of the computers themselves (powerful symbols in our society). As Turkle (1984) maintained, "The machine is presented as a way of asserting status, a way of saying that this is

someone who has not been left behind" (p. 184). Some teachers reacted to the excitement of computers, as well as to their perceived desirability. One explained,

> *You even look at [the technical support staff] and you're threatened by them.. or you look at them and you're like "Man, do they know some serious stuff!" And, so, as you know, as people who get into it.. they're looking either to.. either just to be up to snuff or to enjoy the opportunity we have. Or it might be in vain* [sic] *in terms of, "I want to be bigger, badder than anybody else!"*

The terminology of "bigger, badder" seemed to reflect a particularly masculinist view of technology. Another teacher observed,

> *If we have it, it would be a crime if there was a teacher in this school that didn't make use of this in the best way it could be made use of. It would be unfair to all of the teachers out there in the world that would LOVE to have it. It would be unfair for me to have it and to ignore it.*

On one of my visits I noticed a new bulletin board display that a teacher had placed in one of the main hallways. It had no caption, just a random design composed of the names of every educational computer technology the district had access to or owned. It appeared that the district's educational technologies seemed significant enough, in and of themselves, to be deserving of a striking display which needed no caption or explanation, and which elicited no questioning comments from observers. This silent exhibit spoke eloquently of the power of educational technology within the accepted norms and customary ways of thinking of those at High Plains. It spoke of an attitude of acquisition, and not an attitude of questioning, "For what purpose?"

Discourse of this nature conveyed the importance of technology and was a nearly constant feature of everyday life at High Plains. Such discourse also involved public recognition of those who used technology, marginalization of dissenters, and the shape of particular social practices (such as purchasing, hiring, and providing technical support). I will discuss each of these more fully in the following sections.

Recognition

As previously mentioned, the image of the model school was actively cultivated at High Plains. Those teachers and students who were most involved in the use of technology were continually asked to display their expertise. Teachers were accustomed to visitors in their classrooms, and the school has held whole-school assemblies for students' technology presentations. The District Information and Communication Plan stated:

> *As a result of the technology professional development, several High Plains teachers have presented technology sessions at national and state conferences. ...The district has and will continue to place into the school budget money for technology and technology training, which includes money for travel to technology conferences and teacher incentives for technology presentations at conferences.*

Teachers' views on promoting High Plains as a model included such understandings as the following:

> *We give a lot of ideas.. where other schools are just starting out.. because we have gone through a lot of doors and a lot of windows that other people are just now getting to. So,...even though not everybody is going to be able to look at us*

and say, "OK. We're going to be able to do exactly what it is they are doing.." Half the problem I think, most of the time is just knowing where to start and what to do next.

Their reputations as leaders in technology, along with expectations from administrators who had invested large sums in equipment and who also had a stake in upholding the image of model school for technology, worked to create pressure for teachers to adopt the use of technology.

Holloway (1996) stated that unlike the commercial sector, "The profit for schools in acquiring technology is not monetary. It is more likely...increased status and reputation, sometimes feeling modern" (p. 1109). I hold this applies to teachers and students as well. The recognition bestowed upon the district for its ownership of significant amounts of educational technology profited the school through increased status and reputation. At the same time, and in the same way, those who displayed their accomplishments with computer technology profited through increased status and reputation both in the school and in the broader community. They were accorded approval and the privilege of travel by the administration, and respect by their peers.

Purchasing Practices

Often it seemed that purchasing decisions received more time and consideration than the pedagogical decisions regarding why a certain technology should or should not be used in classrooms. Perhaps the general mindset at High Plains, and in society at large, that held that the use of advanced educational technology represented progress, made such decisions of pedagogy seem unnecessary. The administration made it clear that it considered the use of technology to be what was in the best interest of the students. And

it seemed to use technology expenditures as a way to focus on the school's vision of making students technology literate.

District purchasing decisions often seemed to spring from what new technology might be available for instructional use. A teacher confided that she knew a suggestion to purchase a certain software package would immediately pique the interest of the administration and would be received well because it was technological. Another noted that the administration was

> *always trying to bring our kids the latest things so that they are on top of the.. the world. And we talk about the business world and the market.. the job market out there and what they need to know to be marketable... But they are always searching for them and looking and bringing to us.*

Illustrating this intention, the district participated in several pilot programs with educational technology companies. Of course, this also fit well with the image of model school for technology.

However, several teachers complained that there was too much technology available at High Plains. There was just not enough time for teachers to become proficient with every program. Administrators also recognized that problem. One admitted

> *The school puts a lot of pressure on teachers. We have so many different programs, so much technology... too much technology. Teachers are forced to learn 3 or 4 or 5 different things, barely learning each one of them. Where if we focused on one or two, we'd be a lot better off.*

This seemed to me to be an accurate assessment. A comment that was made more than once at High Plains was, *"You are going to make mistakes with technology. We try to make all the mistakes we can so that we can get past them and go on."* However, continually trying new things can interfere with identifying and getting the most out of those programs that are beneficial. Even though this district provided teachers with more support and training than most, to become comfortable with several programs, an individual teacher needed to spend an additional few hours of personal time each week. And because of updates and new acquisitions, this was a seemingly unending commitment.

Technical Support

The provision of technical support for equipment and for training has been shown to be one of the most important factors in encouraging teachers to learn and integrate the use of technology (Trotter, 1999). To provide training for a teaching staff of 23, and to maintain hardware and software, the district provided two full-time directors and two part time helpers. One of the helpers was in charge of maintenance and training for district administrative software. Part of the responsibilities of the support personnel was to help ensure the use of technology, as was conveyed by this observation: *"We know who the ones that are hesitant and we make sure we take care of them first try to raise that comfort zone and help that integration become easier for them."*

A part-time support technician described a project:

to correlate the [state] objectives with our Jostens program, [and] with our Lightspan program. To make sure our technology was supporting the [state] objectives. And if a teacher didn't know how to integrate technology with a

certain skill, we have a book that I put together...that says, "Ok, if you have to do alphabetizing, this CD will do it for you on Lightspan, that you can send home. And these programs will do it for you on Jostens."

Although the example used was related to elementary grades, this story illustrates the type of efforts made to assist the district's teachers in their use of technology.

The district also published, on the school's Internet web site, an Information and Communication Plan that set out the intentions and deliberations of a committee charged with directing the uses and purposes for technology. This thirty-five page document (portions of which are included as Appendix D) consisted of: the district's Vision Statement; Philosophy; Technology Goals for faculty, students, and the district (that spelled out the student skills and software programs expected at every grade level); a training plan; a Future Development of Technologies plan; a plan for evaluation; Internet Use Agreement; and a Teacher (technology) Competency self-survey. The document stated that the district would help prepare teachers *"to provide students instruction for and opportunities to use various resources available as applicable to content area curriculum."* The goals for the district were as follows:

1. *Provide effective technology that supports learning and teaching.*
2. *Provide all students instruction in the use of productivity software* [i.e., word processing].
3. *Provide up-to-date technology, training, and support management communication, and management of teaching/learning applications.*

When considering that most schools can ill afford any technical support personnel, and rarely hold technology training sessions for teachers, it seems evident that

High Plains was committed to encouraging teachers to adopt and integrate technology. Part of this commitment consisted of a curriculum for teachers.

Curriculum for Teachers

With the continual advancement in computer technology, being a model school meant maintaining the image of a school that has state-of-the-art technology. This was dependent on continually upgrading expensive equipment and continually training the staff and students in how to use newly acquired technology. This was accomplished by providing teachers what was in effect a curriculum of their own through mandatory staff development. The district's Information and Communication Plan stated that goals for the faculty were as follows:

1. *Teachers will comprehend, accept, and evolve into the role of an educational facilitator.*
2. *Educational facilitators will master the use of information and communication technologies in order to create an environment where students become active, self-directed, life-long learners.*
3. *Provide a guideline for the purchase and adoption of new technologies.*
4. *Support the achievement of the Districts mission, goals, and strategies.*

High Plains Public Schools were deregulated by the State Department of Education in order to rearrange the school schedule so that students attended 4 ½ days per week. This allowed the district to provide staff development which most often took the form of direct instruction in the use of specific software for the entire faculty every Friday afternoon. Teachers signed attendance sheets at the official Friday afternoon sessions, although sometimes teachers missed the training because of sponsoring field

trips, or, as I observed, participating in an impromptu, small-group session on the use of a technology in which they had a particular interest. The staff development session that I attended focused on acquainting teachers with changes made to the district's homepage and with the forms on which they were to input their classroom inventory information.

Additionally, other training opportunities were provided such as the following. The summer prior to my research, all K-12 core teachers had been sent at district expense to Arizona for two weeks to attend a workshop to learn about a new Internet and satellite video curriculum adopted by the district. This group was to help train the few non-core teachers who had not been expected to go to Arizona.

However, reports show that training classes themselves are insufficient for ensuring technology use (Trotter, 1999). Therefore, at High Plains, rather than assuming that once teachers had been taught how to use technology they would do so, the integration of technology into lesson plans was discussed, demonstrated, and modeled by the training staff and by guest speakers, such as nationally known Alan November. The extent of the training itself, and the conspicuous official support for technology, again constituted a discourse that normalized the use of educational technology and defined non-users as refusers.

Hiring Practices

Technology and its use had increased in importance with regard to the choice of new teachers for High Plains. Prospective teachers were asked not only what experience they might have with educational technology, but also whether or not they would *"be willing to, you know, come in a week or two before they're employed to get used.. to learn a few of these programs."* However, the superintendent said of most teachers with

even 5 years classroom experience without computers, *"when you bring them into the technology environment they still feel safety and security in their past experience."* Therefore he had made the decision to hire first year teachers, those without classroom experience. He explained,

> *The reason I went with first year teachers is because they are coming out of college and I hired people that were.. would have had some technology experience. But I hired people that were aggressive, highly motivated, that were willing to step in to this environment and would be willing to learn it quickly.*

This view of beginning teachers seemed to be based, in part, on the premise that learning to teach results from socialization into the status quo (Britzman & Greene, 1991). Those teachers whose understanding of teaching had not yet undergone routinization, when brought into an environment in which the use of technology was not only expected but was the norm, would be more likely to adopt its use themselves. Socialization would likely have resulted from the mentoring of coworkers and from the first year teacher's desire to gain the respect and recognition afforded to those who projected the image of leaders in technology use.

The superintendent's view of first year teachers also recognizes to some extent, the difficulty of becoming proficient with educational technology and values the determination of those who are willing to commit to gaining skills and experience in its use. The resolution to develop a faculty composed of teachers who *"will master the use of information and communication technologies,"* at the risk of *"a lot of them mak[ing] first year mistakes,"* sends a strong message to those teachers who are not already *"on*

board with technology." It tells them that they are less valued. Again, a non-discursive practice conveyed expectations and in a sense, defined the normal and abnormal.

Teacher Responses

Meeting Expectations

At the time of this study, in the eighth year of technology use at High Plains, 7 of the 21 teachers interviewed at the secondary school had taught there at the time technology was introduced (8 years or longer). Most of these teachers had accommodated themselves to the expectations of teaching in a model school for technology. Toward the end of my research, in an impromptu visit, one of them admitted,

> *I'm probably not a really good person to ask because I usually just accept things and go on so...I would just know that that is the way it was and use it. So, you've asked me more thought-provoking questions than I've ever run across.*

Another replied when interviewed,

> *We are expected, I think, to produce and perform more than other schools, and teachers. We're expected to promote High Plains and umm.. I think that's been beneficial because you can become too comfortable. Change is a part, and you expect it to be a part of this.. job here.*

A third reported she felt she had to use the technology that was provided, as another measure that she was accomplishing the schools' goals.

Regarding the pressures some teachers felt to adopt the use of technology one responded, *"technology was so foreign to them, that it was scary to think that you had to do this. And that maybe your job depended on you getting on board and doing what you're.. with this technology thing."* This seemed to be a common understanding even

though a teacher was considered a career teacher by the state after teaching in a district for more than three years. Being a career teacher was similar to having tenure and meant that those teachers could not be terminated for refusing to use technology. This in effect allowed teachers some leeway to resist the various pressures to adopt the use of technology. However, the legality of not being subject to termination did not protect those teachers from the pressure to comply nor from the discourse, at High Plains and in the educational community in general, that constituted them as refusers. As Hodas (1993) claimed

> The pressure towards competence and the acquisition of new skills, which is generally not a feature of school culture or the employment contracts under which teachers work, will be strong. It will come from unexpected directions: from below (from the 'tools' themselves) and from within, as teachers struggle to retain mastery over their students. (p. 16)

Satisficing

Teachers commonly spoke of the necessity for technology competency for students (a philosophy spelled out in the school's Vision Statement, see Appendix E), while some still seemed to covertly refuse technology use for themselves. Some of these teachers required students to use computers in their classes but chose forms of use, such as Internet research, that did not require much teacher participation. These teachers came to project an image of the acceptance of technology, or as Hodas (1993) put it, "a trial-and-error rummaging through Standard Operating Procedures to secure a satisficing response" (p. 3). Satisficing, in the sense of "satisfying" and "sufficing," or giving the appearance of compliance, relieved the pressure to change by finding a way to deflect it.

It was a coping mechanism that was commonly known but not often openly acknowledged. A new teacher volunteered, *"There is considerable resistance from teachers who have been at the school for some time against using technology. Some don't use it much."*

While I was getting acquainted around the school early in the research, a teacher who had taught there several years disclosed to me that her classes didn't really use technology. Her classroom was one of two that each had a teacher workstation but no student workstations. (When I asked the technology support personnel about this, I was told that teachers had to request that computers for students be placed in their rooms because locating equipment in places where it would not be used was a waste of time and funds.) Several weeks later in an interview, although she talked about students needing technology *"to get them ready for the real world,"* this teacher asserted

> *I felt like when I came here that.. I felt very inferior because I thought I was the only one who didn't know anything, but I found out that a lot of them were still resisting it.. that had been here a long time. So, I think it's all in your attitude and whether you want to learn it, whether you see that it's going to make your life easier or better or.. in education to know the latest things, to see the newest thing.... I think a lot of it that I'm exposed to, I haven't used yet because I haven't taken the time to.. play with it like you have to and to really use it.*

This appearance of compliance was actually sufficient for the school's purposes since it 1) verbally supported the model school image and 2) satisfied the rules and procedures, while it mitigated the threat to the teacher's self-definition and self-respect (Cuban, 1997; Hodas, 1993; Kerr, 1996b).

That all teachers do not spend the significant amounts of time and energy required to learn and to implement new technologies has long been considered a problem. Most researchers have "blame[d] the stubborn backwardness of teachers or the inflexibility and insularity of school culture" (Hodas, 1993, p. 12). However, technology's promise of improved teaching has implied a direct criticism of teachers' work, and some researchers have recently proposed that teachers may have many valid reasons to resist. These include 1) challenges to traditional classroom authority, prestige, and ways of working and relating to others, 2) contradictory advice from experts, and 3) unreliable and intractable technologies (Cuban, 1999; Hodas, 1993; Meyrowitz, 1996).

The teacher whose ways of teaching have been dependent on the prestige and authority accorded teachers in the past, is often reluctant to employ the more constructivist ways of teaching that may be advocated by those promoting the use of technology. At High Plains, that teacher may find herself in a double bind. Her sense of herself as a teacher may be threatened because to be a co-learner or facilitator of technology, means that she is no longer seen as the sole competent authority and no longer retains power and control in the classroom (Cuban, 1983; Kerr, 1989). However, it is exactly this role of educational facilitator, master of information and communication technologies, that is specified in the Information and Communication Plan for faculty. Additionally, it appears that students at High Plains regard a teacher less highly if she is not competent with technology, and furthermore, the prevailing discourse of the both the local and broader educational communities constitute her as a refuser, resisting the progress afforded by technology.

Cuban's (1999) second reason for teacher resistance to technology involved teachers receiving contradictory advice from experts. At High Plains this seems, for the most part, to come in the form of too much technology. Teachers are bombarded with training by technical support personnel charged with seeing to it that teachers are trained in the use of all technologies held by the district and constrained by the expectations of administrators who hope to see their acquisitions put to use.

As to Cuban's (1999) third reason for resistance, the unreliability and intractability of technology can be said to be inherent in much of today's state of the art technology despite the best efforts of the technical support personnel. At High Plains, for example, the computer teacher reported the system email was not working for several weeks during the school year in which this study took place. Such problems might reasonably be expected to be common when dealing with pilot projects as High Plains does.

Schools as Organizations

Public schools have traditionally been organized as bureaucracies to help to ensure that policies were implemented and accountability was guaranteed. The bureaucracy also provided a hierarchy of power that determined relationships among groups (Hodas, 1993; Kerr, 1996b). Educational technology has been said to promote a changed relationship among learners, faculty, and their institutions, moving from the traditional teacher-centered, whole group instruction format to a student-centered, teacher-as-coach relationship (Carnegie Mellon University, 1994; Cuban, 1983; Duffy & Jonassen, 1991; Meyrowitz, 1996; Plater, 1995). From an organizational standpoint, this

change could work to loosen the bureaucratic structure and could be seen as a disruption of the norm (Hodas, 1993; Kerr, 1996b; Meyrowitz, 1996).

This possible threat to the organization of changing the relationship between students and teachers, and thus by necessity between teachers and administration, would appear to have been forestalled at High Plains. I propose this was accomplished by increasing control of the behavior of students (and teachers) through "the panoptic impulse of surveillance" (Couture and Dobson, 1997, p. 32), (such as using technology to electronically monitor email and Internet use), and through stricter discipline, in part to present the model school image to visitors.

At first glance this may appear to be a very negative assessment. However, a history that has included dissention in community relations and poor student achievement levels makes this particular consolidation of power actually serve as a positive influence in the community of High Plains. It may be seen as a response to pressure from outside the school (from the state and from public opinion) and as such, a move toward stability and equity.

Just as a bureaucracy is in a sense a technology (an organized, rational means for accomplishing a task), schools can be thought of as a technology. Hodas (1993) claimed,

> When schools are called upon to perform more "efficiently," to maximize outputs of whatever type (high school or college graduates, skilled workers, patriotic citizens, public support for education and educators) from a given set of inputs (money, students, staff, legal mandates, public confidence), it is their capacity to act as technologies, as rational institutions, that is being called upon. (p. 2)

In this case, one more understanding of educational technology at High Plains is as the rational, problem-solving response to demands for improved student performance—applying a scientifically arrived at solution, such as the use of computers, to the educational process (Cuban, 1997). However, it is just this understanding of the use of technology that researchers have been unable to satisfactorily explain through quantitative, rational, ordered and controlled studies.

Summary: Prevailing Discourse

The communication of expectations for behavior shaped the adoption and implementation of educational technology at High Plains and defined the members of this educational community as leaders in technology use. The language used to describe the nature and purpose of schools and teaching at High Plains was that of effectiveness, efficiency, and control, and thereby, normalized the use of educational technology. Those who voiced resistance were labeled as refusers, while those who met expectations about technology use received public recognition and validation through purchasing decisions and technical support. Teachers commonly spoke of the necessity for technology competency although some still seemed to covertly refuse technology use and to project an image of the acceptance of technology, a satisficing response (Hodas, 1993).

It is characteristic of our rational, scientifically oriented society that many people viewing High Plains from within and from without, assume that the technological solution of implementing educational technology has been responsible for any improvement in student achievement. Such would indicate that it is still the case that

> In the American mind, technology seems to be linked with notions of efficiency and progress; it is a distinguishing and preeminent value, a characteristic of the

way Americans perceive the world in general, and the possible avenues for resolving social problems in particular. (Kerr, 1996b, p. 143)

This perspective defines the problem in such a way that it narrowly focuses on the mechanisms of student learning, rather than including the examination of the social meanings of technology use such as attitudes and opinions of teachers, students, and others. The perception that technology *"has made teachers more efficient"* constitutes one more way of promoting "compulsory enthusiasm" for educational technology both at High Plains and around the country. Again, the prevailing discourse, in this case the valuing of science and technological solutions employed in a metaphor of organization and production, has shaped a reality—another story to be told about High Plains.

No One True Story

There is no one of these interpretations of High Plains that is the true story, nor do they exhaust all the possible viewpoints. But through the various perspectives we can begin to gain understanding. Postmodernism/poststructuralism would posit that there is no metanarrative of the goodness of educational technology—not even a neutrality to be claimed. Bryson and de Castell (1998) "argue that it is principally the interpretive constraints imposed by these stories, and only secondarily the material capacities and constraints of the technology itself, which differently construct possibilities for pedagogic relations among students, teachers, and educational technologies" (p. 68).

Since all meaning is socially constructed, we must examine all the social practices, institutional policies, and the social interactions that take place among the members of the school community. There are always trade-offs, discontinuities, and

competing and conflicting stories (deMarrais & LeCompte, 1999; Lather, 1991). Revealing these contradictions, and particularly the social inequalities, is a major premise of critical theory—that is, to make problematic those things that are taken for granted in a culture, such as in the culture of educational technologists and other educators involved in the introduction of educational technology into schools (Lather, 1991; Nichols & Allen-Brown, 1996).

CHAPTER SIX:

SUMMARY, CONCLUSIONS, LIMITATIONS, AND SUGGESTIONS FOR PRACTICE AND FURTHER RESEARCH

This chapter provides the opportunity for asking and answering what this research is all about and whether it is meaningful. I seek to acknowledge the strengths of the work, as well as the possibilities and questions unearthed but not addressed by the study. However, at the same time, limitless multiple perspectives, the ironies and contradictions in the data, and the role my understanding plays in framing the data, lead to continual rethinking the implications. Consequently, this last chapter is a recognition that reality is of a complex and contradictory nature and that we have the capacity to know and tell only a part of it.

After presenting a summary of the study, I discuss the limitations in this work. Next, I offer conclusions that I have drawn from the study. Finally, I present some suggestions for practice and for further research within this area of study.

Summary

Introduction

The discourses underpinning the introduction of computer technology in schools have been framed by tangled historical, social, and economic forces of corporate involvement, government actions and rhetoric, and public demands. This study attempted

to explore how teachers and students negotiate meaning about themselves, school and their world in an environment that emphasizes the use of technology. This study also sought to make known attitudes and assumptions about the use of computers in school, and identified and discussed the prevailing discourse that operated within an educational environment in which technology is upheld as essential to preparing students for work and successful living in the 21st century.

Surrounding Discussions of Educational Technology

Prevailing discourses, which demand school use of technology to prepare students for entering a transformed workplace, can work to produce a shift in the roles of teachers, calling for them to become facilitators of student learning and to work through less directive, more collaborative means (Kent & McNergney, 1998; Plater, 1995). This revised role for teachers represents a formula for school reform that discounts the reality of the school as an organization that not only is bound by its bureaucratic structure and by historical conditions, but is one that also must respond to problems and demands of teachers, students, parents, employers, and politicians, all of whom may have different visions of the purpose of schools (Hodas, 1993; Kerr, 1996b). The prevailing discourses surrounding educational technology shape the possibilities for how technology is used, as well as situate educators, students, and schools within the language and normative practices of social regulation.

Little research has been carried out investigating how students and teachers make sense of technology in their everyday lives at school (Kerr, 1996a; Nichols & Allen-Brown, 1996). The works of a few sociologists and researchers operating from a critical theory and postmodern/poststructural perspective, provide insights into the disparities,

complexities, and contradictions involved in the implementation of technology, as well as to issues relating to race, class and gender (Bryson and de Castell, 1998). These studies have called attention to the multiplicity of power relations among administration, faculty, students, and the community, and each can aid in understanding the complex and contradictory nature of integrating technology into the organizational structure of schools (Bromley, 1998). However, almost none of this sociological or critical postmodern/poststructural research has been based on empirical studies in schools (Nichols & Allen-Brown).

Methods and Theoretical Framework

This research consisted of a 1998 five-month qualitative case study that examined class instruction, assignments, pages from the school's Internet web site showing students' published works and teachers' curricular materials, interviews and informal interactions between and among faculty and students seeking to understand how they viewed technology and school in general. I employ a theoretical and methodological framework that operates at the intersection of critical theory and postmodern/poststructural thought. Educational technology, even in a model school, is a single strand in the fabric of schooling, fabric that is woven from classroom processes, curricular texts, politics, community history, economics, and more. As such, it takes its shape and purpose from "the dense interconnections among various actors and processes" (Nespor, 1997, p. xi). Making use of both critical and postmodern/poststructural theoretical lenses allows me to make sense of the complex and contradictory realities of schooling in a technologically enriched school environment (Kincheloe & McLaren, 1994; Lather, 1991; Wexler, 1987, 1992). Cherryholmes (1988) gives several strategies

for a critical postmodern/poststructural investigation. These strategies include relating historical circumstances and political practices to current conditions, determining who benefits from the particular power arrangements, providing a close reading and analysis of the data, delineating dominant and valued categories, developing alternative interpretations, and determining the broader setting of a specific curricular design. In this study, I have employed each of these strategies in my attempt to understand technology at High Plains.

By foregrounding issues often overlooked in favor of the now omnipresent discussion of the benefits of educational technology for students and teachers in schools, I examine how teachers and students negotiate meaning about themselves, school and their everyday lives. Since I necessarily bring my own predispositions, experiences and theoretical orientations to the conceptualizing and carrying out of the research, this approach demands that I include my position as a White, middle-class female researcher involved in daily use of computers with students and teachers in public schools (Lather, 1991).

Background of the Study

The very small, rural district of High Plains is exceptionally well funded though it has one of the lowest income school populations in the state. In 1987 the schools were placed on the state's low-performing list, which meant that the student average score was in the first quartile of the range for the state on the Iowa Test of Basic Skills (ITBS). In 1990, one year after taking his position, the superintendent began promoting the use of educational technology (used here to mean computers and computer-based technology) as a solution to the problem of low student achievement. Having access to an unusually

generous budget, he introduced computer technology at High Plains as a way to facilitate the individualization of instruction and to focus attention on providing the best possible opportunities for students. This was a first step in what became a redefinition of the school and its inhabitants as leaders in the use of technology.

Few students or teachers in the United States have access to the amount and variety of educational technology to be found at High Plains Public Schools. What does it mean for students and teachers to learn and work in an environment that emphasizes the use of educational technology? If curriculum is interpreted broadly to include "all of the experiences, planned and unplanned, that occur under the auspices of the school" (Jackson, 1992, p. 8), then how does technology use interact with curriculum and the role of schooling in the lives of the inhabitants of High Plains Public Schools?

Significance of Place

Historical, political, economic and cultural circumstances interacted at High Plains to help create its reputation as a model school, which may have been the first time this area has been presented in a positive light. High Plains found that, as a model school for technology, they had become very high profile as other schools sought information about how to emulate their accomplishments. Concurrent with helping others, advantages accrued to the High Plains district and to its students because experience with technology was viewed as a valuable asset. Recognition from other school districts helped confer a reputation, a sort of power that allowed the creation of a new image for High Plains and its students and teachers.

Teachers and students came to exhibit a particular sense of self, to see themselves as members of a special community of leaders in educational technology. This view of

themselves appeared to carry over into students' conduct, academic performance and career goals. Thus characteristics of the specific place of High Plains (i.e., isolation, socioeconomic status, and school funding) interact with how students and teachers think of themselves. As described by both students and teachers, High Plains had become the central "place" in their world, a place that gave meaning to their lives—it was one way they understood who they were. Computers were the most prominent features of that "landscape."

Everyone that I talked to at High Plains schools indicated that they thought proficiency in the use of technology was an essential step in preparation for the future. However, despite a widely discussed concern for equity and a consensus that there was little or no difference in student use of educational technology, circumstances that I observed indicated some inequities in results if not in intentions. It would seem that even in a place that has emphasized educational technology to such a degree for all students, intentions to ensure equity have not outweighed dominant ideology which creates "socialization patterns that lead to different and unequal expectations for males and females in this society" (deMarrais & LeCompte, 1999, p. 290). Similarly, there were discrepancies in Native Americans' use of technology in which some (special education students) were underserved while others (the Native American studies class) employed technology in more culturally significant ways.

Curriculum Configuration

Though district goals emphasized the need for students to process and evaluate information through advanced technology, much of the use of computers in the classroom was merely related to accessing information. Such conflicts and contradictions between

the written curriculum and how curriculum played out in classrooms included a predominance of use of the Internet over other forms of educational technology. I contend that this was a consequence of issues relating to the bureaucratic organizational structure of schools and to the nature of teaching. As a technology, the Internet was relatively easy for students to use, maintained respect for the role of teacher, and did not threaten the existing principles and order of schools, such as hierarchy of authority and the transmission of the norms and values of the dominant society (Cuban, 1983; Hodas, 1993; Kent & McNergney, 1999; Kerr, 1991). Thus, assigning reports using the Internet allowed teachers to been seen as knowledgeable and to meet the explicitly stated expectation that they would integrate technology into their classes, while it required little extra time and little change in their own behavior.

The hidden curriculum in operation at High Plains worked to produce exemplary student behavior that I came to believe was related to expectations that, at least partially, stemmed from a desire to have the proper model student image projected to the constant stream of visitors. Also, students and teachers had become so aware of the importance of educational technology to High Plains that it assumed a larger-than-life dimension. The school's emphasis—including its willingness to spend large amounts of money on technology, as well as society's approval of technology, had together produced a discourse that ensured that most students unquestioningly assumed technology meant progress and that its effects were unequivocally positive.

Prevailing Discourse

I also explored how teachers and teaching are situated within the prevailing discourse surrounding the use of educational technology at this school. Like students,

teachers come to understand the world and themselves through expectations conveyed through language and social practices. The social practices related to educational technology at High Plains included public recognition of those who used technology, marginalization of dissenters, and the shape of particular social practices (i.e., purchasing, hiring, and providing technical support, and a technology curriculum for teachers). By relating the responses of teachers to expectations for behavior, and how such expectations play out within the organizational structure of the school I characterize High Plains as exhibiting Roszak's (1996) "compulsory enthusiasm" for educational technology (p. 12).

Multiple Perspectives

In the process of exploring the meaning of the use of educational technology, all of these issues serve to illustrate ways in which conflicts and contradictions characterize postmodern schooling for students and teachers. Revealing these contradictions and particularly the social inequalities is a major premise of critical theory—that is, to make problematic those things that are taken for granted in a culture, such as in the culture of educational technologists and other educators involved in the introduction of educational technology into schools (Lather, 1991; Nichols & Allen-Brown, 1996). The framework of postmodernist/poststructuralist thought helps illuminate the set of stories about educational computing that formulate the norms for High Plains, stories that set the limits for appropriate use of educational technology.

Conclusions

In this section, I wish to make sense of the study through two broad discussions. The first considers the role of technology at High Plains. In the second part, I address the

theoretical issues that have played an integral part in the analysis and production of this study.

The Role of Technology at High Plains

Despite the discourses promulgated in the literature of enhanced learning and of preparing students for the future,

> What educational technology may be about is the work done in schools: how it is defined, who does it, to what purpose, and how that work connects with the surrounding community....ways in which teachers change their assumptions about what a classroom looks like, feels like, and how students in it interact when technology is added to the mix....it may thus change the distribution of power in that school and thereby alter fundamentally how the school does it work. (Kerr, 1996b, p. 164)

Technology-Driven School

It is Kerr's (1996b) portrayal of what educational technology is about that most resonates with the meaning of educational technology at High Plains. An instrumental view of the use of technology seemed pervasive as the common perception was that all improvements at High Plains were due to technology. Students and faculty often spoke of using the computer as *"a tool, just like a pencil or paper."* However, the use of technology entails acts of power, whether it is marshalling a faculty amenable to major curriculum change or creating a school culture that facilitates students' developing a positive sense of self through pride of belonging.

The question, What does educational technology mean to students in a school that emphasizes educational technology? could be rephrased to ask, What does it mean to be a

student in a school that emphasizes educational technology? The important part then is the "to be." How they understand themselves, who they are, is influenced by their understandings of the use of educational technology because, as with all technology, it allows them to conceive of themselves and the world in new and different ways, as having various new and different characteristics and abilities than were possible before. Because the question is about being, it relates to conceptions of self and how it is that they are who they are. It is also about place and culture because as humans, we are located in a specific time and space and live within a particular society.

The superintendent at High Plains spoke of *"technology driving the curriculum."* I would hold that it did so to a greater extent than was intended by the comment. Not only did teachers feel compelled to implement technology in their curricula. Not only did the students and teachers of High Plains ground their sense of self in their use of technology. But also, the discourse that legitimated such behaviors as particular purchasing and hiring decisions and staff development in technology affected the everyday social practices of schooling at High Plains. This school system, rich with technology, seemed to contradict the idea of technology loosening the bureaucratic structure of schooling that often shapes the dominant modes of instruction (Hodas, 1993). At the same time, teacher use of technology often functioned as a means of satisficing (in the sense of "satisfying" and "sufficing") or giving the appearance of compliance, a coping mechanism that relieved pressure to change by finding a way to deflect it.

Thus, this examination of a model school for technology may serve to remind us that even in model schools there are contradictions and conflicts that may belie outward appearances. It also reminds us that many factors came together to produce the reputation

of model school at High Plains. The uniqueness of the contexts at High Plains, combined with the particular period of intense interest in educational technology from the public and from surrounding educational institutions, would not likely be duplicated in any other location or time.

Technology is not neutral, as evidenced by the extent to which educational technology at High Plains has come to dominate the very idea of school itself. For instance, how significant is it to find that a teacher feels the need to plead for technology to be placed in perspective with regard to students' feelings?

> *We've got the technology. The kids are aware of that. We are aware of that. But, the kids may not want to do technology everyday. They may not want to get on the computer everyday. But if we continue feeding it, feeding it, feeding it, it's just like anything else, if a child doesn't like it... a balloon can only hold so much air. Again, that is giving the opportunity for the students to understand that, 'yes, it is important and it is going to be a part of our life'.... But it shouldn't be mandatory that they have to do it everyday. I don't even like doing something I don't want to do everyday. But how often do we allow our kids to come in and give us feedback on that? I think that is one of the most important issues, that we are going so fast, we are growing so fast with technology, above and beyond what we already have as an advantage....where do our kids fall? What is our real evaluat...that's our real true evaluators right there. That's our kids.*

Multiple Stories/Multiple Definitions of Success

Bryson and de Castell (1998) stated

> This process of recognizing and rewarding only a subset of activities or accounts tells us at the same time both how 'success' is defined and why such definitions are arbitrary. What will count as failure from within a given story tells us, for example, what that story will exclude in terms of the prospective uses of that technology. And, perhaps most importantly, here it is that we see how educational technologies can become "technologies of normalization" and at what educational cost such normalization is achieved. (p. 84)

The various stories told at High Plains demonstrate the multiple definitions of success used to understand how technology operated. Making use of technology to give students employment skills can be an emancipatory activity that fights against oppression and can provide opportunities for social groups to change their status. And students who have attained a certain comfort level with computers will be better equipped to acquire the technology skills they need in the workplace than those who are uncomfortable with computers. However, given the rapidity of technological development, intensive instruction in currently used programs has a useful longevity of a very few years. A curriculum focused on giving students such job skills thus falls into the contradictory space in which it may ultimately serve only to limit students' visions of their possibilities to lower-end and service jobs (as exemplified by the female students I interviewed who were planning for secretarial work). While, at the same time, it may provide "their only opportunity to participate in a technological culture seen as a critically important route to decent jobs and higher education" (Bryson & de Castell, 1998, p. 76).

Other stories at High Plains involved teachers taking leadership roles in integrating technology, as well as teachers who felt unable to accommodate technology in their teaching. These stories helped teachers discern what possibilities were available for educational practice at High Plains. Some teachers saw technology as the wedge that drove them out of the profession. Other teachers viewed the adoption of technology as a means of caring about students. These teachers willingly spent the time and effort to learn and implement technology because they felt it was significantly beneficial to students' overall welfare. This attitude helped define High Plains school as not just a vehicle through which to deliver instruction but as a place where students were nurtured.

Stories characterizing students and teachers as leaders in technology normalized a shared sense of self that 1) defined appropriate attitudes for High Plains inhabitants toward the use of technology, and 2) drew attention away from differences in race and culture as it redefined what it meant to be an inhabitant of the High Plains model school for technology. It is the interplay among sense of place, race and sense of self, and the use of educational technology that appears to be significant in understanding what it means to be educated at High Plains. These are ultimately ideological questions between the position concerned with producing an educated citizenry capable of competing in a global economy and the position concerned with passing on traditions or social values. As such these are questions that cannot be simply answered but must be continually renegotiated by societal interactions.

Theoretical Conclusions

What moral can we derive from this place, from the story of the emphasis on educational technology at High Plains Public Schools?

The following was reported in the March 22, 1999 issue of Forbes:

> Peter Drucker says the U. S. education system is overadministered and undermanaged. Meaning: There are a lot of bureaucrats, but they don't apply sound management techniques to producing the output they are hired to produce....technology just might make schools better at quality control—knowing which instructional techniques work and when (Upbin, 1999, p. 68).

As the clamor becomes more strident from business, government and the public for schools to spend scarce funds on educational technology, educators need new ways to understand what technology can and cannot do for schools, and how technology interacts with curriculum and the nature of educational experience. Such understandings may not often be found through the scientific tradition.

> We can no longer remain ahistorical, detached, impersonal, and 'behaviorly objective.' In the process of exploring meaning and knowledge, we can no longer separate the context of historical events from the autobiographical experiences of teachers and students in postmodern schooling. (Slattery, 1995, p. 66)

Conducting research on the use of computer technology in schools from a postmodern/poststructural perspective in effect enlarges and redefines educational technology from a hardware/software issue, or even an implementation issue. It must be understood as a "way of thinking about education, instruction, curriculum, students, etc., rooted in positivism and science" (Muffoletto, 1996, p. 265). The use of educational technology is a manifestation of a way of thinking—a manifestation of certain values and assumptions about the nature of knowledge, the nature of learning and the learner, and the purposes of education. Originating from the narrowly prescriptive field of

instructional technology, educational technology is necessarily both ideological and political. With its roots deeply embedded in science, itself a search for "the best answer," educational technology has become a systematic approach that generally decontextualizes education. The term "implementation" provides some understanding of the focus of such a system by implying the use of a tool to carry out a presupposed (if somewhat nebulous) plan. The term "integration" of technology also carries some connotation of purposely tying the equipment itself to pedagogy. As Kerr (1996b) maintained, "The values and assumptions of both supporters and critics of technology's use in education bear careful inspection if we are to see clearly the possible place for educational technology" (p. 147).

While educators at High Plains may well be congratulated, they may also be urged to look deeper, understand the historical forces that brought them to this point and to consider the nature of the educational experiences they wish their students to have. For educators from other "places," eager to know more about educational technology, this is an exhortation to them for the need for self-understanding in order that they may conceive of new possibilities rather than assuming ideas and programs can be transplanted, a one-size-fits-all concept. Fragmentation and inattentiveness to social context have hindered theory in educational technology. The concept of place and its corollary, sense of self, may provide the field of educational technology a means by which to focus a conceptual-theoretical framework on the local and concrete. Alternatively, we must historically situate schools as social institutions and teachers as important players in students' construction of knowledge, recognizing that they are often entrusted by society with conserving social values and passing on traditions. Focusing

curriculum on educational technology in order to produce an educated citizenry capable of competing in a global economy too narrowly limits the purposes of education.

> If education is to be viewed as a primary engine for such change, and if educational technology is seen by some as a principal part of that engine, then we need to understand how and why such changes may take place, and what role technology may rightly be expected to play. (Kerr, 1996b, p. 147)

Limitations

All studies possess inherent limitations; this study is no exception. Such limitations affect the possibilities and understandings generated from the data and the analysis of a study. First, although critical theory advocates emancipatory action in research, often in the form of collaboration and reciprocity between the researcher and the participants of a study, I achieved this to a lesser degree than I wished. My behavior in the research was reciprocal in the sense that I was open and honest with all participants about the purposes and methods of the study. I often used participants' questions about the study as vehicles to discuss the rationales behind the research questions. By engaging participants in reflective conversations about their current beliefs and behaviors, I was able to encourage them to reflect on the meanings they drew from the use of educational technology. During these discussions, I often was asked about my own perceptions of issues pertaining to technology use.

Lather (1991), however, held that the most powerful means for creating reciprocity within a study is to generate theory through participant/researcher collaboration. I did not attempt such collaboration for several reasons. Because of time

constraints and the difficulty in scheduling interviews at participants' convenience, it was necessary for me to conduct interviews with teachers and students through the last week of the school year. Although I began analysis soon after I began collection of the data, it was not until after I left the field that I had access to the entire data set, including the transcriptions of all interviews, and was able to gain a holistic perspective that allowed me to be certain of the direction of the analysis. However, in retrospect, my understanding of theory collaboration may have been too narrowly defined. I might have shared more of my early perceptions from the analysis with students and teachers.

Other limitations of this study related to the amount of time I was able to spend in the field. In ethnographic studies, one way in which the concerns of validity can be met is through a lengthy study period. Perhaps a longer time frame (such as one that included the beginning as well as the end of the school year), would have given rise to other data, insights, and interpretations of the use of educational technology at High Plains. Also, a lengthier stay in the field might have allowed further development of interview questions which could have brought new understandings of students' and teachers' perceptions. Different wording or formats for questions, permitting a better match between participant/researcher perceptions of the language and topics of questions may have provoked different responses. For example, my question about ethnic or racial group membership had to be reworded because it was interpreted differently by participants than what I intended.

Additionally, different or additional data sources could have produced more possibilities in the analysis and interpretation of the study. While I questioned participants about their community and the social interactions that took place within it,

extended observations of the community could have provided another perspective for the study. Living in the community, or developing relationships with Native American tribes in the area, would have provided another important dimension. I also recognize that for some Native Americans, my position as a White researcher presents insurmountable difficulties in speaking for/about Native Americans and educational technology.

An important source of data that proved unavailable to me in this study was a larger number of interviews with High Plains students. Perhaps, more time spent in the field developing relationships with students would have encouraged more of them to grant interviews. This might have provided additional views of students' understandings of the use of educational technology.

Other methodological concerns for this study include the necessarily restricted perspective of a single researcher. Although Denzin (1989) discussed the advantage of employing multiple researchers, Mathison (1988) pointed out the inaccuracy of the notion that multiple methods and investigators ensured a convergence or triangulation of the analysis of the data that resulted in a more correct account.

Suggestions for Practice

Convinced that we inhabit a world in which we have no objective basis for making indisputable claims of truth or reality and that part of the conclusions drawn from this research relate to the significance of context for curriculum, I hold that acts of determining curriculum, if possible at all, must be made from a position of unpretentiousness (Lather, 1991). As educators, we must strive to find approaches that provide us with workable or satisfactory solutions, with the realizations that 1) the

curriculum choices we make are based on contingent knowledge that is subject to continual reinterpretation, and 2) the decisions we make may not produce our intended effects (Cherryholmes, 1988).

Rather than merely prescribed subject matter, I view a school's curriculum as everything students have an opportunity to learn, planned and unplanned, as well as that which is omitted or excluded (McCutcheon, 1982). McCutcheon's definition of curriculum, by necessity encompasses Wexler's (1992) assertion that, for students, life in high school is about the making of self or identity. Not coincidentally, in today's society, proficiency with technology and sense of self are intertwined for many students (Poster, 1995; Tapscott, 1998; Turkle, 1984, 1995). From a critical theory standpoint, an appropriate technology curriculum would also address questions related to the uneven distribution of technology use with regard to race, ethnicity, class, and gender. Such inequalities involve schools through concern for the part they play in the creation and maintenance of these undemocratic and ultimately oppressive conditions which privilege some social groups over others (Beyer & Liston, 1996; Bromley, 1998; Damarin, 1998).

Cherryholmes (1988) stated "constructors [of curriculum] must realize that what is built is temporal, fallible, limited, compromised, negotiated, and incomplete or contradictory" (p. 143). I am convinced that curriculum must continually evolve and is context dependent; that is, it must meet the particular needs of the community for which it exists even as those needs change. Such needs involve the nurturing of stewardship of the community, including its environment, values and culture (Howley & Howley, 1995). It is crucial that the entire surrounding community of participants including administrators, teachers, parents, students, and community members must have

continuous input into curriculum design and implementation (Nespor, 1997). Therefore, the curriculum I suggest here must be recognized to be tentative, contingent, incomplete and subject to critical re/evaluation.

Technology Staff Development

Since many teachers are not familiar with educational technology and since classroom teachers generally determine student access to technology, staff development is an essential starting point for the consideration of curriculum. Therefore, I think it is crucial for teachers to understand the historical and social circumstances that have brought technology to the position of prominence that it enjoys. Teachers should be provided opportunities to focus on the social context within which educational technology was designed and on how those designers intended it to be used. They also need occasions to explore the meanings about technology constructed and enacted in society, as well as the within the social context of their own classrooms.

For teachers (particularly women, and most teachers are women), technology is often perceived as threatening and intractable. Providing opportunities for a critical examination which includes social issues may prove empowering as it helps reduce intimidation and allows them to "contextualize technology as non-threatening and under one's control, while receiving often-overwhelming signals to the contrary" (Condron, 2000, p. 2). With proper support, teachers can come to see technology itself as neither good nor bad, but to realize that decisions about its use can result in desirable or undesirable consequences. With this understanding, teachers are then in position to make more critical decisions about appropriate use of technology in their own classrooms and decisions about goals for their own learning.

Technology Curriculum for Students

The concept of the computer as an add-on to what has traditionally been done in classrooms ignores possibilities for new ways of teaching and learning. Bruce (1998) proposed instead that we conceptualize the use of technology as we conceptualize the use of language, so that we 1) teach the *use* of technology, 2) teach *about* technology, and 3) teach *through* technology. This is an explicit departure from the focus of the 1998 educational technology standards of the International Society for Technology in Education (ISTE), and leans more toward the national Standards for Technological Literacy released by the International Technology Education Association (Zehr, 2000). Rather than focusing on student use of instructional technology (computers) and acquisition of skills in specific computer applications, the Standards for Technological Literacy include a more critical examination of all technology and the meanings constructed about its use and value in society.

Though all stages of this proposed technology curriculum operate at the same time, the focus gradually changes over the years from learning to *use* technology, to learning *about* technology, to learning *through* technology as students develop more critical thinking skills. In keeping with Dewey's concern for learning by doing, I propose that the use of technology in early elementary grades takes place through student free experimentation, including production related to their own projects. This allows students the experience of constructing their own knowledge of how to *use* technology, as well as the opportunity to watch and learn with others including their teacher. This is similar to the manner in which children learn language. Some students come to school having had related learning experiences with technology at home. I believe that it is essential for

schools to provide this sort of technology experimentation as a means to help address the issues of the material inequities in our society. Integrated learning systems or other packaged technology curricula should be only a minor part of the school experience, to be used as an optional means to familiarize students with computers or as one option among many for assisting students with specific skills.

For middle school students, in addition to continuing to provide the technology access and the experiences available to students in elementary, I propose that technology be a topic specifically included in their investigations of society, science, and the world at large. By concentrating on project-based, hands-on learning, students would be allowed the time and provided the support, to gain further experience with computer technology for inquiry, communication, construction, and expression (Bruce & Levin, 1997). Examples of such projects include using local networks within the school, as well as the Internet, to facilitate student work on jointly produced school publications or to share student-prepared multimedia productions among grade levels, classes, or schools. Through specifically designed activities that integrate the use of technology, students come to understand and to critically question how new technologies are involved in industry, health care, national and international relations, and other areas of social life. Learning *about* technology and how it relates to society can encourage students to become aware of, and to confront issues of social injustice.

The middle and high school years are critical to the development of an individual's sense of self and Wexler (1992) holds that "each student contributes to his own self-production by the interactional labor that he performs" (p.10). While, much of this interaction may occur outside of school in response to popular culture, Wexler

asserted that schools are "one of the few *public* spaces in which people are engaged with each other in the interactional work of making meaning. These are places for making the CORE meaning, of self or identity among young people" (p. 155, emphasis in original). The imagistic nature of popular culture is now enmeshed in the school environment to a greater extent than ever before through the introduction of the Internet to classrooms. The ubiquitous advertising on web pages that students now use for academic assignments often bombards them with messages that sell lifestyles and identity, as well as products. I feel it is essential that such messages not be ignored but rather be used as a means to interrogate social issues and practices. This can encourage students to recognize these messages and produce their own critical analyses (Bowers, 1988; Kincheloe, 1995; Pinar, et al., 1995).

Production of their own projects challenges students to combine artistic, literary, and intellectual skills in their work and brings about opportunities for students to experience the processes by which knowledge is created with computers and to consider how production constitutes acts of power. Student production provides occasions for stressing the problems inherent in computerized manipulation of graphical elements that can distort representations of reality, and can also furnish authentic situations for examining the ethics of electronic privacy (Kahn & Friedman, 1998). By grounding media literacy in this manner students come to recognize how the employment of new technologies, particularly by corporate power holders, influences our perceptions of the world and helps shape our culture and identities. This also exposes the "myth that technological innovations in TV and computers have simply served to produce a better informed community" (Kincheloe, 1995, p. 230).

By the time students are entering high school, technology may be viewed as an integrated environment for learning that ties the classroom to several larger environments, including school and local community cultures, and the national and global milieu (Stone, 1998). While recognizing the requirements to meet certain standards of subject content and units of study, as much as possible these needs might be integrated into experiences that are more project-oriented. By this time such projects and the critical examination of the meanings people construct regarding the use of technology should have become the primary focus of the curriculum for learning *through* technology. Such learning opportunities, possibly developed through interaction within communities connected digitally, could help students develop values more in line with those expected in the job market of the future. These expectations will likely involve more egalitarian ways of working, independent thinking, and adapting to a more flexible work environment developed to design and create customized services and products (Tapscott, 1998). Rather than encouraging extensive training for all students in the use of application software such as word processors or spreadsheets, support can be provided, at the point-of-need, for all students to acquire some minimal proficiency with a wide variety of new technological tools so that they are able to participate more fully in a society that requires continual learning and relearning (Salomon, 1998).

In addition to this basic level of technological experience, students might be offered the option to participate in a variety of advanced technology opportunities. The following suggestions are not meant to be prescriptive or exhaustive, but merely to serve as examples of activities that employ project-based, hands-on group experiences that

permit students to learn to *use* technology, to learn *about* technology, and to learn *through* technology.

At the middle school level:

- Students might discover and develop needed software presentations, such as Internet tutorials, to help provide other community members access to technology.
- Student teams might develop particular equipment skills such as use of a scanner or digital camera, in order to teach groups of fellow students, faculty, or community members.
- Students might be asked to identify and critique instructional software or web sites to be used in class or by younger students.
- Students could receive hands-on instruction in the maintenance, setup, upgrade and minor repairs of personal computers by refurbishing older computers for distribution to community centers.

At the high school level:

- Students might construct, or serve as technical advisors for the construction of web pages for area schools, businesses, and community organizations.
- Students could engage the community in identifying resources and projects of benefit to the community, and explore the use of video editing and production equipment in the pursuit of those specific goals.
- Students might be asked to identify and address a problem resulting from inappropriate or irresponsible use of technology.
- Advanced internships or apprenticeships could be developed that involve students working with technical support personnel on maintenance of the school's hardware.

- Students could serve as facilitators for distance learning courses that would offer college level credit to community members.

Reflective Curriculum

If technology adoption and integration is not driven by informed educational decisions, current public and corporate involvement may result in educational choices being made on the basis of technology availability without regard to educational or pedagogical considerations. The common "wisdom" that computer and telecommunication technology provides vast improvements for student access to information ignores the fact that for many students the problem is not that they lack information but rather they lack the skills to make sense of the information they already have (Bromley, 1998; Salomon, 1998).

Wexler stated, "In the semiotic even more than industrial society, knowledge is power" (as cited in Pinar, et al., 1995, p. 303). Curriculum theorizing regarding the use of technology must acknowledge the extent to which schools comprise a part of social practice and examine the implications of that for students, and must realize as Pinar, Reynolds, Slattery and Taubman point out, in the information age "curriculum *is* power" (p. 303, italics original).

Suggestions for Further Research

A postmodern/poststructural approach to research emphasizes the inconsistencies and contradictions of social reality. Therefore, it could be anticipated that in using such an approach this research has raised as many questions as it attempted to investigate. Additionally, since postmodern/poststructural thought assumes that meaning is

continually renegotiated through social interactions, this research does not seek to uncover a static and fixed reality. For this reason, I propose some further questions and ideas that could broaden the field of considerations for examining the ways educational technology is understood in the everyday lives of students and teachers.

In bringing a critical postmodern/poststructural orientation to bear on an examination of the cultural and social processes surrounding the use of educational technology, I attempt to foreground issues often overlooked in favor of the now omnipresent discussion of the benefits of educational technology for students and teachers in schools. Educational technology has provided an especially prominent platform for discussions of the preparation of students for future employment and of educational reform that emphasizes student-centered learning over the traditional pedagogical approach to schooling, which has been described as teacher-centered, textbook-dependent, whole group instruction that uses a question-and-answer format (Cuban, 1983). Both of these discussions seek curricular change, and both comprise discourses originating from outside the classroom. While framed as advantages of educational technology, these discourses have worked to redefine the purposes of education and the structure of schooling in our society.

By reframing such discussions to illuminate their underlying assumptions about the purposes of education and the nature of schooling, we can refocus what has become "compulsory enthusiasm" (Roszak, 1996, p. 12) for educational technology.

> How people write, talk, and otherwise communicate about what they know, do, and believe reflects the ways they are shaped by particular discourse communities. The more people incorporate the language of a particular discourse

> community, the more power that discourse community has. (Anderson & Damarin, 1996, p. 270)

I would suggest that those interested and involved in the use of educational technology should work to create a new discourse in which educators have opportunities (and are encouraged) to think critically about their ultimate goals for teaching and technology. It is only through such reflections and consideration of the significance of how meaning is made about technology, how those meanings affect the inequalities evident in the material and social conditions of our postmodern information-based society, and how those meanings are implicated in economic sustainability and environmental protection, that decisions about the appropriate use of educational technology can be made. As researchers and educators find new ways to talk about and work with educational technology, we transform what is possible in the world by altering the surrounding discourses of possibility.

Another concern for research on educational technology is that of setting. Kerr (1996b) stated that

> The "strong claim" of sociologists might be put simply as 'settings have plans for us.' That is, the social and organizational contexts of actions may be more important in explaining what people do than their individual motivations and internal states. (p. 145)

The habits and practices, or discourses, of a community are influenced by the characteristics of the place in which it exists. An understanding of the contexts in which technology operates serves to illuminate the interactions of inhabitants, as well as the everyday realities and cultures of students and teachers. We cannot separate the

experiences students and teachers have with educational technology from the context in which those experiences are embedded.

Therefore, this would indicate a need for researchers to contextualize the implementation of educational technology in a particular school through examining the meanings constructed by its inhabitants as influenced by historical, political, economic, and cultural contexts. Questions that are crucial to High Plains may or may not be of such importance in other school situations. For instance, can High Plains maintain its position as a model school? What happens if other schools begin to catch up with their level of technology implementation? How would that affect students' sense of self and reputation as leaders in technology, and thus their academic achievement? Hargreaves and Fink (2000) theorized that innovations have life spans that cycle through stages and that the importance of model schools as showcases is to grow leadership cultures and cadres of exceptional staff members, resources that are then pulled away to influence change in other locations. Is this to be the fate of High Plains? What might be done to forestall such a scenario?

As students negotiate the various roles in which they find themselves, they construct different understandings of the expectations imposed on them as technology users. For example, while male students may adopt a directive stance wishing to be involved in the design and control of technology, female students may accept a more passive use of technology such as clerical applications. Since awareness and concern for equity does not seem to be sufficient to alleviate such discrepancies, further research should focus on how to employ technology in ways that work to close the gender gap and empower female students. It would also seem imperative that research be carried out in

Native American communities regarding how students make sense of the use of educational technology and what that means for students' worldviews and for their society. Examination of these sociological aspects of the use of educational technology is especially pertinent and should receive more attention from the educational community.

Finally, I call for further critical empirical studies to investigate how meanings are constructed about the use of technology and how those meanings play out in real school situations. Despite the extensive rhetoric regarding the need for educational technology, neither this study nor Warschauer's (2000) empirical study shows the introduction of educational technology to be unproblematic in the real world. Researchers might explore issues such as how the use of specific technologies is implicated in the tension between school bureaucracy and the pressures for school reform, or how technology is employed in schools and outcomes for particular social groups such as women and minorities.

References

Anderson, J. (1994). The rite of right or the right of rite: Moving toward an ethics of technological empowerment. Educational Technology, 34 (2), 29-34.

Anderson, J., & Damarin, S. (1996). Poststructural feminism and research in educational communications and technology. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 269-274). New York: Macmillan.

Apple, M. W. (1986). Teachers and texts: A political economy of class and gender relations in education. New York: Routledge & Kegan Paul.

Apple, M. W. (1993). Official knowledge: Democratic education in a conservative age. New York: Routledge.

Apple, M. W. (1998). Teaching and technology: The hidden effects of computers on teachers and students. In L.E. Beyer, & M. W. Apple (Eds.), The curriculum: Problems, politics, and possibilities (2nd ed.) (pp. 314-338). Albany, NY: SUNY Press.

Apple, M. W. & Jungck, S. (1998). "You don't have to be a teacher to teach this unit": Teaching, technology, and control in the classroom. In H. Bromley & M. W. Apple (Eds.), Education, technology, power: Educational computing as a social practice (pp. 133-154). Albany, NY: State University of New York.

Assembly of Native Educator Associations. (1998, February 3). Alaska Standards for Culturally Responsive Schools. Alaska Native Knowledge Network. [On-line]. Available: http://www.ankn.uaf.edu/currstan.html

Barnes, S., & Strate, L. (1996). The educational implications of the computer: A media ecology critique. The New Jersey Journal of Communication, 4 (2), 180-208.

Basso, K. H. (1996). Wisdom sits in places: Landscape and language among the Western Apache. Albuquerque, N.M.: University of New Mexico Press.

Becker, H. (1983). School uses of microcomputers: Reports from a national survey. Baltimore, MD: Johns Hopkins University.

Becker, H. (1986). Instructional uses of school computers. Reports from the 1985 national study. Baltimore, MD: Johns Hopkins University, Center for the Social Organization of Schools.

Bernstein, R. J. (1971). Praxis and action: Contemporary philosophies of human activity. Philadelphia: University of Pennsylvania Press.

Bettis, P. J. (2000). Corporate discourses in school: Adapting to the prevailing economic climate. Educational Foundations, 14 (1), 23-49.

Beyer, L. E., & Liston, D. P. (1996). Curriculum in conflict: Social visions, educational agendas, and progressive school reform. New York: Teachers College Press.

Blacker, D. (1994). Philosophy of technology and education: An invitation to inquiry. [On-line]. Available: http://www.ed.uiuc.edu/PES/94_docs/BLACKER.HTM

Blacker, D. (1996). Political liberalism, technology, and schooling. Educational Foundations, 11 (4), 13-20.

Bowers, C. A. (1988). The cultural dimensions of educational computing: Understanding the non-neutrality of technology. New York: Columbia University.

Bowers, C. A. (1993). Education, cultural myths, and the ecological crisis: Toward deep changes. Albany, NY: SUNY Press.

Bowers, C. A. (1995). Educating for an ecologically sustainable culture. Albany, NY: State University of New York.

Bowers, C. A. (1998, April 15). How computers contribute to the ecological crisis: Rethinking the digital phase of the Industrial Revolution. Paper presented at the Annual Meeting of the American Education Research Association, San Diego, CA.

Britzman, D. P. & Greene, M. (1991). Practice makes practice: A critical study of learning to teach. New York: SUNY Press.

Bromley, H. (1992). Culture, power, and educational computing. In C. Bigum, & B. Green (Eds.), Understanding the new information technologies in education: A resource for teachers. Geelong, Australia: Deakin University Press.

Bromley, H. (1998). Introduction: Data-driven democracy? Social assessment of educational computing. In H. Bromley, & M. W. Apple (Eds.), Education, technology, power (pp. 1-25). New York: SUNY.

Brownlee-Conyers, J., & Kraber, B. (1996). Voices from networked classrooms. Educational Leadership, 54 (3), 34-36.

Bruce, B. C. (1996). Technology as social practice. Educational Foundations, 11 (4), 51-58.

Bruce, B. C. (1998). Dewey and technology. Journal of Adolescent & Adult Literacy, 42 (3), 222-226.

Bruce, B. C., & Levin, J. A. (1997). Educational technology: Media for inquiry, communication, construction, and expression. Journal of Educational Computing Research, 17 (1), 79-102.

Brunner, C. (1997, February). Opening technology to girls. Electronic Learning, p. 55.

Brunner, C., & Tally, W. (1999). The new media literacy handbook: An

educator's guide to bringing new media into the classroom. New York: Random House.

Bryson, M., & de Castell, S. (1998). Telling tales out of school: Modernist, critical, and postmodern "true stories" about educational computing. In H. Bromley, & M. W. Apple (Eds.), Education, technology, power (pp. 65-84). New York: State University of New York Press.

Burbules, N. C. (1996). Technology and changing educational communities. Educational Foundations, 11 (4), 21-32.

Burbules, N. C. (1997). Technology: What we haven't worried about. Education Digest, 62 (9), 51-57.

Burton, J.K., Moore, D. M., & Magliaro, S. G. (1996). Behaviorism and instructional technology. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 46-73). New York: Macmillan.

Caffarella, E. P. (2000, Jan.) Doctoral research in educational technology: A directory of dissertations, 1977-1999. [On-line.] Available: http://www.edtech.univnorthco.edu/DISSWWW/DISSDIR.HTM

Carnegie Mellon University. (1994). The Internet in K-12 education. Pittsburgh: Carnegie Mellon University.

Cherryholmes, C. H. (1988). Power and criticism. New York: Teachers College Press.

Cleary, L. M., & Peacock, T. D. (1998). Collected wisdom: American Indian education. Needham Heights, MA: Allyn & Bacon.

Coburn, J. (1998, February). Learning that's real: Projects that prepare students for life beyond high school. Technology & Learning, 18 (6), 58-64.

Cohen, D. K. (1987). Educational technology, policy, and practice. Educational Evaluation and Policy Analysis, 9 (2), 153-170.

Condron, L. (2000, April). Dual task: Learning the language of technology and questioning its non-neutrality. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Connell, J. M. (1996). Introduction: Assessing the impact of computer technology on education. Educational Foundations, 11 (4), 3-4.

Couture, J. –C., & Dobson, T. (1997, Winter). Stamping out: Student use of e-mail in public school. JCT: Journal of Curriculum Theorizing, 13 (4), 31-35.

Cuban, L. (1983). How did teachers teach, 1890-1980. Theory into practice, 22 (3), 159-165.

Cuban, L. (1993). Computers meet classroom: Classroom wins. Teachers College Record, 95 (2), 185-210.

Cuban, L. (1997, May 21). High-tech schools and low-tech teaching. Education Week, pp. 38, 41.

Cuban, L. (1999, Aug. 4). The technology puzzle: Why is greater access not translating into better classroom use? Education Week, pp. 68, 47.

Cuban, L., & Kirkpatrick, H. (1998, Summer). Computers make kids smarter—Right? TECHNOS Quarterly for Education and Technology, 7 (2), 26-31.

Damarin, S. K. (1988). Issues of gender and computer-assisted instruction. In M. Simonson (Ed.), The 1988 Proceedings of Selected Research Paper Presentations. Washington, DC: Association for Educational Communications and Technology.

Damarin, S. K. (1989). Rethinking equity: An imperative for educational

computing. Computing Teacher, 16 (7), 16-18.

Damarin, S. K. (1990). Unthinking educational technology. In M. Simonson (Ed.), The 1990 Proceedings of Selected Research Paper Presentations. Washington, DC: Association for Educational Communications and Technology.

Damarin, S. K. (1991a). Feminist unthinking and educational technology. Educational and Training Technology International, 28 (2), 111-119.

Damarin, S. K. (1991b). Rethinking science and mathematics curriculum and instruction: Feminist perspectives in the computer era. Journal of Education, 173 (1), 107-123.

Damarin, S. K. (1991c). Women and information technology: Framing some issues for education. Feminist Teacher, 6 (2), 16-20.

Damarin, S. K. (1992a). Feminisms, Foucault, and felicitous design. In M. Simonson (Ed.), The 1992 Proceedings of Selected Research Paper Presentations. Washington, DC: Association for Educational Communications and Technology.

Damarin, S. K. (1992b). Women and information technology: Framing some issues for education. Feminist Teacher, 6 (2), 16-20.

Damarin, S. K. (1994). Equity, caring, and beyond: Can feminist ethics inform educational technology? Educational Technology, 34 (2), 34-39.

Damarin, S. K. (1998). Technology and multicultural education: The question of convergence. Theory into Practice, 37 (1), 11-19.

Dede, C. (1998). The scaling-up process for technology-based educational innovations. In C. Dede (Ed.), Learning with technology: ASCD 1998 yearbook (pp. 199-215). Alexandria, VA: Association for Supervision and Curriculum Development.

deMarrais, K. B., & LeCompte, M. D. (1999). The way schools work: A sociological analysis of education (3rd ed.). New York: Addison Wesley Longman, Inc.

Deyhle, D. (1995). Navaho youth and Anglo racism: Cultural integrity and resistance. Harvard Educational Review, 65, 403-444.

Denzin, N. K. (1989). The research act. Englewood Cliffs, NJ: Prentice-Hall.

Denzin, N. K., & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. D. Denzin, & Y. S. Lincoln (Eds.), Handbook of qualitative research (pp. 3-17). Thousand Oaks, CA: Sage.

Doctor, R. D. (1991). Information technologies and social equity: Confronting the revolution. Journal of the American Society for Information Science, 42 (3), 216-228.

Duffy, T. A., & Jonassen, D. H. (1991). Continuing the dialogue on the implications of constructivism for educational technology. Educational Technology, 31 (9), 9-48.

Ellsworth, E. (1989). Why doesn't this feel empowering? Working through the repressive myths of critical pedagogy. Harvard Educational Review, 59 (3), 297-324.

Ely, D. P. (1995a). Technology is the answer! But what was the question? Paper presented at the James P. Curtis Distinguished Lecture. Capstone College of Education Society, University of Alabama. (ED 381 152).

Ely, D. P. (1995b). Trends in educational technology 1995. Syracuse, NY: ERIC Clearinghouse on Information and Technology.

Fabos, B., & Young, M. D. (1999, Fall). Telecommunication in the classroom: Rhetoric versus reality. Review of Educational Research, 69 (3), 217-259.

Falling through the net: Defining the digital divide. (2000, March 18). National

Telecommunications and Information Administration, U. S. Department of Commerce. [On-line.] Available: http://www.ntia.doc.gov/ntiahome/fttn99/contents.html

Fatemi, E. (1999, September 23). Building the digital curriculum. Education Week, (Technology counts: Building the digital curriculum), pp. 5-8.

Feenberg, A. (1991a). Critical theory of technology. New York: Oxford University Press.

Feenberg, A. (1991b, September 30). Critical theory of technology: A presentation to the Simon Fraser University Diamond Club. [On-line.] Available: http://www.irn.pdx.edu/~kerlinb/tscp/Feenberg.html

Feenberg, A. (1996). Marcuse or Habermas: Two critiques of technology. Inquiry, 39, 45-70 [On-line]. Available: http://www-rohan.sdsu.edu/faculty/feenberg/marhab.html

Feenberg, A. (1998a, May 1). Heidegger, Habermas, and the essence of technology [On-line]. Available: http://www-rohan.sdsu.edu/faculty/feenberg/kyoto.html

Feenberg, A. (1998b, May 1). Summary remarks on my approach to the philosophical study of technology [On-line]. Available: http://www-rohan.sdsu.edu/faculty/feenberg/talk4.html

Feenberg, A. (1998c, May 1). From essentialism to constructivism: Philosophy of technology at the crossroads [On-line]. Available: http://www-rohan.sdsu.edu/faculty/feenberg/method1.html

Fixico, D. L. (1997). Ethics and responsibilities in writing American Indian history. In D. A. Mihesuah (Ed.), Natives and academics: Researching and writing about American Indians (pp. 84-99). Lincoln, NB: University of Nebraska Press.

Franklin, U. (1990). The real world of technology. Toronto: CBC Enterprises.

Getting America's students ready for the 21st century: Meeting the technology literacy challenge. (1996, June 29). Washington, DC: U.S. Department of Education.

Gillespie, A., & Robins, K. (1989, Summer). Geographical inequalities: The spatial bias of the new communications technologies. Journal of Communication, 39 (3), 7-19. [On-line]. Available: http://www.windsor.ca/faculty/socsci/comstudies/Costclasses/gillespie.title.html

Giroux, H. A., Penna, A. N., & Pinar, W. F. (Eds.) (1981). Curriculum and instruction: Alternatives in education. Berkeley, CA: McCutchan.

Glesne, C., & Peshkin, A. (1991). Becoming qualitative researchers: An introduction. White Plains, NY: Longman.

Goodson, I. F. (1997). The changing curriculum. New York: Peter Lang.

Guba, E. G. (1990). The alternative paradigm dialog. In E. G. Guba (Ed.), The paradigm dialog (pp. 17-30). Newbury Park, CA: Sage.

Guerard, E. B. (2000, February). Group questions the wisdom of computers in early grades: Controversial mission statement sparks discussion. eSchool News, pp. 1, 26.

Hannafin, M. J., Hannafin, K. M., Hooper, S. R., Rieber, L. P., & Kini, A. S. (1996). Research on and research with emerging technologies. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 378-402). New York: Macmillan.

Hargreaves, A., & Fink, D. (2000, April). Model schools in mortal contexts: The fate of sustainability. Paper presented at the meeting of the American Educational Research Association, New Orleans, LA.

Harp, L. (1997, May/June). Feds and states up the ante: More dollars for school

technology--but now legislators want results. Electronic Learning, pp. 41-43.

Hlynka, D., & Belland, J. (Eds.) (1991). Paradigms regained: The uses of illuminative, semiotic and postmodern criticism as modes of inquiry in educational technology. Englewood Cliffs, NJ: Educational Technology.

Hlynka, D., & Yeaman, A. (1992). Postmodern educational technology. ERIC Digest EDO-IR-92-5. Syracuse, NY: ERIC Document No. 348 042.

Hodas, S. (1993, September 14). Technology refusal and the organizational culture of schools. Education Policy Analysis Archives, 1 (10). [On-line]. Available: http://epaa.asu.edu

Holloway, R. E. (1996). Diffusion and adoption of educational technology: A critique of research design. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 1107-1133). New York: Macmillan.

Holzberg, C. S. (1997, May/June). Computer technology--it's a girl thing. Technology & Learning, pp. 42-48.

Howley, C. B., & Howley, A. (1995, October). The power of babble: Technology and rural education. Phi Delta Kappan, 77 (2), 126-131.

Information rich, information poor: Bridging the digital divide. (1999, October 14) BBC News. [On-line.] Available: http://news.bbc.co.uk/hi/english/special_report/1999/10/99/information_rich_information_poor/newsid_466000/466651.stm

Iseke-Barnes, J. M. (1997, Winter). Hypertext, hypermedia, intertextuality, and story telling: Reading and writing ourselves in the text. JCT: Journal of Curriculum Theorizing, 13 (4), 25-30.

Jackson, P. W. (1992). Conceptions of curriculum and curriculum specialists. In P. W. Jackson (Ed.), Handbook of research on curriculum (pp. 3-40). New York: Macmillan.

Kahn, P. H., & Friedman, B. (1998). Control and power in educational computing. In H. Bromley, & M. W. Apple (Eds.), Education, technology, power: Educational computing as a social practice (pp. 157-173). Albany, NY: State University of New York.

Kemmis, D. (1990). Community and the politics of place. Norman, Oklahoma: University of Oklahoma Press.

Kent, T. W., & McNergney, R. F. (1998). Will technology really change education?: From blackboard to web. Thousand Oaks, CA: Sage.

Kerr, S. T. (1989). Technology, teachers, and the search for school reform. Educational Technology Research and Development, 37 (4), 5-17.

Kerr, S. T. (1990). Technology: education: justice: care. Educational Technology, 30 (11), 7-12.

Kerr, S. T. (1991). Lever and fulcrum: Educational technology in teacher's thought and practice. Teachers College Record, 93 (1), 114-136.

Kerr, S. T. (1996a). Visions of sugarplums: The future of technology, education, and the schools. In S. T. Kerr (Ed.), Technology and the future of schooling: Ninety-fifth yearbook of the National Society for the Study of Education, Part II. (pp. 1-27). Chicago: The National Society for the Study of Education.

Kerr, S. T. (1996b). Toward a sociology of educational technology. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology

(pp. 143-169). New York: Macmillan.

Kerr, S. T. (Ed.) (1996c). Technology and the future of schooling: Ninety-fifth yearbook of the National Society for the Study of Education, Part II. Chicago: The National Society for the Study of Education.

Kincheloe, J. L. (1995). Media and the schools: What is the effect of media on the educational experience of children? In J. L. Kincheloe, & S. R. Steinberg (Eds.), Thirteen questions: Reframing education's conversation (pp. 227-235). New York: Peter Lang.

Kincheloe, J. L., & McLaren, P. L. (1994). Rethinking critical theory and qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), Handbook of qualitative research (pp. 138-157). Thousand Oaks, CA: Sage.

Kincheloe, J. L., & Pinar, W. F. (1991). Introduction. In J. L. Kincheloe, & W. F. Pinar (Eds.), Curriculum as social psychoanalysis: The significance of place (pp. 1-23). New York: State University of New York Press.

Kinlicheeny, Sr. J. (1995, Summer). Spirituality and curriculum: A Native American view. JCT: Journal of Curriculum Theorizing, 11 (2), 39-48).

Koetting, J. R. (1983). Philosophical foundations of instructional technology. Paper presented at the annual meeting of the Association for Educational Communications and Technology, New Orleans, LA.

Koetting, J. R. (1993). Educational technology, curriculum theory, and social foundations: Toward a new language of possibility. In R. Muffoletto, & N. N. Knupfer (Eds.), Computers in education: Social, political, and historical perspectives (pp. 129-139). Cresskill, NJ: Hampton.

Koetting, J. R. (1994). Postmodern thinking in a modernist cultural climate: The need for an unquiet pedagogy. Educational Technology, 34 (2), 55-56.

Landow, G. P. (1997). Hypertext 2.0: The convergence of contemporary critical theory and technology. Baltimore: Johns Hopkins University Press.

Larson, A. E., & Clift, R. T. (1996). Technology education in teacher preparation: Perspectives from a year-long elementary teacher education program. Educational Foundations, 11 (4), 33-50.

Lather, P. A. (1991). Getting smart: Feminist research and pedagogy with/in the postmodern. New York: Routledge.

Lather, P. A. (1999, April). From competing paradigms to disjunctive affirmation. Paper presented at the annual conference of the American Educational Research Association, Montreal.

LeCompte, M. D., & Preissle, J. (1993). Ethnography and qualitative design in educational research (2nd ed.). San Diego: Academic.

Lincoln, Y. S., & Guba, E. G. (1984). Naturalistic inquiry. Beverly Hills: Sage.

Locust, C. (1988). Wounding the spirit: Discrimination and traditional American Indian belief systems. Harvard Educational Review, 58 (3), 315-330.

Lomawaima, K. T. (1995). Educating Native Americans. In J. A. Banks, & C. A. McGee Banks (Eds.), Handbook of research on multicultural education (pp. 331-342). New York: Macmillan.

Lumsdaine, A. A. (1996). Educational technology, programmed learning, and instructional science. In D. P. Ely, & T. Plomp (Eds.), Classic writing on instructional technology (pp. 65-90). Englewood, CO: Libraries Unlimited. (Original work published

1964.)

MacGregor, S. (1990). Computer-assisted thinking skills instruction: Curriculum principles, teacher preparation, and student outcomes. In A. McDougall, & C. Dowling (Eds.), Computers in education. North-Holland: Elsevier Science Publishers.

Mander, J. (1991). In the absence of the sacred: The failure of technology and the survival of the Indian Nations. San Francisco: Sierra Club.

Marshall, C., & Rossman, G. B. (1989). Designing qualitative research. Newbury Park, CA: Sage.

Mathison, S. (1988). Why triangulate? Educational Researcher, 17 (1), 13, 14-17.

McCarthy, C. (1990). Race and curriculum. London, England: Falmer.

McCutcheon, G. (1982). What in the world is curriculum theory? Theory into Practice, 21 (4), pp. 18-22.

McGrath, B. (1998, April). Partners in learning: Twelve ways technology changes the teacher-student relationship. T.H.E. Journal, 25 (9), 58-61.

McLaren, P. (1994). Life in schools. New York: Longman.

McLaughlin, C. (1995a). Developing environmental literacy. The Technology Teacher, 54 (3), 30-34.

McLaughlin, C. (1995b). Implications of global change. The Technology Teacher, 55 (5), 14-18.

Means, B. (Ed.) (1994). Technology and education reform: The reality behind the promise. San Francisco: Jossey-Bass.

Meyrowitz, J. (1985). No sense of place. New York: Oxford University Press.

Meyrowitz, J. (1996). Taking McLuhan and "Medium Theory" seriously:

Technological change and the evolution of education. In S. T. Kerr (Ed.), Technology and the future of schooling: Ninety-fifth yearbook of the National Society for the Study of Education, Part II. (pp. 73-110). Chicago: The National Society for the Study of Education.

Mihesuah, D. A. (1998). Introduction. In D. A. Mihesuah (Ed.), Natives and academics: Researching and writing about American Indians (pp. 1-22). Lincoln, NB: University of Nebraska Press.

Moll, M., & Froese-Germain, B. (1998, March 6). Critical issues in education and technology. [On-line]. Available: http://www.ctf-fce.ca/e/what/restech/critical.htm

Montgomery, K. C. (1996). Children in the digital age. The American Prospect, 27, 69-74 [On-line]. Available: http:// epn.org/prospect/27/27mont.html

Morgridge, J. P. (1997, February). It's working. Technology & Learning, 17, 15.

Morris, D. R. (1997). Adrift in the sea of innovations: A response to Alexander, Murphy, and Woods. Educational Researcher, 26 (4), 22-26.

Muffoletto, R. (1994a). Technology and restructuring education: Constructing a context. Educational Technology, 34 (2), 24-28.

Muffoletto, R. (1994b). Schools and technology in a democratic society: Equity and social justice. Educational Technology, 34 (2), 52-54.

Muffoletto, R. (1996). Realism and the symbolic: Two ways of knowing. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 265-269). New York: Macmillan.

Muffoletto, R., & Knupfer, N. (Eds.). (1993). Computers in education: Social, political and historical perspectives. Cresskill, NJ: Hampton.

National Center for Education Statistics. (1998, February). Issue brief: Internet access in public schools [On-line]. Available: http://nces.ed.gov/pubs98/98031.html

National Education Association. (1999, December 27). Education Technology National Education Association Resolutions 1997-1998. Focus on Technology. [On-line]. Available: http://www.nea.org/cet/BRIEFS/brief10.html

Nespor, J. (1997). Tangled up in school: Politics, space, bodies, and signs in the educational process. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., Publishers.

Newsom, J. (1996). Integrating technology with instruction: One district's experience. In S. T. Kerr (Ed.), Technology and the future of schooling: Ninety-fifth yearbook of the National Society for the Study of Education, Part II. (pp. 200-221). Chicago: The National Society for the Study of Education.

Nichols, R. G. (1991). Reconciling educational technology with the life-world: A study of Habermas' theory of communicative action. In D. Hlynka, & J. Belland (Eds.), Paradigms regained: Uses of illuminative, semiotic and post structural criticism as a mode of inquiry in educational technology (pp. 121-137). Englewood Cliffs, NJ: Educational Technology.

Nichols, R. G., & Allen-Brown, V. (1996). Critical theory and educational technology. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 226-252). New York: Macmillan.

Noble, D. D. (1996). Mad rushes into the future: The overselling of educational technology. Educational Leadership, 54 (3), 18-23.

Novak, T. P., & Hoffman, D. L. (1998). Bridging the Digital Divide: The impact of race on computer access and Internet use. [On-line.] Available:

http://ecommerce.vanderbilt.edu/papers/race/science.html

Ogbu, J. U. (1987). Variability in minority school performance: A problem in search of an explanation. Anthropology & Education Quarterly, 18, 312-334.

Olson, L. (1997, January 29). Book sparks debate over necessary job skills. Education Week, p. 15.

Orr, D. W. (1992). Ecological literacy: Education and the transition to a postmodern world. Albany, NY: SUNY Press.

Peck, K. L., & Dorricott, D. (1994, April). Why use technology? Educational Leadership, 51 (7), 11-14.

Peha, J. M. (1995). How K-12 teachers are using computer networks. Educational Leadership, 53 (2), 18-25.

Perelman, L. J. (1992). School's out: Hyperlearning, the new technology, and the end of education. New York: William Morrow and Company.

Persell, C. H., & Cookson, P. W., Jr. (1987). Microcomputers and elite boarding schools: Educational innovation and social reproduction. Sociology of Education, 60 (2), 123-134.

Peshkin, A.(1997). Places of memory: Whiteman's schools and Native American communities. Mahwah, NJ: Lawrence Erlbaum Assoc.

Petrina, S. (1998). The politics of research in technology education: A critical content and discourse analysis of the Journal of Technology Education. Journal of Technology Education, 10 (1).

Pinar, W. F., Reynolds, W. M., Slattery, P., & Taubman, P. M. (1995). Understanding curriculum. New York: Lang.

Plater, W. M. (1995). In search of the electronic classroom. In E. Boschmann (Ed.), The Electronic Classroom (pp. 3-13). Medford, NJ: Learned Information.

Poster, M. (1995). The second media age. Cambridge, UK: Polity Press.

Postman, N. (1979). Teaching as a conserving activity. New York: Delacorte Press.

Postman, N. (1992). Technopoly: The surrender of culture to technology. New York: Knopf.

Postman, N. (1994, April). Technology as dazzling distraction. Education Digest, 59 (8), 25-28.

Postman, N. (1995a). The end of education: Redefining the value of school. New York: Knopf.

Postman, N. (1995b, October 9). Virtual students, digital classrooms. Nation, 261 (11), 377-382.

Preston, N. (1992). Computing and teaching: A socially-critical review. Journal of Computer Assisted Learning, 8 (1), 49-56.

Revenaugh, M. (1999, February). All about the E-Rate. Educational Leadership, 56 (5), 36-38.

Roberts, L. (1996). A transformation of learning: Use of the national information infrastructure for education and lifelong learning. In Educational media and technology yearbook 1995-6. Englewood, CO: Libraries Unlimited.

Roszak, T. (1996, December). Dumbing us down. New Internationalist, 286, pp. 12-14.

Rothenberg, D. (1998). How the Web destroys student research papers. Education

Digest, 63 (6), 59-61.

Salomon, G. (1997, Jan.). Of mind and media: How culture's symbolic forms affect learning and thinking. Phi Delta Kappan, 78 (5), 375-380.

Salomon, G. (1998). Technology's promises and dangers in a psychological and educational context. Theory into Practice, 37 (1), pp. 4-10.

Salpeter, J. (1998, February). News extra: Snapshot of educational technology today. Technology & Learning, 18 (6), 68, 70.

Sandham, J. L. (1997). Oracle Corp. Contributing $100 million to increase technology for schools. Education Week, p. 12.

Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin, & Y. S. Lincoln (Eds.), Handbook of qualitative research (pp. 118-137). Thousand Oaks, CA: Sage.

Selman, M. (1994). Exploring the middle ground: A reply to Blacker. [On-line]. Available: http://www.ed.uiuc.edu/PES/94_docs/SELMAN.HTM

Sheingold, K., & Tucker, M. S. (Eds.) (1990). Restructuring for learning with technology. New York: Center for Technology in Education; Rochester, NY: National Center on Education and the Economy.

Simonelli, R. (1993). The path of Native American education: Where tradition and technology meet. TECHNOS Quarterly for Education and Technology, 2 (3), n.p. [On-line]. Available: http://www.technos.net/journal/volume2/3simonelli.htm

Slattery, P. (1995). Curriculum development in the postmodern era. New York: Garland.

Sloan, D. (1985). Introduction: On raising critical questions about the computer in education. In D. Sloan (Ed.), The computer in education: A critical perspective (pp. 1-9). New York: Teachers College Press.

Smart, B. (1985). Michel Foucault. New York: Tavistock Pub.

Smith, D. G. (1997, Fall). The geography of theory and the pedagogy of place. JCT: Journal of Curriculum Theorizing, 13 (3), 2-4.

Sofia, Z. (1998). The mythic machine: Gendered irrationalities and computer culture. In H. Bromley, & M. W. Apple (Eds.), Education, technology, power (pp. 29-52). New York: State University of New York Press.

Spring. J. H. (1996). The cultural transformation of a Native American family and its tribe 1763-1995: A basket of apples. Mahwah, N. J.: Lawrence Erlbaum Associates, Inc. Publishers.

Stake, R. E. (1994). Case studies. In N. K. Denzin, & Y. S. Lincoln (Eds.), Handbook of qualitative research (pp. 236-247). Thousand Oaks, CA: Sage.

Starkey, B. A. (1998). Using computers to connect across cultural divides. In H. Bromley, & M. W. Apple (Eds.), Education, technology, power (pp. 175-185). New York: State University of New York Press.

Stone, A. (1998). Learning to exercise power. In H. Bromley, & M. W. Apple (Eds.), Education, technology, power: Educational computing as a social practice (pp. 187-199). Albany, NY: State University of New York.

Streibel, M. J. (1986). A critical analysis of the use of computers in education. Educational Communications and Technology—A Journal of Theory, Research and Development, 34 (3), 137-161.

Streibel, M. J. (1991). Instructional design and human practice: What can we learn from Habermas's theory of technical and practical human interests? In M. Simonson (Ed.), The 1991 Proceedings of Selected Research Paper Presentations. Washington, DC: Association for Educational Communications and Technology.

Streibel, M. J. (1998, Winter). Information technology and physicality in community, place, and presence. Theory Into Practice, 37 (1), 31-37.

Study shows technology-achievement link. (1997, June). Electronic school. The American School Board Journal (Suppl.), A4.

Summary of the Improving America's Schools Act. (1994, November 9). Education Week, pp. 18-19.

Sutton, R. E. (1991). Equity and computers in the schools: A decade of research. Review of Educational Research, 61, 475-503.

Swisher, K. G. (1997). Why Indian people should be the ones to write about Indian education. In D. A. Mihesuah (Ed.), Natives and academics: Researching and writing about American Indians (pp. 190-199). Lincoln, NB: University of Nebraska Press.

Tapscott, D. (1998). Growing up digital: The rise of the Net Generation. New York: McGraw-Hill.

Tapscott, D. (1999). Educating the Net generation. Educational Leadership, 56 (5), 6-11.

Thiele, L. P. (1997). Postmodernity and the routinization of novelty: Heidegger on boredom and technology. Polity, 29 (4), 489-517.

Thomas, J. (1993). Doing critical ethnography. Newbury Park, CA: Sage.

Trahant, M. (1998, Jan. 20). "Internet lessons from canyon walls." MSNBC News: Technology. [On-line]. Available: http://www.msnbc.com/news/136924.asp

Trotter, A. (1997a, March 5). Technology vision pursued with new urgency. Education Week, pp. 22, 24.

Trotter, A. (1997b, March 12). CEOs, educators unite with a strong promise to promote technology. Education Week, p. 8.

Trotter, A. (1997c, May 21). Inequities in access to technology documented. Education Week, p. 6.

Trotter, A. (1997d, July 9). Survey finds strong public support for more technology in schools. Education Week, p. 8.

Trotter, A. (1997e, November 10). Taking technology's measure. Education Week (Technology counts: Schools and reform in the information age), pp. 6-11.

Trotter, A. (1999, September 23). Preparing teachers for the digital age. Education Week (Technology counts: Building the digital curriculum), pp. 37-43.

Trotter, A. (2000, January 26). Intel, Microsoft to launch major training program for teachers. Education Week, p. 5.

Turkle, S. (1984). The second self: Computers and the human spirit. New York: Simon and Schuster.

Turkle, S. (1995). Life on the screen: Identity in the age of the Internet. New York: Simon and Schuster.

Turkle, S. (1997). Seeing through computers: Education in a culture of simulation. The American Prospect, 31, 76-82 [On-line]. Available: http://epn.org/prospect/31/31turkfs.html

Tyre, T. (1990, April). Integrated learning systems: Extending their reach. T.H.E. Journal (Technological Horizons in Education), 17 (8), 10-11.

Upbin, B. (1999, March 22). Instant feedback in the classroom. Forbes, pp. 68-72.

Van Dusen, L. M., & Worthen, B. R. (1995). Can integrated instructional technology transform the classroom? Educational Leadership, 53 (2), 28-33.

Viadero, D. (1997a, October 15). Few U.S. schools use technology well, 2 studies report. Education Week, p. 6.

Viadero, D. (1997b, November 10). A tool for learning. Education Week (Technology counts: Schools and reform in the information age), pp.12-13, 15, 17-18.

Wallace, M. I. (1993). Ricoeur, Rorty, and the question of revelation. In D. E. Klemm, & W. Schweiker (Eds.), Meanings in texts and actions: Questioning Paul Ricoeur (pp. 234-254). Charlottesville, VA: University Press of Virginia.

Warschauer, M. (2000, January 7). Technology and school reform: A view from both sides of the tracks. Education Policy Analysis Archives, 8 (4). [Online.] Available: http://epaa.asu.edu

Westbrook, K. C., & Kerr, S. T. (1996). Funding educational technology: Patterns, plans, and models. In S. T. Kerr (Ed.), Technology and the future of schooling: Ninety-fifth yearbook of the National Society for the Study of Education, Part II. (pp. 49-72). Chicago: The National Society for the Study of Education.

Wexler, P. (1987). Social analysis of education: After the New Sociology. New York: Routledge and Kegan Paul.

Wexler, P. (1992). Becoming somebody: Toward a social psychology of school. London, England: Falmer.

White, K. A. (1997a, July 9). School technology captures public's fascination, states' dollars. Education Week, p. 15.

White, K. A. (1997b, November 10). A matter of policy. Education Week (Technology counts: Schools and reform in the information age), pp. 40-43.

Wilson, A. C. (1998). American Indian history or non-Indian perceptions of American Indian History? In D. A. Mihesuah (Ed.), Natives and academics: Researching and writing about American Indians (pp. 23-26). Lincoln, NB: University of Nebraska Press.

Windschitl, M. (1998). The WWW and classroom research: What path should we take? Educational Researcher, 27 (1), 28-33.

Winner, L. (1980). Do artifacts have politics? Daedalus, 109 (1), 121-136.

Wishart, D. J. (1994). An unspeakable sadness: The dispossession of the Nebraska Indians. Lincoln, NB: University of Nebraska Press.

Wolcott, H. F. (1995). The art of fieldwork. Walnut Creek, CA: AltaMira.

Yeaman, A. R (1994a). Deconstructing modern educational technology. Educational Technology, 34 (2), 15-24.

Yeaman, A. R. (1994b). Where in the world is Jacques Derrida? A true fiction with an annotated bibliography. Educational Technology, 34 (2), 57-64.

Yeaman, A. R., Hlynka, D., Anderson, J. H., Damarin, S. K., & Muffoletto, R. (1996). Postmodern and poststructural theory. In D. H. Jonassen (Ed.), Handbook of research for educational communications and technology (pp. 253-295). New York: Macmillan.

Yeaman, A. R., Koetting, J. R., & Nichols, R. G. (1994). Critical theory, cultural

analysis and the ethics of educational technology as social responsibility. Educational Technology, 34 (2), 5-13.

Zehr, M. A. (1997, November 10). Partnering with the public. Education Week (Technology counts: Schools and reform in the information age), pp. 36-38.

Zehr, M. A. (1999, October 20). More home schooling parents turn to online courses for help. Education Week, pp. 1, 12-13.

Zehr, M. A. (2000, April 12). National standards on technology education released. Education Week, p. 18.

Zuboff, S. (1988). In the age of the smart machine: The future of work and power. New York: Basic Books.

APPENDIX A

INTERVIEW PROTOCOL
FOR TEACHERS AND ADMINISTRATORS

Before conducting the following interview, I will ask teachers or administrators for permission to audiotape the interviews and assure them that I will take precautions to ensure that their identities will be kept confidential.

1. Describe how you organize your school day.

2. When you enter your classroom (or the school), what do you see?

3. Do you intentionally plan to utilize educational technology in school? If so, how do you do that planning? What factors enter into your decisions?

4. Tell me about a particularly successful time or lesson in which you used educational technology.

5. Tell me about a time or lesson in which you used educational technology that you felt was not successful.

6. Does educational technology work better for some subjects than others? If so, which ones and why?

(For teachers: Describe how your field and educational technology relate to each other.)

7. How do you feel when you use computers in school? Does everybody feel that way you do about using educational technology? Why or why not?

8. Tell me about the groups of students at this school?

9. How does each group of students react to educational technology?

10. Do you use educational technology differently with any classes, students or groups of students? If so, how?

11. Are teachers who use educational technology different from those who do not? If so, how?

12. What is it like to work at this school?

13. If you could, what would you change in the curriculum at this school?

14. Does educational technology affect your attitude about school? If so, how?

15. Is the use of educational technology in school important? If so, why?

16. How does technology affect your life? How does technology affect society?

17. How long have you taught? at this school?

18. When and where did you get your degree? What is the degree in?

19. Of the ethnic or racial groups here at this school, is there one that you would identify yourself as a part of?

APPENDIX B

INTERVIEW PROTOCOL
FOR STUDENTS

Before conducting the following interview, I will ask students for permission to audiotape the interviews and assure them that I will take precautions to ensure that their identities will be kept confidential.

1. Describe how you use computers in school?

2. Will you use computers in your career after you get out of school? If so, how? Describe what your life will be like five years from now.

3. Does educational technology work better for some subjects than others? If so, which ones and why?

4. Tell me about a time when using educational technology helped you learn something. Tell me about a time when using educational technology for a lesson made learning harder, or take longer.

5. What would your classes be like if teachers used educational technology more or less than they do now?

6. Tell me about the groups of students at this school?

7. How does each group of students react to educational technology?

8. How do you feel when you use computers in school? Does everybody feel that way you do about using educational technology? Why or why not?

9. If you were a teacher, would you use educational technology in class? If so, how?

10. Are teachers who use educational technology different from those who do not? If so, how?

11. Does educational technology affect your attitude about school? If so, how?

12. Is the use of educational technology in school important? If so, why?

13. How does technology affect your life? How does technology affect society?

14. How long have you attended this school?

15. Of the ethnic or racial groups here at this school, is there one that you would identify yourself as a part of?

APPENDIX C

STUDENT TECHNOLOGY GOALS
from the
High Plains Public School District
Information and Communication Plan, 1997

III. GOALS

STUDENTS

1. Students will become proficient in accessing information from a myriad of traditional as well as non-traditional sources.

2. Students will become proficient in processing (evaluating, organizing, comprehending) information they have accessed.

3. Students will become proficient in applying new knowledge (information they have accessed and processed) to real-world situations.

4. Students will become proficient in creating traditional as well as non-traditional means of communicating new knowledge.

5. Students will become self-directed, active, life-long learners.

TECHNOLOGY GOALS BY GRADE LEVELS

The following grade specific technology goals can be used to provide ideas and suggestions to teachers for future planning. These goals should be considered when integrating technology into the curriculum and incorporating the use of technology into the classroom. This process is expected to take several years to be fully implemented with staff development and support considered a top priority.

There are many levels in which these goals can be accomplished. These goals provide direction for basic key experiences with technology needed by our students, but also account for the varying levels of difficulty and complexity expected at different grade levels. For example, a goal such as: create documents using word processing skills and publishing programs, would have a first grader finishing a simple sentence and perhaps adding a publishing program graphic, while a high school senior might be writing a lengthy, complex report with self-designed graphics. The goal would remain the same, however, the product would look different depending on the level and the ability of the individual student.

As this plan is implemented, individual schools sites, as well as specific grade-level and subject curriculum committees would help to further develop and refine these suggestions. These proposed technology goals were not planned as an add-on to an already full school day, but rather as avenues for teachers and students to explore through their designated content-area curriculum, producing non-traditional output.

GRADES 5-8 TECHNOLOGY GOALS

1. Students will communicate through and enhance their productivity with applications software.

Produce a document using word processing incorporating both text and graphics and following the writing process steps.

Programs: *Microsoft Word, Children's Writing and Publishing Center, PageMaker 6.0*

Create databases and spreadsheets and integrate them into reports.

Collect, manipulate, and interpret data.

Programs: *Microsoft Access, Microsoft Excel*

Use publishing software and scanners to produce page layouts.

Programs: *PageMaker 6.0, HPScanner Software, MSWord*

Use electronic spell checkers, thesauruses, and grammar checkers.

Demonstrate basic proficiency in word-processing skills such as change page setup, columns, mail merge, labels, headers/footers, and font size and style.

2. Students will communicate visually, graphically, and artistically through multi-media and computer assisted design tools.

Produce videotape using a camcorder and straight cut video-editing equipment.

Use audio equipment.

Create multimedia presentations, which link various media.

Programs: *PowerPoint, PowerPoint, HyperStudio*

3. Students will communicate through networks and telecommunications.

Use network communication such as electronic mail to access school information.

Communicate with schools on global level. (Internet)

4. Students will access, retrieve, evaluate, and apply electronic information.

Use search strategies to retrieve information from electronic encyclopedias, almanacs, indexes, catalogs, and the Internet and select pertinent information.

Use a variety of calculators including graphic calculators.

Use laser discs and remote control devices.

5. Students will use technology to enhance their understanding and development of basic skills.

Advanced keyboarding and mouse skills.

Operate peripheral devices.

Care for technology hardware and use it safely.

Understand copyright laws and other ethical issues pertaining to use of technology in society.

Understand basic capabilities and limitations of technology's hardware and software.

Select and use technology appropriate to needs.

GRADES 9-12 TECHNOLOGY GOALS

1. Students will communicate through and enhance their productivity with application software.

Converge and integrate products from various applications to create an enhanced product.

Programs: *Microsoft Word, Microsoft Excel, Microsoft Access, PowerPoint, PageMaker 6.0, HyperStudio*, e-mail, HTML

2. Students will communicate visually, graphically, and artistically through multi-media and computer-assisted design tools.

Programs: *Windows Paint Brush, Fine Artist, HyperStudio, PageMaker, PowerPoint, Video Toaster*

3. Students will use technology to access, retrieve, evaluate, and apply visual and auditory information.

Use search strategies to locate electronic information (identify key words, narrows search by addition of terms, broadens search, uses truncation, uses wild cards).

Programs: *Catalog Plus, SIRS, Researcher*, Internet

Use electronic encyclopedias, almanacs, indexes, and catalogs.

Programs: *Encarta, Grolier's Encyclopedia, SIRS Researcher, Catalog Plus, etc.*

Use networks for information (on-line databases, libraries, electronic bulletin boards).

4. Students will use technology independently and cooperatively.

5. Students will follow ethical guidelines for using technology.

6. Students will use technology to maximize productivity and effectiveness.

Put into practice, skills and knowledge gained in previous years in order to fully integrate the use of technology into their total school experience.

APPENDIX D

Selected portions of the

High Plains Public School District

Information and Communication Plan

1997

High Plains Public School Information and Communication Plan

1997
Table of Contents

High Plains Public School

Information and Communication Plan

I. INTRODUCTION

Education is one of the most information intensive enterprises in existence. It is based on the need to make quality meaning from the deluge of information that surrounds us. Human learning requires that we locate useful and relevant information, manipulate that information to extract sense and meaning, and then communicate that meaning to others. These three functions are the bedrock of the school purpose. They are also precisely the three areas in which modern communication and computer technologies can assist us. For this reason, educational institutions everywhere are interested in access to these tools.

Over the last decade and a half, computer technologies have played a major part in the education of many children in State. The early 80's saw the introduction and frustration of computer usage in schools when teachers were given machines but little instruction on how to use them. In the late 80's schools began moving away from a computer programming mentality use of the machines to one where the computers were viewed as supplemental tools for classrooms. Educational software allowed schools to begin to develop individualized instructional programs to help students in math skills, science, English, and some non-traditional curriculum areas, such as art and music. In the early 90's the Internet began to move into K-12 classrooms, away from the higher education and military users. Now the Internet and computer technologies provide an avenue of unprecedented resources for schools.

The co-evolution of personal computers and the Internet is an amazing revolution in the making. This revolution rivals the printing press, the automobile, and the telephone in its effects on the human condition. The future effects on business and education will be enormous. In January 1994, President Bill Clinton called for connecting every classroom, library, clinic and hospital in the United States to a "national information superhighway" before the year 2000. He said, "Instant access to information will increase productivity. It will help educate our children. It will provide better medical care. It will create jobs." In May of 1997, the Federal Communications Commission (FCC) issued a unanimous ruling on Universal Service that would help schools, libraries, clinics and hospitals realize this plan.

VISION STATEMENT

As the dawn of a new millennium approaches, a constant deluge of technology and information is bombarding society. How a student is able to interface with the technology to process and evaluate information will determine their success in life. It is the High Plains Public School District's responsibility to prepare students to be active participants in this dynamically changing world. To accomplish this, High Plains Public School District will actively pursue, implement, and integrate the state of the art technologies and instructional designs to enhance and improve a learning environment where students are valued and encouraged to explore, fail, try again, and succeed. A fine line exits between success and

failure; between information/technology overload and its effective use to ensure a harmonious lifestyle. It is the responsibility of the High Plains Public School District to ensure the balance is maintained.

PHILOSOPHY

Primarily, as a means, information and communication technologies support increased opportunities for acquisition of higher order thinking skills, preparation for occupations requiring higher technological skills, participation in self-directed and active learning, and more options for achieving district curriculum goals. Information and communication technologies can be employed to assist student learning by offering students and teachers a variety of ways to access, process, apply and communicate information and by allowing the student more choices in individualized learning.

Secondarily, as an end, information and communication technologies represent a set of tools that students will need to master in preparation for work and for successful living in the 21st century. Constant practice of using these tools in a variety of contexts will instill in students a disposition to use them effectively as adults.

II. Relationship to District Mission and Goals

Objectives of this Plan

The major purposes or objectives of this Information and Communication Plan are to:

1. Improve the quality of instruction.
2. Improve the academic performances of the District students.
3. Provide a guideline for the purchase and adoption of new technologies.
4. Support the achievement of the Districts mission, goals and strategies.

III. GOALS

FACULTY

1. Teachers will comprehend, accept, and evolve into the role of an educational facilitator.
2. Educational facilitators will master the use of information and communication technologies in order to create an environment where students become active, self-directed, life-long learners.
3. The facilitator will encourage continual student growth by being himself or herself an active participant in the learning process.

STUDENTS

1. Students will become proficient in accessing information from a myriad of traditional as well as non-traditional sources.

2. Students will become proficient in processing (evaluating, organizing, comprehending) information they have accessed.

3. Students will become proficient in applying new knowledge (information they have accessed and processed) to real-world situations.

4. Students will become proficient in creating traditional as well as non-traditional means of communicating new knowledge.

5. Students will become self-directed, active, life-long learners.

DISTRICT

1. Provide effective technology that supports learning and teaching.

2. Provide all students instruction in the use of productivity software.

3. Provide up-to-date technology, training, and support management communication, and management of teaching/learning applications.

APPENDIX E

VISION STATEMENT

(from the district Information and Communication Plan, 1997)

As the dawn of a new millennium approaches, a constant deluge of technology and information is bombarding society. How a student is able to interface with the technology to process and evaluate information will determine their success in life. It is the High Plains Public School District's responsibility to prepare students to be active participants in this dynamically changing world. To accomplish this, High Plains Public School District will actively pursue, implement, and integrate the state of the art technologies and instructional designs to enhance and improve a learning environment where students are valued and encouraged to explore, fail, try again, and succeed. A fine line exits between success and failure; between information/technology overload and its effective use to ensure a harmonious lifestyle. It is the responsibility of the High Plains Public School District to ensure the balance is maintained.

APPENDIX F

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: February 6, 1998 **IRB #: ED-98-061**

Proposal Title: A GROUNDED THEORY STUDY OF THE IMPACT OF EDUCATIONAL TECHNOLOGY

Principal Investigator(s): Pamela Bettis, Fena Hartzell

Reviewed and Processed as: Expedited w/special population

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature: _____ Date: February 9, 1998
Chair of Institutional Review Board
Cc: Fena Hartzell

VITA

Fena Hartzell

Candidate for the Degree of
Doctor of Education

Dissertation: CONTRADICTIONS IN TECHNOLOGY USE: STORIES FROM A MODEL SCHOOL

Major Field: Curriculum and Instruction

Biographical:

Education: Received Bachelor of Science degree in Geology and Geography from Stephen F. Austin State University, Nacogdoches, Texas in January, 1970.

Received Masters of Library and Information Studies from the University of Oklahoma, Norman, Oklahoma in August, 1991.

Completed the requirements for the Doctor of Education degree with a major in Curriculum and Instruction at Oklahoma State University in July, 2000.

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Laboratory Instructor - Geology, Stephen F. Austin State University, Nacogdoches, Texas
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Professional Association Memberships: American Educational Research Association, Association for Educational Communications and Technology, American Educational Studies Association, Association for Supervision and Curriculum Development