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New Technology in Education as Viewed through the Utopic and Dystopic Worlds of Science Fiction

Vivian Elaine Jackson

NEW TECHNOLOGY IN EDUCATION AS VIEWED THROUGH THE UTOPIC AND DYSTOPIC WORLDS OF SCIENCE FICTION

by

VIVIAN ELAINE JACKSON

(Under the Direction of John A. Weaver)

ABSTRACT

The use of educational technology has become a focus of reform efforts designed to enrich student learning. Proponents of technology view it as the panacea of education while others ask us to question this myth-information. Throughout America, school districts are designating millions of dollars for technology. Nevertheless, while there are schools with desirable infrastructures, too many schools are ill equipped for enhancing learning through technology. In addition, many classrooms house computers used to merely advance traditional teaching modes, e.g., drill and practice, rather than teach the importance of social responsibility for humankind and the environment through our use of technology.

This study is designed to analyze the reasons for the continued existence of challenges to the integration of educational technologies through the lens of science fiction literature and film. Metaphorically, participants link science fiction plots and characters to their orientations to technology, to present experiences with technology in the field of education, to their future expectations of technological advancements, and to the need to reconceptualize our understanding of technology as a mere tool. It is this association with the worlds of science fiction that provides educators and policy makers with an understanding of ourselves in relation to others and technology. Research into

teachers' attitude towards technology integration can provide relevant information regarding solutions to the persistent challenges facing the adoption of technology in education.

Participants' personal stories and their metaphorical analysis of science fiction indicate that educators' orientation to technology, self-efficacy, perceptions of technology, technology resources, and training and support are predictors of technology integration. In addition, educators' involvement in the planning stages of technology programs and their accountability for high-stakes testing are also significant factors. Conclusions derived from the findings suggest that those involved in technology reform efforts in education need to address educators' concerns for inclusion in the design, development, and implementation of plans for the integration of technology in classroom instruction.

INDEX WORDS: Autonomous Technology, Bias of Technology, Critical Pedagogy, Critical Theory, Cultural Studies, Education Reform, Educational Technology, Posthuman Culture, Science Fiction Metaphors, Technoscience

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VIVIAN ELAINE JACKSON

B. A. English Literature, Clark College, 1969

M.A. Education, Central Michigan University, 2002

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VIVIAN ELAINE JACKSON

Major Professor: John A. Weaver

Committee: John A. Weaver
Karen A. Ferneding
Ming Fang He
William M. Reynolds

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DEDICATION

This study is dedicated to all of those who dare to teach and learn in the midst of oppression and whose radical voices collectively resonate with a tone of hope for our present and future worlds of education.

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This study is the result of a collaborative effort and it would not have come into fruition without the input of others. I would like to express my deepest appreciation to the following individuals who have enriched my educational experiences and supported my efforts in a variety of ways. I sincerely hope that you recognize the value of your contributions and it is also my desire that you are satisfied with the results of our effort.

I thank my dissertation chairperson, Dr. John A. Weaver, for his expertise and guidance. It is his interest in sci-fi that encouraged me to consider the genre for this study. Dr. Weaver motivated me to reflect on the importance of fantasy, and how as a child I viewed reality and fantasy the same. As a result, I am more captivated by science fiction and I am aware that *what has been*, *what is today*, and *what is to come* are first conceived within one's imagination.

Dr. Weaver was never too preoccupied to answer my questions or to guide me through difficult situations. I could always count on his positive and caring delivery of advice. Dr. Weaver's support kept me on a steady course to complete this study. I cannot thank him enough for believing in my work, trusting my ideas, and living what he teaches.

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Dr. Ming Fang He has been and continues to be the connection between doctorate students, living and working throughout the state, and Georgia Southern University. She often travels long distances to meet with us, providing inspiration and encouragement. Dr. He was generous with her time and effort on behalf of this study. I am truly grateful.

I share Dr. Dan Rea's concerns for underserved students in elementary, middle, and high school environments. His writings on motivating youth inspired me to study the attitudes of a digital generation. Dr. Rea reminded me that even my own learning should be fun, and that anything short of serious fun is not learning at all.

Dr. William Reynolds is an inspiration to all students that enter his classes. The support I received from him was invaluable. Dr. Reynolds reminded me that research should present a design for improvement rather than be the landscape for nonproductive complaints. In fact, through his conversations and writings, I have learned even more about patience, reciprocity, reflection, persistence, and power. His passion for teaching and learning makes him a model for educators to emulate.

I am truly indebted to the participants in this study for their professionalism and commitment to working in the best interest of children. They welcomed me into their classrooms and offices with kindness and open-mindedness. Their conversations about the delights and dilemmas of teaching with technology are enlightening.

Finally, I thank my husband, Timothy Jackson, without whom none of this would have been possible. He made every trip with me from Atlanta to Georgia Southern University throughout the course of my studies. He has made this accomplishment and the rest of my life so very special. I believe him when he says that my best years are yet to come.

TABLE OF CONTENTS

Page

CHAPTER 1
CHARTING THE COURSE

There are no passengers on spaceship earth. We are all crew.
- McLuhan (1974)

Setting the Stage for an Exploration

America is a technocultural society (Ferneding, 2003), which is evident in the ways technologies alter our perceptions of the world as well as our interactions with others. In fact, technology influences our perceptions of ourselves and it has the capacity to influence the construction and reconstruction of our identities. From childhood, I have listened to the concept that we are products of our environment. This environment or culture is not neutral because many of us experience the discomforts of the many faces of injustices. In comparison to culture, technology is also not neutral (Feenberg, 2001; Ferneding, 2003). For this reason, technoculture is a space in which the characters often fluctuate between the roles of the oppressor and the oppressed. It is also a space where the conflicts are nurtured by greed.

In studying technology integration in the field of education, I refer to Sadar's (1997) discussion of cultural studies. Sadar (1997) describes cultural studies as the study of almost anything in which oppression exists. Therefore, the study of the resistance to technology integration in education is a cultural study engaged to determine how those who ignore the voices in the field mold the lives of educators, and how silent voices become a part of the problem rather than a part of the solution.

Whenever we engage in a cultural study to find solutions to conflicts generated by power struggles, we are involved in critical research. Therefore, our attitude and behavior

as researchers are guided by a critical theory. Because cultural studies and critical theory focus on transforming the lives of the oppressed through action and the use of the imagination, the study of science fiction provides a metaphorical, an analogous, and a multidisciplinary approach to understanding our circumstances and the need to change for the sake of humankind. Sci-fi presents the possibilities associated with our fixation with technology and the power struggles that incur.

Although technology provides us with an element of convenience, science fiction narratives examine the oppressive outcomes of technology and the challenges we face when we fail to be socially responsible. Through sci-fi, we view the possibility of who we could become in light of who we are. As we strive to successfully confront the challenges of technology, we ought to consider science fiction as the genre that unlocks the imagination, which is "an important instrument in the task of continually holding the goal up to view" (Marcuse, 1968/1992, p. 16).

In a world of global communications and technological advancements, education has been presented a challenge. In fact, the present system of education reform is experiencing the crippling effects of a lack of progress in the area of technology. Within the technology plans of state departments of education, such technological challenges as accessibility, training, human and financial resources, effective planning, and implementation are identified. Regardless of these challenges, this is an age in which technology is considered the redeemer within education reform, as reflected in technology plans throughout American education systems.

Providing a quality education also requires that our school systems design effective practices that allow students to recognize their responsibility to safeguard

society from the misuse of technoscience. Therefore, teachers as well as students must develop an awareness of the important position of technology in our daily lives. We will always be faced with technology, for it is a readily accepted extension of who we are becoming. Because of the effects of technology in the lives of students, the classroom environment ought to reflect the interactive learning nature of technology as an extension of mankind. This knowledge should be used to teach the need for students to direct their experiences with technology in a productive manner.

This study examines our educational systems' focus on technology and educators' perceptions of technology through a comparative analysis of educators' lived experiences and technology's position in science fiction. Analogous relationships are drawn between characters and occurrences in sci-fi and their personal experiences with technology. I chose to use the construction of metaphors and analogies in order to establish an even more vivid impression of these experiences in the minds of participants and readers. I contend that science fiction is an important genre that can be used to explore human issues through metaphors, analogies, and exaggerations.

The theoretical framework for this study includes critical theory's social critique of technoscience. Using in depth interviews, I collected the stories of educators whose voices have been silent in education reform**.** The lived experiences of classroom teachers voice the need for change and the findings uncover the need for a reconceptualization of technology in education.

Autobiographical Roots and Personal Reflections

Works of art bear the signatures of their creators, not simply their autographs but the motivation that drove them to create in the first place. That motivation is found within

their life experiences and their creations usher them into a state of Being and Becoming. In concurrence with Heidegger (1962), Denzin (1989) says that we are "talking beings" who live and talk ourselves into existence through narrative structures (p. 71). Such is true of this study, which affords me an opportunity to examine myself within contexts that shape my interests as I am Becoming.

My interest in literature can be traced back to elementary school, where I listened attentively during story hour, with an eye of imagination that is typical of children. This fascination with stories continued and I chose literature as my course of study at Clark College (now Clark-Atlanta University). As a literature teacher, I am aware of the power of literature to connect us to a world that is bigger than our immediate surroundings, and which stimulates the imagination. Science fiction is the genre that captivates my interest, not simply because it is entertaining, but because it exposes dilemmas in society through extended metaphors.

My first introduction to futuristic technology was in the early sci-fi films, e.g., "Lost in Space" (1965). I recall various handheld devices and web cams. As a child, I was captivated by the thought of life on other planets and space travel. However, what escaped me was the fact that there were no notable African American characters in these stories. During that era, this was not unusual for a child as young as I to overlook this situation because African Americans on television in strong roles were not the norm. With the emergence of the Civil Rights Movement came a heightened awareness of racial stereotypes in film and the exclusion of African Americans in serious roles.

As a result of becoming engrossed in the Civil Rights Movement, my interest in sci-fi changed and for a considerable amount of time, I completely avoided the genre

until “Star Trek” presented African Americans in stronger roles. For example, Levar Burton brought substance to the character of Geordi La Forge of the Enterprise in “Star Trek: The Next Generation” (1987). Burton moved into the role of science fiction writer with *Aftermath* (1997), a depiction of the fall of humankind and minorities’ quest to survive in spite of oppression. It was through the work of John Weaver, *Science Fiction Curriculum, Cyborg Teachers, and Youth Cultures* (Weaver, Daspit, & Anijar, 2003) that I was inspired to consider sci-fi as the mirror of educational experiences with technology reform.

I gaze into the mirror of my experiences with educational technologies from my own classroom. I have worked in the same non-traditional school environment for 26 years. This school has always been a joint venture between an urban school district and a national dropout prevention initiative. It remains a small storefront school with less than twelve staff members. The student population has rarely exceeded eighty and it is limited to 11th and 12th grades. But, the school itself has experienced one metamorphosis after another. Sending all staff members into new states of adjustments is an obvious result of the changes.

When I joined the staff, the school was an alternative school designed to serve any student that was referred by the local school district because of attendance and behavioral problems. Several years later, a major fast food corporation found interest in financially supporting the school in a joint venture with the district and the dropout prevention initiative; and the school's name was changed to include the name of that corporation. When corporate interest changed, the school’s name was changed as well.

With the entrance of the new millennium, our school became a high-tech, business-oriented school environment. The dropout prevention initiative received multi-million dollar grants from foundations interested in expanding new and innovative learning environments for students whose academic success in secondary education is threatened by poor attendance, pregnancy, disruptive behavior, etc. Again, this change was a top-down decision that generated many challenges and it may account for initial resistance.

Veteran teachers, the majority of whom had little computer experience, were among the first to complain. As a result, teachers were apprehensive when the high-tech design was introduced. Even more unsettling was the attitude of the site director, who aggressively fought against the change. The site director was not included in the decision-making process and his voice was one of dissension. Coupled with limited computer experience, the staff's lack of involvement in the planning stage could account for their initial resistance.

During training, staff began to realize that a high tech environment afforded them an opportunity to individualize instruction, which before had only been a wonderful concept that was not always practical when needed. In fact, there were other components in place that truly gave students opportunities that they might not experience otherwise. These opportunities include dual enrollment and job shadowing. In fact, teachers were allowed to think critically, to explore new possibilities, and to design lesson plans with the students involved in the whole process.

What more could an educator want? This site provides unlimited possibilities for students and teachers to move "in-between." But, few staff members recognize that there

is an "in-between" that welcomes all. Too much time is devoted to misuse or no use of technology and most refuse to exercise their newfound freedom to explore and to design projects and research activities that stimulate the critical and creative minds of youth. Because of their reluctance to emerge from the box, I am led to question whether or not our perceptions direct the building of our own constraints.

The program's administration has attempted to involve teachers in evaluating new software and in restructuring the online curriculum in support of state standards. Teachers are given the freedom to incorporate the online curriculum in the designs of state-mandated course content in a manner that best meets the needs of students. The online curriculum serves as prescriptive tutorials, while teachers are afforded opportunities to engage students in hands-on activities, peer-to-peer tutoring, Internet research experiences, video design, film interpretation, etc. However, some teachers have determined that meeting the needs of students is centered on test preparation. Stress accompanies teacher accountability for high-stakes tests and a primary focus on testing limits the productive and creative possibilities in the classroom. It appears that tradition has an invisible hold on many of us, which affects the way we view our opportunities and the sites of our oppression.

Unlike teachers in more traditional environments, I have the opportunity to chart the course of my practice in using instructional technology while mindful of the fact that I are not exempt from state and district mandates. Though bureaucracy exists, I do not feel its pressures in the same manner as teachers in traditional settings. No one is constantly looking over your shoulder to critique your every move. However, the most

tense-filled and oppressive moments are those involving the return of high-stakes test results because students' graduation status is determined by these results.

It appears to be somewhat of a paradox that some semblance of freedom coexists within oppressive situations. In our quest to reveal and counter the effects of oppression, we are apt to find spaces of freedom, even if these spaces begin within the imagination. These spaces provide opportunities to breed hope, to build community, and to generate strategies to oppose and eliminate oppression. Such is the case with science fiction. As we analyze utopias we may find evidence of oppression; and within many dystopian literature and film, characters' actions are guided by a mental image of a better world.

It is reasonable to question whether the computer will replace the human touch of teachers, classroom parents, and community volunteers. I would rather consider redefining their roles because many are merely considered as human resources available to assist in improving test scores by tutoring students labeled as deficient. Classroom volunteers could serve as mentors and assist in developing service learning and real world problem-solving activities that afford students opportunities to explore, through the Internet, a world that many may never see.

Even an adventure through a neighboring town has been nixed, along with field trips to museums and nature trails because of the scarcity and cost of fuel. However, surfing the Web is an exploration that may stimulate the critical thinking of young people who may become the menders of their broken communities that are too often reminiscent of third world countries. I find that this exploration is a welcomed change from the pressures of standardization; yet, my students are successful on standardized tests because they have been encouraged to think critically. My experiences as a doctorate

student reintroduced me to the child that still lives inside. This child inside has a vivid imagination. She questions ambiguity without reserve and she is more aware of the need to challenge students to do the same.

I have listened to teachers in traditional settings complain about a lack of technology and technological support. Their lived stories tell of educational experiences in which they find themselves victims to standardized tests, slaves to scripted reform packages, and sufferers from a lack of respect given them by policy makers and administration. Teachers in traditional and non-traditional educational environments share some complaints, regardless of their varying degrees of teacher freedom.

I chose to research the use and misuse of technology in non-traditional settings. This research examines the ills and presents an idea of a space of unlimited possibilities in education. This research study was designed to be a serious fun trek that frees our imaginations to be caring and socially responsible in creating and using technology.

Why have I chosen to do this research? I am passionate about dispelling the notion that technology is a dangerous entity by pointing out the fact that man is responsible for using it destructively and constructively. Some teachers may tend to be more critical of technology because of the notion that it endangers true learning. What is also an issue is the fact that too many teachers are computer illiterate, while the students surpass them in technological knowledge. There must be a bridging of that gap. In fact, children view technology much the same as I viewed my fantasies as a child. Technology is a learning experience; and adults and children must be taught to use it to improve society for all people, while eliminating any desire of utilizing it for destruction.

I chose to use science fiction for its metaphorical power. Metaphors are usually associated with poetry. However, we are beings that move and speak in rhythmic patterns. Although we are not cognizant of the fact, we often think and make decisions metaphorically. We describe our relationships with others in metaphor and we find use of metaphor in our informal conversations with self regarding pleasant and disconcerting thoughts. In Chapter 22 of *Poetics* (350 B. C.), Aristotle says, "But the greatest thing by far is to have a command of metaphor. This alone cannot be imparted by another; it is the mark of genius, for to make good metaphors implies an eye for resemblances." The ability to construct metaphors suggests that a person has an instinctive perception of locating their circumstances within unfamiliar or alien settings.

Who am I as a researcher? As a researcher, I am an observer who has practiced the art of knowing when to be silent. However, this silence is no longer induced by the motives of external forces that find favorable opportunities to gain from the silent voices of women and marginalized people. My experiences in Curriculum Studies at Georgia Southern University have prepared me to recognize those forces and their motives. My silence is a temporary, yet recursive, exercise of my own will; and my silence is, constantly, broken and restored as needs arise. When my silence is broken, what resounds is the voice of a woman whose purpose in life is to improve the life of another. As educators, we have been afforded the opportunity to affect the lives of students. Breaking the bounds of silence, unlocks the voices of those whose lived experiences and imaginations hold the keys to education reform's effective use of technology.

As a teacher in a technology-oriented environment, I was once engrossed in my own little world – my classroom. I planned without major concern for what was taking

place outside this world, until staff meetings, classes at the university, and district conferences brought me back to the reality that things were not as pleasant for others. However, nothing has redirected my thinking about technology integration, its challenges, and education as a whole than this study.

It was a difficult task for me to gain entrance to some schools and I had entered the research phase somewhat naïve. In fact, some teachers were reluctant to talk about using technology in the classroom and this was definitely a surprise to someone that always supported researchers. On one occasion, a principal called me about the study after having received a letter. He drilled me about what I wanted to know. After talking with him for some time, he found excuses not to allow me to go any further than his phone call. His explanations included: (1) Time was of the essence for him because he was a new principal in the system; (2) There were very few teachers on his staff and he needed time to design orientation for the new members; and (3) There were not enough teachers and some might not be interested in participating. Nevertheless, he promised to contact me shortly after the beginning of the new school year. This never happened.

After many attempts to locate participants for this study, I was successful in finding six educators that were eager to share their traditional and non-traditional experiences in education with technology. It was through conversations with one participant that I found a probable cause for educators' reluctance to engage in dialogue about reform efforts' focus on technology as the panacea. Many educators are skeptical to discuss the subject because they are not certain that their anonymity will be guaranteed. For such skeptics, fear of negative ramifications of being associated with such a study was paramount. This study did not utilize a pencil and paper type survey of check offs,

but, rather, lengthy conversations that would engage real emotions from their narratives of experience.

As I interviewed educators in the field, I found myself reexamining my views of technology integration. This was brought about as I listened to teacher complaints within what many would suggest as utopian worlds of education – high-technology schools. I have become more cognizant of the fact that a computer and an electronic curriculum are viewed by program designers or administrators as the only "instruments" needed. These teachers sorely needed instructional materials, paper, and supplies. Most of them use their own funds to support this shortage.

Even more alarming was the fact that school district budgets for technology took precedence over funding human resources needed in the schools. At one research site, a paraprofessional's job security was at stake. During the time of my preparing to interview her, I found that the district was being subjected to complaints about positions being loss. As I spoke with the paraprofessional participant, I gazed into eyes of uncertainty; and yet, they were the eyes of someone who wanted to help me. Certainly, she was more important than the computer at which she sat.

During the course of scheduling and conducting interviews, I was actively involved with my own students. On one particular day, a student asks that I review a passage on his computer. It began with a quote from Swados' *On the Line* (1957): "Never mind the machinery. Remember the men" (p. 62). Education's panacea uttered these words and I began to realize that the machines themselves utter warnings. At that point, I recalled the importance of Ferneding's (2003) work because it echoes this same warning

that we must recognize the importance of our human resources and the arts that often experience a permanent demise within education in favor of technology.

Although I support the integration of technology, I concur that we cannot afford to design budgets that ignore the importance of people and the disciplines of art and music. This study has opened my world by tearing down the imaginary walls of my somewhat safe haven. As a result, I now recognize that this safe haven is not so safe after all because there are far too many challenges to the effective education of a space-bred generation.

Context of the Study

Technology is a viable part of society. However, schools tend to consider the existence of computers in the classroom as additional tools that come close to being viewed as useless things that merely occupy space. At best, computers have been used to entertain rather than instruct and inform students of their social responsibilities. As a result, educators have failed to visualize the interactive capabilities of computers in relation to the humans who use them.

Each day, I enter a high tech school environment where the curriculum is electronic and the record keeping system for teachers is computerized. Because they are media kids, the students can work on course content for hours and they still manage to use computers to access online search engines and libraries. However, the idea that media could find a space in the center of curriculum poses a challenge for teachers.

Many teachers have not kept abreast of technological advancements. In fact, many educators are not aware of technology's influence in the lives of students as well as in their own lives. An even greater challenge is in training educators in the effective use

of computers in education. Many are reluctant to incorporate technology because they view the students as more knowledgeable than they. There is some truth to those assumptions; as a result, states are requiring teachers to become adept in the use of technology.

We cannot dismiss teacher complaints and concerns about technology as the driving force behind education reform. In an age in which education reform has established technology as its new savior, schools are experiencing cutbacks in funding computers. As we welcome the voices of educators through narrative expressions of their experiences with technology, it is necessary to be mindful of the fact that our individual experiences are guided by our varied perceptions of technology.

According to Segal (1994), "Science and technology would be used as though, like the Sabbath, they had been made for man, not (as at present and still more so in the Brave New World) as though man were to be adapted and enslaved to them" (p. 115). Our lives are becoming enslaved to cell phones, computers, the ATM, the Internet, computers, etc. Paradoxically, the very things that free us are the things that we allow to enslave us and destroy others. Such a complicated discourse as this is nonexistent in the instructional plans for education reform, where it has earned a rightful place.

The underlying problem within our system is the fact that instructors fail to teach *responsibility* in utilizing science and technology in the protection and perpetuation of life, globally. To the contrary, many teachers are provided carefully written scripts that are void of such dialogues and procedures to stimulate discussions. However, other educators avoid opportunities to escort their students into those spaces in-between where there is limitless knowledge of self in relationship to every entity in this world. There

must be balance in anything we do and there must be the possibility to travel in various spaces that ultimately give rise to a better society for all of nature and mankind. As a result of our continued negligence in teaching social responsibility for the development and use of technology, man's misuse of technology will continue to make life comfortable for many, while it will continue to destroy masses of Earth's people and its natural resources.

The effects of global warming cannot be denied. However, few of my students were aware that it is the result of humankind's choices. In fact, we ought to consider how far artificial intelligence will progress. Presently, it is used in various professions, e.g. banking, the military, engineering, and medicine. What alarms me is the thought that artificial intelligence may develop in such a way that it will control our being to the point that we become subservient to the machine.

We ought to consider sci-fi as a predictor of what technologies will become in the future and what effects they will have on society. All effects are far from positive. The robot in "Lost in Space" (1965) alerts us to this fact: "Danger! Danger!" "Gog" (1954) and "Colossus: The Forbin Project" (1970) are two films that depict the creation of a computer to benefit humans that ultimately turn on their creators. Whereas Gog's conflicts are the result of sabotage, conflicts with Colossus began when it started to learn on its own. Its final deduction was that human beings are threats to Earth's security and, therefore, a technological dictatorship was crucial. Both films alert us to what could happen when human beings abdicate their responsibilities to technology. Sci-fi speculates that AI will eventually spell death and destruction. The thought of how we are engaged in

using technology so irresponsibly motivated me to use sci-fi as a mirror of life's possibilities.

Significance of the Study

This study will contribute to educators' awareness that paradoxically, through science fiction, we are able to uncover the *reality* of life when mankind has failed to be socially responsible in designing and implementing technology. Furthermore, science fiction provides a metaphorical depiction of the stakeholders in technology-driven reform efforts.

As a language arts teacher, I was drawn to Morton's (1996) brief analogy of the educational environment and the technological land of Laputa in *Gulliver's Travels*. Science and technology are the focal points of the flying island of Laputa. The Laputans practice astrology and its importance is observed in their clothing, all of which are adorned with planets and stars. At the center of their circular island is a cave in which astronomers oversee a magnetic lodestone that guides the movement of this island where mathematical concepts are valued above everything. Nevertheless, progress was virtually non-existent because ludicrous procedures were followed over and over again and the Laputans were oblivious to a need for change. This is equivalent to the attitudes of many schools regarding change, especially as change relates to the experience of computers in the classroom. We cannot undermine the importance of technological advancement but we ought to be responsible in experiencing and using technology.

In education, we find inequities in the access to educational technologies. Therefore, all students are not afforded the same opportunity to experience technology. "The reason that technology has not had an impact on teaching and learning is that

students have, for all intents and purposes, not actually used the technology" (Norris, Sullivan, Poirot & Soloway, 2003, p. 15). Teachers are often held responsible for students' lack of experience with technology; however, billions of dollars are poured into technology in education and one or two computers, in the classrooms, are the only visible signs of funding. Education reform policy makers ought to be cognizant of the fact that they are responsible for the experience, or lack thereof, of technology in education. Without accepting this responsibility, our educational institutions will continue to avoid teaching a responsible use of technology.

Rather than a mere focus on improved test scores, the educational environment ought to encourage students to use technology to explore the world for solutions to issues that plague society. Providing such experiences builds critical thinking and empathy. A responsible use of technology is grounded in an ethic of caring about all of Earth's people, creatures, and natural resources. As Dr. Seuss (1971) writes in *The Lorax*, “Unless someone like you cares a whole awful lot, nothing is going to get better. It's not”.

We must also be aware that technologies influence the way people define themselves and others. We have only to experience the openness of what appears to be an unlimited world of the Internet. Individuals can surf through spaces where a person's gender, race, and age cannot be determined, and where predators can move, with little detection, throughout various virtual communities. For example, Turkle (1995) examines identity-structuring elements in cyberspace, such as online role-play.

As we regress to our childhood, we find ourselves constructing identities through the games we played and many of us continue to do so. This same situation exists with online game communities. According to Turkle (1995), however, online role-playing

games are far more suggestive, psychologically, than the ones we play in the physical. Online role-play blurs what is play and what is real. Many people have moved the virtual game of role-play into their concrete worlds, which is evident through news reports of youth and adults finding themselves in unhealthy and dangerous liaisons. Therefore, we must teach students, by example, how to experience and use technology in such a way that their choices will not create dilemmas but will benefit their environment.

According to Morton (1996), "Our schools will become ever more like the Laputian community with its repetitive procedures--but, while Laputa continued to exist in its repetitive ignorance, our schools, like some of our industries, will not" (p. 1). It is also the aim of this study to contribute to an awareness of the need to reject nonproductive and repetitive procedures that are charted by education's traditions. A major step in this direction is to involve the silent voices of the children, parents, and teachers. Once the voices of the key players are heard, we become cognizant of multiple ways of thinking and perceiving varied directions for change. However, it has been and continues to be a tradition, in education, to look towards the “policy elites” for directions (Ferneding, 2003).

As we entered this century, decision-making bodies did not seriously involve teachers in the planning process. We can say for certain that education reform strategists entered this century just as they left the last. Teachers enter during the implementation stage of instructional improvement, and they continuously struggle to execute programs of which they had no voice in selecting or planning (Cuban, 2001; Ferneding, 2003). For this reason, Dewey’s utterance that we merely experience an illusion of democracy continues to be heard. Cannella (1997) says, “Educators (and I include myself) have not

constructed a language that gives the message that we want to learn from and with parents and their children" (p.107). Furthermore, "We listen to outside experts to inform us, and, consequently, we overlook the treasure in our very own backyards: our students" (SooHoo, as cited in Poetter, 1997, p. iii).

As educators, we must break with traditions and recognize the value in hearing the voices of those who have been created as the Other, and who are treated as the Other by those who share both descriptions because we are all socially responsible for remedying the ills of society. Therefore, we cannot afford to remain ignorant of technology's essence and our individual and collective responsibility to this world. Aristotle emphasized the importance of recognizing the essence of something as being what that thing happens to be. As we approach technology, we must understand *what* it is, which may move us beyond what we *think* of it in terms of usage.

Our system of education has relegated technology, and computers in particular, to a classroom tool. We label pencils, pens, and rulers as *tools*. There is no possible interactive experience with these tools because we can only use them. They do not have the capacity to respond as an entity separate from a person. However, an individual only has to observe students engaged in technological experiences to recognize that the computer and a student are experiencing each other. I have observed my students become so immersed in this relationship that, temporarily, time becomes some limitless idea in space.

The in depth interview unlocked the voices of the inhabitants in the field, who work in support of the students. These voices express their perceptions of technology as well as their involvement with technology in education reform efforts. These voices also

provide characteristics of a new space in education reform where a relational community is not enslaved by science and technology, but whose rhizomatic nature will provide even more new spaces to experience technology in support of life and growth. Unlocking these voices ought to significantly encourage complicated discourses from which unlimited possibilities for the development of a new and more socially responsive curriculum reform.

The beneficiaries of this study include all stakeholders in effective education reform. An effective education reform ought to be designed to improve the learning experiences of students who become knowledgeable of the essence of technology, and to teach students the need to use technology for the improvement of the lives of all, rather than for the neglect or destruction of anyone. Participants in this study benefit by sharing their experiences, and by recognizing from their stories why our system of education is in its present condition as it relates to technology. Participants recognize their positions in fostering a static system of education that nurtures its traditions, while presenting itself as a structure in society that seeks to unlock technology's transforming possibilities.

This study provides educators and policymakers with varied perceptions to consider when developing and implementing technology plans that are socially driven. These stakeholders ought to recognize, through this study, that man was not created for science and technology. To the contrary, technoscience exists for man to experience in order to improve the environment in which they live and work.

Statement of the Problem

Education reform has promoted new technology as the savior of the education system in America. Many are convinced that technology-enhanced teaching and learning

will improve failing test scores. The findings of Scheidet (2003); Page (2002); Norris, Sullivan, Poirot, and Soloway (2003); and Jones, Staats, Bowling, Bickel, Cunningham, and Cadle (2004) conclude that integrated computer technology is effective in raising test scores.

State departments of education have designed technology plans in keeping with the Federal Ed-Tech program, which is described in the U. S. Department of Education's "Enhancing Education through Technology," and they depend on matching federal funds to support their technology programs. State goals are in conjunction with Ed-Tech's goals "to assist students in crossing the digital divide by ensuring that every student is technologically literate by the end of eighth grade, and to encourage the effective integration of technology with teacher training and curriculum development. However, research studies reveal teacher resistance to the implementation of technology integration, which minimizes the opportunities to guarantee the technological literacy of students (Cuban, 2001; Ferneding, 2004; Snider, 2002; Prain & Hand, 2003; Finley & Hartman, 2004).

Purpose of the Study

The purpose of this study was to determine reasons for resistance in the implementation of technology plans in education. I examined teachers and support staff's perceptions of technology, their methods of integrating instructional technology in the classroom environment and the barriers to successful integration.

Findings will be analyzed through the lens of science fiction by constructing direct comparisons between the content of science fiction film and literature and the experiences of educators in the field. In addition, this study will provide participants with

the opportunity to imagine and describe a space in-between where staff and students are encouraged to experience technology in an approach that promotes a relational community whose foundation is social responsibility in the creation and use of technology.

Research Questions

The need continues for policy makers, educators, and education reform advocates to critique American education's position within technology integration. Therefore, this study seeks an answer to an overarching question: During an age of rapid growth and advancements due to science and technology, how does education in America continue to be plagued with challenges in using technology to enrich students' learning for life and to promote their need to be socially responsible?

I contend that when each individual functions responsibly we open the umbrella of social justice. However, American education's technology integration, with the flavor of social awareness, is deterred. In order to determine how this situation continues to exist, specific questions must be addressed: (1) How involved are teachers, principals, and school support staff in designing and implementing technology plans? (2) What roles do teachers play in technology's marginalized position? (3) What are educators' perceptions of technology as an integral part of the human experience? (4) How ought we to study technology in such a way that it can be a problem-solving and socially transforming experience? (5) Who benefits from technology in education reform?

These questions were intended to encourage participants and readers, inclusive of myself, to challenge viewpoints of technology integration in education, to recognize the influence of technology in our lives, and to evaluate *self* as socially responsible in

teaching the use of technology. The use of science fiction as metaphors for our educational experiences was intended to create an opportunity for us to recognize how our thoughts and actions are metaphorical and how metaphors shape our views of the past, present, and future.

Terminology

Technology

Technology is commonly referred to as either information technology (IT) or educational technology. The National Center on Accessible Information Technology in Education defines information technology as computers, computer hardware, software, and all telecommunications equipment (e.g. beepers, cellular phones, and teleconferencing equipment). Information technology includes multimedia and video products, duplicating equipment, and fax machines.

Those devices used to enhance the processes of teaching and learning are considered educational technology. Computer systems, printers, digital cameras, scanners, hardware and software, the Internet, and networking systems are important educational devices. In fact, educational technologies include electronic libraries and texts, which are now replacing books (old technology).

In this proposed study, "technology" is defined from two approaches: instrumentalism and substantivism. According to Feenberg (1991), the substantive theory suggests that technology is not technological, but "constitutes a new type of cultural system that restructures the entire social world as an object of control. This system is characterized by an expansive dynamic which ultimately mediates every pre-technological enclave and shapes the whole of social life" (p.7). The instrumental view of "technology" is the most popular. This view sees "technology" as the tool that man

makes use of as he desires. The instrumental theory states, "Everything depends on our manipulating technology in the proper manner as a means" (Heidegger, trans. 1977).

Technoscience

Ellul (1964) speaks of the challenge we face in rejecting the traditional viewpoint that technology is a product of science. Ellul (1964) contends that this idea is based upon scientists' study of the physical sciences, which does not hold true for other sciences. Technology did not develop and extend itself into our lives until science made its appearance. However, in *The Technological Society*, Ellul (1964) says, "Historically, technique preceded science; even primitive man was acquainted with certain techniques" (p. 7).

Today, when we speak of technology in relation to science, we think of a collection of technical operations that are considered the preparatory stages of scientific research. On the other hand, a distinction between science and technology becomes less obvious when we consider the fields of biology, sociology, and psychology. Technique is so intertwined with them that we cannot determine where one stops and the other begins. To be even more precise, Ellul (1964) says that everything is technique in the application of such sciences. "But it is not application which characterizes technique, for, without technique . . . science has no way of existing" (p. 9). With these thoughts in mind, Ellul (1964) concludes, ". . . the relationship between science and technique ought to be reversed" (p. 7).

Technoscience, a term coined by Bruno Latour, is used to denote the amalgamation of science and technology. The term emerged as a result of Latour's (1987) study of the exclusion of many people from the credits given for scientific endeavors. In

Science in Action (1987), Latour explains that there are "armies" of people involved in science, other than the handful we refer to as "academic scientists." In fact, Latour (1987) contends that scientists' work can only begin when others have done the groundwork. Without those who lay the groundwork, powerless scientists are left in unimportant and uninteresting situations.

According to Latour (1987), "science and technology . . . is a figment of our imagination, or, more properly speaking, the *outcome* of attributing the whole responsibility for producing facts to a happy few" (p. 174). In accepting the idea of *science and technology*, we are contributing to the exclusion of others and the celebration of a few people who seek power and leadership roles. Slaughter and Leslie argue (as cited in Anderson, 2001), "Technoscience makes impossible the separation of science and technology, basic and applied research, discovery and innovation . . . Technoscience is at once science and product," just as McLuhan (1964) noted, "the medium is the message." Ihde posits that use of the term *technoscience* implies that a difference between science and technology cannot be discerned.

Generally speaking, the study of technoscience creates an awareness of the relationships between mankind and technology. From a social context, we are guided through a space of understanding how society is both influenced by technoscience and *is* an influence on developing technologies. "Our travel through technoscience should then be full not of microbes, radioactive substances, fuel cells and drugs, but of wicked generals, devious multinationals, eager consumers, exploited women, hungry kids and distorted ideologies" (Latour, 1987, p. 175). Therefore, the aim of *technoscience* is to

describe the ways in which our technological creations are sites for power struggles, dilemmas, and the construction of our identities.

The relevance of a cultural study of technoscience is obvious in the efforts of Haraway (1991), Hayles (1999), Weaver (2000; 2004) and McLuhan (1964). Haraway, Hayles, and Weaver's work examines the posthuman/cyborgian nature of mankind. In comparison, McLuhan's cultural study of technology, as extensions of man, also provides a clear picture of how a person's dependence upon technology has extended itself into his/her life. In addition, we gain insight into the influences of technoscience through the works of Ihde and Pickering, both of whom share an interdisciplinary perspective of technoscience. A cultural study of technoscience opens us up to a space of always becoming because there are no set boundaries. In a published interview with Casper Jensen, Andrew Pickering says,

> A politics of becoming would be a politics of experiment, desperately interested in the visible world, material and social, continually trying this and that without pretending to know the outcome in advance. It would also be a politics of the imagination, continually searching for other ways to imagine . . . (Jensen, 2003, p. 94)

Hyperreality

Hyperreality refers to a simulated reality or a virtual reality. Baudrillard discusses Disney theme parks as simulations of reality. We can travel to the virtual worlds of space travel and the twilight zone. However, we can experience the hyperreal from the comforts of our homes. Watching court television places some in a hyperreal world where our experiences are simulations of the experiences of those on site.

As we watch extensive coverage of the war in Iraq, we are experiencing to some degree what soldiers must be experiencing, although it is not truly happening to us.

However, we walk away having had an experience with an illusion that has truly affected us. We can also witness the hyperreal experiences of those engaged in playing video games and the simulated experiences of science labs and city construction planning found on the Internet.

This study addresses the seductive and illusionary power of hyperreality. In fact, hyperreality has the power to influence the structuring of a person's identity. However, according to Kincheloe (1993), when students and teachers apply what they have critically derived from a study of "the hidden power of hyperreality, they employ their critical system of meaning to develop a democratic vision of what they can become" (p. 99). Therefore, in addition to its seductive and illusionary qualities, hyperreality has the power to influence a person to envision a better future.

Science Fiction

The genre of science fiction means many things to many people. Damon Knight, the founder of Science Fiction Writers of America, lists the following as elements of science fiction on their website: (1) Science, technology and invention; (2) The future and the remote past, including all time travel stories; (3) Extrapolation; (4) Scientific method; (5) Other places--planets, dimensions, etc., including visitors from the above; and (6) Catastrophes, natural or manmade. However, when we think of its content we concern ourselves with techno-scientific concepts, a utopian view of what the world could become, and a dystopian view of the present world.

According to Weaver, Anijar, and Daspit (2004), science fiction is the genre "through which the future can be speculatively visualized in the present" (p. 1). The same is the case for sf criticism. The focus of sf criticism could "shift from scientific

accuracy to social criticism, thematic structures, archetypes, cognitive estrangement or political correctness, but the bottom line remains the same--the medium is there to serve the message, and it is the message that we must study" (Pierce, 1994, p. 133).

Cultural Studies

According to Sardar (1997), "culture seems to be (almost) everything and cultural studies the study of (almost) everything" (p. 5). Cultural studies attempts to describe how the lives of people play out within their culture and it is about how culture speaks for them and critical theory determines its attitude. Cultural studies is concerned with oppression and the need to uncover the oppressor. It focuses on the move to empower the oppressed so that their lives are transformed through imagination and action.

Cohen (1994) describes cultural studies as "a multidisciplinary approach to culture that aims to understand the ways people can intervene in sociocultural processes and to further facilitate that intervention" (p. 98). In comparison, Grossberg (1997) identifies cultural studies as an attempt to find solutions to the conflicts that arise when one entity attempts to exert its power in the lives of others. Grossberg (1997) suggests that searching for the answers to the whys of power struggles and oppression is constant. "It is, to use Stuart Hall's somewhat overly heroic image, a constant effort to 'wrestle with the angels,' the angels of theory and of the real organizations and productions of power" (Grossberg, 1997, p. 4).

In every area of our culture, including education, we can find technology extending itself. What is made even more obvious through cultural studies is the fact that technology has become one of our major cultural structures that has the power to

influence the construction of our identities. Therefore, this proposed cultural study focuses on America as technoculture.

When an individual acquires great power, the use or misuse of that power is everything. Will it be used for the greater good or will it be used for personal or destructive ends? Now this is a question we must all ask ourselves.
- Professor Charles Xavier ("X-Men: The Last Stand," 2006)

CHAPTER 2

AN AWAKENING

STRANGE is our situation here upon Earth. Each of us comes for a short visit, not knowing why, yet sometimes seeming to divine a purpose. From the standpoint of daily life, however, there is one thing we do know: that man is here for the sake of other men - above all for those upon whose smile and well-being our own happiness depends, and also for the countless unknown souls with whose fate we are connected by a bond of sympathy. Many times a day I realize how much my own outer and inner life is built upon the labors of my fellowmen, both living and dead, and how earnestly I must exert myself in order to give in return as much as I have received.

- Einstein (1931)

Through this review of literature, I provide an overview of the theoretical framework for this proposed study - critical theory. Critical theory has added, as a major focus, the culture of technology due to the utilization of technology to promote and secure the position of the privileged.

The theories of Heidegger and Feenberg are examined in order to develop an understanding of the power relations associated with technological advancements. By examining power and oppression, I recognize the importance of opening spaces within the field of education for complicated discourse and for an understanding of the need for a critical pedagogy.

This review also includes literature regarding the concept of autonomous technology, the bias of technology, and technology as extensions of education and curriculum. Related research studies of Cuban and Ferneding are examined in an effort to stimulate the questioning of technology in education reform. Literature will also illuminate technology as an extension of who we are becoming as people living in a technoculture, often referred to as a posthuman culture.

Within this review of literature, is an overview of science fiction that includes an expanded definition as well as the characteristics of science fiction. A brief history begins around 2700 B.C. with *The Epic of Gilgamesh* followed by a description of the influence of pulp magazines in the life of science fiction as a genre. The themes of the pulps vary but robotic themes are prevalent. In addition, community is emphasized in science fiction. Feminist and African American science fiction are stimulated and nurtured by the *need* for community and change. As a result, science fiction proves to be a source of parables and lessons that move us into spaces of unlimited possibilities.

The final section of this review of literature provides mirror images of our empirical environment through a tri-focal lens that merges critical theory, science fiction, and technology reform in education. This tri-focal lens enables us to rethink our perceptions of lived experiences up close, at a distance, from the past, in the present, as well as far, far away in the not so distance future.

The World Menders: An Overview of Critical Theory

Critical theorists stress the importance of questioning our sources of knowledge. Many individuals adopt the perceptions and opinions of others; and their unquestioning behavior reflects this attitude. Critical theory terms this attitude and behavior as *false consciousness*.

> Persons acting out of ideological false consciousness do not act freely and deliberately in the fullest sense. They deceive themselves regarding the true motives underlying their behavior. In so deceiving themselves, they allow a causal factor (a hidden, unconscious motive) to determine their behavior in ways that contradict their true interests (Ingram, 1990, p. 51).

It is in the interest and well being of society that critical theorists work. Revealing social injustices is the first step to ridding society of its ills.

We first hear the term "critical theory" used by the Frankfurt School, a philosophical thought that emerged in the Institute of Social Research in Frankfurt, Germany, during the early 1930s. Due to Nazi control, the Frankfurt School was forced to move from Germany in 1933. The School found themselves moving between Switzerland, France, and the United States. "After the war, in 1950, the institute returned to Frankfurt, although several of its key members, especially Herbert Marcuse, remained in the United States" (Surber, 1998, p. 130).

During the beginnings of the Frankfurt School era, the main characters were Max Horkheimer (1895-1973), Theodor Adorno (1903-1969), Herbert Marcuse (1898-1979), Jürgen Habermas (b.1929), and Walter Benjamin (1892-1940). The topics of their discussions covered the culture industry, capitalism, instrumental reason, science, and technology. "For the Frankfurt School critical theorists, art and culture were important components of the critique of modern forms of domination" (Hanrahan, 2000, p. 4). Although their views varied, critical theorists concurred that individuals' survival in a capitalist society required them to adapt to the law of exchange. "The prevalence of the law of exchange and the regimentation of opinion by the mass media etc., ensured that nearly everyone's behavior became regularized and compulsive" (Held, 1980, p. 168).

Max Horkheimer and Theodor Adorno

Horkheimer served as the director of the Institute of Social Research from 1930 to 1958. Alway (1995) says that Horkheimer was effective as an *academic entrepreneur* whose philosophy "concerned itself with the great fundamental questions about human social life, questions concerning the individual's relationship to society, the constitution

of communities, the role and meaning of culture, and the quality and status of social existence" (p. 24).

In "Traditional and Critical Theory," Horkheimer (1937/1992) examines the main difference between traditional theory and critical theory. According to Horkheimer (1937/1992), traditional theory encourages people to adapt to situations with societal rules of which they had no involvement in designing. "The content of mass belief, in which no one really believes, is an immediate product of the ruling economic and political bureaucracies . . ." (p. 252) that determine the rules. Regarding a traditional attitude, Horkheimer (1937/1992) adds,

> The individual as a rule must simply accept the basic conditions of his existence as given and strive to fulfill them; he finds his satisfaction and praise in accomplishing as well as he can the tasks connected with his place in society and in courageously doing his duty despite all the sharp criticism he may choose to exercise in particular matters. (p. 244)

Horkheimer (1937/1992) describes a critical attitude as "wholly distrustful of the rules of conduct with which society as presently constituted provides each of its members" (p. 244). Consequently, critical theory encourages people to not only critique their circumstances, but to become actively engaged in bringing about change. However, Horkheimer (1937/1992) contends that critical theory will never change, "until there has been a historical transformation of society" (p. 251).

In “Means and Ends,” Horkheimer (1947/1992) questions a person's ability to reason. Horkheimer says, "When pressed for an answer, the average man will say that reasonable things are things that are obviously useful, and that every reasonable man is supposed to be able to decide what is useful to him" (p. 35). In questioning man's ability to reason, Horkheimer (1937/1992) describes subjective reasoning as "essentially

concerned with means and ends . . ." (p.35); therefore, it "conforms to anything" (p. 42). Both the oppressor and those who work in the interest of the oppressed apply subjective reasoning. The emphasis is one of pragmatism - *whatever works in a given situation*.

The move to subjective reason from objective reason, which is based on universal truths, occurred when those *truths* began to be questioned. For example, the democratic concept of *the majority rules,* "was certainly not considered to be a guarantee of justice" (Horkheimer, 1947/1992, p. 44); and "All men are created equal" is not an absolute truth that guarantees equality for all people. Horkheimer (1947/1992) says that the proletariat accepts social injustices as facts. This attitude of acceptance closes the mind to imagining a different world where dreams can be fulfilled (p. 150).

Horkheimer (1937/1992) considers a critical thinking person as an individual whose thought processes do not function in isolation. In addition, critical thinking is not simply the function of a group. According to Horkheimer (1937/1992), critical thinking is the function of "a definite individual in his real relation to other individuals and groups, in his conflict with a particular class, and, finally, in the resultant web of relationships with the social totality and with nature" (p. 246). Therefore, we ought to continuously critique our critiques together, acknowledge the triumphs and suffering of people, and question whether the Other dominates our thoughts.

As it relates to science and technology, Adorno suggests that people often fluctuate between what is useful and what isn't. During a 1953 visit to Los Angeles, Adorno was inspired to write "The Stars Down to Earth." Adorno observed that mankind treated science and technology with both dependency and hostility (Adorno, 1953/1994, p. 2). In fact, Adorno (1953/1994) views technology as a possible threat to mankind,

even though technology was designed "to make life easier" (p. 42). Horkheimer observed rapid developments in the economy, and pointed to the continuous commitment to financing technologies as the reason for widespread unemployment (Held, 1980, p. 49).

Adorno shared Horkheimer's view, as well as other critical theorists, that the collapse of capitalism would never materialize (Ingram, 1990, p. 44). In 1947, Adorno and Horkheimer wrote *Dialectic of Enlightenment*, in which they challenge others to consider a person's position as object in a capitalist society. Alway (1995) says, "For Horkheimer and Adorno the treatment of others as objects to be administered, manipulated, deceived, and exploited . . . arises from the basic relationship between humankind and nature" (p. 34). This is evident in "The Concept Of Enlightenment," in which Adorno and Horkheimer examine this knowledge. Adorno and Horkheimer (1947/1992) write,

> Technology is the essence of this knowledge. It does not work by concepts and images, by the fortunate insight, but refers to method, the exploitation of others' work, and capital. The 'many things' which, according to Bacon, 'are reserved,' are themselves no more than instrumental: the radio as a sublimated printing press, the dive bomber as a more effective form of artillery, radio control as a more reliable compass. What men want to learn from nature is how to use it in order wholly to dominate it and other men. That is the only aim. (p. 49)

According to Adorno and Horkheimer (1947/1992), “The man of science knows things in so far as he can make them. In this way their potentiality is turned to his own ends” (p. 51). Therefore, nature is merely the object of man’s domination and manipulation. Paradoxically, man suffers as a result of his power to manipulate and control. “Men pay for the increase of their power with alienation from that over which they exercise their power” (Horkheimer & Adorno, 1947/1992, p. 51).

Adorno and Horkheimer (1947/1992) contend that our application of knowledge should be aimed toward "the dissolution of domination" (p. 56). However, forces of the Enlightenment will function against this aim by continuing to be deceptive to masses of people. For example, religion and materialism are powerful forces whose agendas have been bent to create barbaric situations for some and favorable situations for others. In fact, a deceptive force "reinforces and strengthens dominant interpretations of reality. It informs, entertains, amuses, distracts, and distorts. It is the means by which the consciousness of individuals is encroached upon, shaped, and pacified" (Always, 1995, p. 40).

In "Society," Adorno (1966/1992) describes a society in which there is one principle of identity that seeks to destroy personal identities by constantly engaging people in role-playing. "It is no accident that the notion of 'role' (a notion which claims to be value-free) is derived from the theater, where actors are not in fact the identities they play at being" (p. 64). In fact, sociologists work to grasp understandings of mankind by studying the various roles they play. However, Adorno calls attention to a profit-driven society that aims to mold mankind into the roles dictated by a consumer network, which finds the needs of the market more important than those of the people. Adorno (1966/1992) adds, ". . . the human beings who actually have the needs, have been socially pre-formed beyond anything which one might naively imagine" (p. 64).

In "How to Look at Television," Adorno (1954/2003) describes the shaping of consumer consciousness. We cannot deny that the culture industry of mass media and entertainment is a source for identity construction. As Adorno (1954/2003) warns, "The repetitiveness, the selfsameness, and the ubiquity of modern mass culture tend to make

for automatized reactions and to weaken the forces of individual resistance" (p. 160). As a result, we are more susceptible to fall prey to political propaganda as well as market strategies.

Herbert Marcuse

Marcuse joins Horkheimer and Adorno as a co-founder of the Frankfurt School and critical theory. “During the late 1960s and early 1970s, Herbert Marcuse was considered one of the world’s most important living theorists. [He was] acclaimed throughout the world as a philosopher of liberation and revolution . . .” (Kellner, 1998, p. xiii).

Marcuse’s (1964) *One-Dimensional Man. Studies In The Ideology Of Advanced Industrial Society* reflects his liberating and revolutionary attitude. Marcuse viewed society as an entity without opposition. For example, in discussing the dangers of war, Marcuse contends that we are confronted with the fact that industrial societies become wealthier as a result of war.

What is distressing is that the majority remains silent in the midst of it all. In other words, society is a one-dimensional space that continuously constructs barriers to deny the existence of critical consciousness. In the introduction, “The Paralysis of Criticism: Society Without Opposition,” Marcuse (1964) says, “We submit to the peaceful production of the means of destruction, to the perfection of waste, to being educated for a defense which deforms the defenders and that which they defend” (para. 1).

In comparison to Horkheimer and Adorno, Marcuse (1964) considers industrial societies as both technological and political. Therefore, the prime objective is the domination of nature. Marcuse (1964) concludes that technology, the economy, and

culture have merged into an “omnipresent system” of domination. In fact, Marcuse identifies mass media as having the power to control what we think should be of interest to us. Adorno (1954/2003) concurs that television is the best source to observe this system in operation.

> By exposing the socio-psychological implications and mechanisms of television, often operating under the guise of fake realism, not only may the shows be improved, but, more important possibly, the public at large may be sensitized to the nefarious effect of some of these mechanisms. (Adorno, 1954/2003, p. 158)

Marcuse (1964/1992) contends that technological progress is responsible for a loss of freedom and individuality in democratic societies. In fact, in “Freedom and Freud's Theory of Instincts" Marcuse (1968/1992) says, “Technology too is born of suppression; even the highest achievements for making human existence less burdensome bear witness to their origin in the rape of nature and in the deadening of human nature” (p. 228). Therefore, technological rationality functions in the same manner as the market: Control of society is the objective. In such a society, technology is the end and mankind is the means. Because *the ends* are more important than *the means*, it is understandable why Marcuse (1964/1992) says, “Suffering, violence, and destruction are categories of the natural as well as human reality, of a helpless and heartless universe” (p. 110).

In “Catastrophe of Liberation,” Marcuse (1964/1992) suggests that, rather than focusing on mastering nature, we ought to focus on technology’s liberating potential. This potential lies within the hands of those who determine its use. Rather than using it to dominate others, Marcuse argued for the use of technology to promote life. “But this particular interest cannot be pursued without bettering and making more humane the conditions of life of the whole and liberating the entire society” (Marcuse, 1938/1992, p. 171).

Marcuse (1938/1992) adds, in "On Hedonism," that technology has the potential to generate happiness for mankind. However, Marcuse says,

> Modern technology contains all the means necessary to extract from things and bodies their mobility, beauty, and softness in order to bring them closer and make them available . . . But only those groups with the greatest purchasing power can take advantage of the expanded capacities and their gratification. (p. 165)

Marcuse (1967) continues his position in "Aggressiveness in Advanced Industrial Society." Marcuse (1967) says,

> Technical progress is identical with the increasing elimination of personal initiative, inclination, taste, and need from the provision of goods and services. This tendency is liberating if the available resources and techniques are used for freeing the individual from labor and recreation which are required for the reproduction of the established institutions but are parasitic, wasteful, and dehumanizing in terms of the existing technical and intellectual capabilities. The same tendency often gratifies hostility. (para. 15)

In Chapter Ten of *One-Dimensional Man. Studies in the Ideology of Advance Industrial Society*, Marcuse (1964) stresses the importance of imagination. "Setting the pace and style of politics, the power of imagination far exceeds Alice in Wonderland in the manipulation of words, turning sense into nonsense and nonsense into sense." Imagination encourages progress. In critique of Marcuse's view of imagination, Ingram (1990) says,

> . . . dialectical imagination, is the principal place in which emancipatory reason is to be located. Such reason is conceived as a form of communication in which oppositions between subject and object, individual and society, freedom and nature, universal and particular are at least maintained in their integrity, if not resolved. (p 74)

Marcuse recognizes an element of independence within the imagination, even though it functions in a world of unfreedom. In "Philosophy and Critical Theory," Marcuse (1968/1992) says that imagination has the ability to consider a different future because it can transcend the present. However, society has stifled and abused

imagination to the point that imagination has “retained the commitment to the prevailing unfreedom in which it was born and from which it abstracted” (1964/1992, p. 105).

Marcuse (1968/1992) recognizes the transforming potential of phantasy, which is a powerful instrument for unlocking possibilities. “Without phantasy, all philosophical knowledge remains in the grip of the present or the past and severed from the future, which is the only link between philosophy and the real history of mankind” (p. 17). Marcuse notes that when allowed freedom, phantasy has the ability to answer complex philosophical questions, even though the answers would be shockingly utopian. And yet the answers that phantasy could provide would be very close to the truth, certainly closer than those yielded by the rigorous conceptual analyses of philosophical anthropology. For it would determine what man is on the basis of what he really can be tomorrow. In replying to the question ‘What may I hope?’ it would point less to eternal bliss and inner freedom than to the already possible unfolding and fulfillment of needs and wants (Marcuse, 1968/1992, p. 17).

Walter Benjamin

Walter Benjamin was born in an upper middle class family. His father was an art dealer, which may account for his interest in art as a theme in his writings. Benjamin received commissions to write from the Frankfurt School. "His double protest - against technical progress in warfare and against the destruction of nature - has a prophetic ring and an astonishing relevance to our own time" (Day, Beiner & Masciulli, 1988, p. 273).

Benjamin's most notable writing, "The Work of Art in the Age of Mechanical Reproduction (1936/2005)," is a research essay that first appeared in French in the *Zeitschrift für Sozialforschung* in 1935. This essay contains Benjamin's (1936/2005)

views on the development, element, and quality of reproduced art. According to Benjamin, "Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be" (Section II, para. 1). The existence of a work of art is affected by its history. As time goes by, it experiences changes such as normal wear and tear; but chemical analysis can be applied to trace its original quality.

Benjamin (1936/2005) says that such analyses cannot apply to reproductions because reproductions are neither original nor authentic. However, a reproduction of an original, in the form of a picture or a recording, can be placed in situations that an original will not exist. For example, "The cathedral leaves its locale to be received in the studio of a lover of art; the choral production, performed in an auditorium or in the open air, resounds in the drawing room" (Section II, para. 2).

Benjamin (1936/2005) contends that as humanity's mode of perception changes with historical circumstances, so does the need for reproductions (Section III, para. 1). "Namely, the desire of contemporary masses to bring things 'closer' spatially and humanly . . ." (Section III, para. 2). For Benjamin, there are liberating effects within mass media, and the destruction of aura.

Regarding film, Benjamin (1936/2005) says, "[Film] extends our comprehension of the necessities which rule our lives; on the other hand, it manages to assure us of an immense and unexpected field of action" (Section XIII, para. 2). With the entrance of film, Benjamin (1936/2005) recognizes the opening of an expanded field in which to travel. "The camera introduces us to unconscious optics as does psychoanalysis to unconscious impulses" (Section XIII, para. 2). In fact, "It presents a process in which it is

impossible to assign to a spectator a viewpoint" (Section XI, para. 1). Therefore, Benjamin found favor in the disconnection with tradition, brought about by mass media because humanity becomes free to experience the world through different lenses.

In this mechanical age, art appreciation is available to masses, rather than to the elite few. Every individual, who chooses to obtain a reproduction, is given the opportunity to express their thoughts and engage their imaginations. People of all ages, gender, and nationality are downloading art and music, which makes the copy much more desirable and affordable than the original. For this reason, Benjamin highly favored the process of reproduction.

In his essay, “The Task of the Translator,” Benjamin (1921/1969) discusses the impossibility of translating a story from one language to another, without altering it in some way. Benjamin draws an analogous relationship between a fragmented story and a broken vessel in need of repair. Translation is the medium used to put the story back together, just as we use an adhesive to connect the fragments of a broken vessel.

For Benjamin (1921/1969), every text can be translated and every translator will be changed as a result of the process. Therefore, it is the task of the translator to enrich his own language by experiencing another language. However, Benjamin (1921/1969) contends that "the basic error of the translator is that he preserves the state in which his own language happens to be instead of allowing his language to be powerfully affected by the foreign tongue" (p. 81). With the tone of the metaphysical, Benjamin (1921/1969) says that an original work creates an afterlife as a result of the process of translation. This afterlife does not suggest the death of the original but “a transformation and a renewal of

something living" (p. 73). "In translation, the original rises into a higher and purer linguistic air" (p. 75).

Benjamin's (1940/1968) "Theses on the Philosophy of History" is his last work. It is a series of eighteen meditations, also known as "On the Concept of History." Thesis 1 is a reference to a Turkish clad puppet enabled by a hunchback to successfully counter the moves of its opponents in a game of chess. Benjamin refers to the puppet as *historical materialism*. Benjamin adds, "It can easily be a match for anyone if it enlists the services of theology, which today, as we know, is wizened and has to keep out of sight" (p. 253).

Benjamin (1940/1968) contends that the goal of the historical materialist is to eliminate historicism. Historicism celebrates the successes of the victor. In Thesis 7, Benjamin notes, "Whoever has emerged victorious participates to this day in the triumphal procession in which the present rulers step over those who are lying prostrate" (p. 256). The victorious refers to a ruling class that has never experienced defeat, while those lying prostrate are obviously the oppressed.

"According to traditional practice, the spoils are carried along in the procession" (Benjamin, 1940/1968, p. 256). These spoils are the cultural treasures created through the efforts of oppressed people as well as through the efforts of the rulers. However, the efforts of the oppressed are obliterated by historicism, while those of the ruling class are highlighted. For example, we cannot deny the exclusion, from history textbooks adopted for our schools, of horrible details of the confrontations with and the boundaries established for Native Americans by the ruling class. The contributions of slaves and their freed children are from scantily treated to rarely mentioned. According to Benjamin (1940/1968),

> There is no document of civilization that is not at the same time a document of barbarism. And just as such a document is not free of barbarism, barbarism taints also the manner in which it was transmitted from one owner to another. (p. 256)

Benjamin urges us to view the past and the present from the perspective of the oppressed. "Not man or men but the struggling, oppressed class itself is the depository of historical knowledge" (p. 260). In Thesis 8, Benjamin (1940/1968), says, "The tradition of the oppressed teaches us that the 'state of emergency' in which we live is not the exception but the rule" (p. 257). Resistance to active response to this emergency is nurtured in *acedia* (sloth). "Among medieval theologians [slothfulness] was regarded as the root cause of sadness"(p. 256).

We are familiar with acedia as one of the seven deadly sins. It is important to note that these sins are gendered. One could argue that because Eve was blamed for the Fall of Man, sin took on the persona of woman. For example, *Superbia* (Pride) is the selfish attempt to center everything desirable on *self*. *Invidia* (Envy) functions in fear and greed and it is willing to construct barriers, in order to deter the happiness of others. *Ira* (Wrath) blurs a person's judgment. *Avaritia* (Greed) functions to hoard wealth, while *Gula's* (Gluttony) attention is directed towards eating and drinking in excess. Finally, *Luxuria* (Lust) functions to satisfy an obsessive craving for sex or power.

Benjamin (1940/1968), urges us to "brush against the grain" (p. 256), which is an active move to confront such issues as the labeling of sins in the names of the daughters of society. To brush against the grain suggests willingness and an urgent need to uncover the injustices of unemployment, poor health care, inequities, and discrimination, as well as, the predators within a market-driven society.

Jürgen Habermas

Habermas deviates from the utopian view of technology's potential. "Unfortunately, [such] theorists lapse back into a conformist view of the neutrality of technology that leaves them little critical margin" (Feenberg, 1991, p. 18). Habermas did not consider Horkheimer, Adorno, or Marcuse's urging for radical change through critical consciousness and resistance to domination by constructing a new technology focus. According to Habermas, restoring harmony between man and nature was merely an unattainable secret hope of Marcuse, Horkheimer, and Benjamin.

In "Technology and Science as 'Ideology,'" Habermas (1970/1992) says, "Instead of treating nature as the object of possible technical control, we can encounter her as an opposing partner in a possible interaction. We can seek out a fraternal rather than an exploited nature" (p. 121). Habermas continues by explaining that this situation can never exist until man begins to communicate freely and to see himself in others. At that point, we ought to be able to see nature as subject and mankind as the Other.

Habermas (1970/1992) contends that technology, as a non-social entity, will always function to dominate man and nature. Habermas (1970/1992) explains his view by predicting the controlling effects of technology. "In the future the repertoire of control techniques will be considerably expanded" (p. 141). For example, surveillance techniques to monitor individuals and organizations will be extended. Educational technologies will be more reliable, as well as propaganda techniques. Habermas (1970/1992) also detects the expansion of new and varied drugs to relieve whatever ails individuals, including their desires for sex change. According to Habermas (1970/1992),

> A prediction of this sort is extremely controversial. Nevertheless, it points to an area of future possibilities of detaching human behavior from a normative system

> linked to the grammar of language-games and integrating it instead into self-regulated subsystems of the man-machine type by means of immediate physical or psychological control. (p. 141)

In "Knowledge and Human Interests: A General Perspective," Habermas (1968/1992) contends that we can never consider knowledge as free of self-interest. Habermas (1968/1992) says that we arrive at this fact through self-reflection. "In self-reflection knowledge for the sake of knowledge attains congruence with the interest in autonomy and responsibility . . . *in the power of self-reflection, knowledge and interest are one*" (Habermas, 1968/1992, p. 264). Therefore, Habermas suggests that mankind has a vested interest in everything created and the knowledge that preceded it. "These interests are the technical, the practical and the emancipatory" (Held, 1980, p. 255). Alway (1995) says,

> The ground and possibility of Critical Theory lie in the emancipatory interest. This is an interest in the reflective appropriation of human life; it is an interest in reason and is rooted in the capacity of human beings to be self-reflective and self-determining. (p. 102)

Heidegger's Views on Technology

Heidegger (1977) says that our instrumental view of technology directs our attitudes towards it. He suggests that viewing technology as poetry will generate a revealing nature. Heidegger's view of a connection between technology and poetry begins with etymology. *Technology* is derived from two words from the ancient Greeks: techne and logos. *Techne* means "art" and *logos* means "a study." The artistic techniques are those that are associated with poets, writers, and artists.

In pointing to technology's etymology, Heidegger reveals the artistry behind it. For this reason, technology cannot be limited to an instrumental frame, but it must be seen as a revealing experience as free as poetry itself. In order to connect and enter into a

free relationship with technology, we must experience it from a poetic orientation. Unlike our treatment of technology, art opens us up to unlimited possibilities in the way we view our world. Art refuses to be enframed and enjoys its freedom to Be. "The poetical brings the true into the splendor of what Plato . . . calls . . . that which shines forth most purely" (Heidegger, 1977, p. 34).

Heidegger's (1977) purpose in *The Question Concerning Technology* is to address the need for us to study technology in such a way that we can truly experience it. He says that by questioning technology, we pave the way for experiencing a relationship with it. "[This] relationship will be free if it opens our human existence to the essence of technology" (p.3). He contends that the problems we experience with technology are the results of our failure to look towards the essence of technology, and of our attempts to confine its being in terms of what it can do for us.

Our present orientation to technology is one of usefulness. In order to be in relation with technology, we must view ourselves, technology, and every entity in the universe as *Becoming* together. This orientation, according to Heidegger (1977), requires that man "renounces human self-will and projects himself . . . away from himself" (p. 47).

With technology there are no ends, but what may appear to be an end is the beginning or the unlocking of new experiences. The challenge for us is to think outside the confines of the limitations that we have placed on technology in our thinking. Such thinking has enslaved us and Heidegger terms it *enframing*. According to Heidegger (1977), "Enframing does not simply endanger man in his relationship to himself and to everything that is. As destining, it banishes man into that kind of revealing which is an ordering" (p. 27). Enframing is the result of man's need to control and manipulate and it

is the reason for the dilemmas created by this need. However, just as chaos can be productive, solutions can be found within the danger of enframing. "Where danger is, grows the saving power also" (Heidegger, 1977, p. 28).

Ordering is responsible for concealing the true essence of technology and it disables us from understanding how our lives are transformed because of technology. Oftentimes, we may hear individuals metaphorically approach it as a destructive entity that will eventually destroy man. Heidegger (1977) says, "What is dangerous is not technology. There is no demonry of technology . . ." (p. 28). However, man has the tendency to use it, just as it uses the earth's elements, "for destruction or for peaceful use" (Heidegger, 1977, p. 15).

Heidegger contends that nihilism is the result of man's having "been drawn into the power realm of the modern age" (1977, p. 62). He adds that man functions in confusion as it relates to "the suprasensory world, the Ideas, God, the moral law, the authority of reason, progress, the happiness of the greatest number, culture, civilization" (Heidegger, 1977, p. 65). Just as the elements are used and misused, man also becomes the used or standing reserve, and loses the ability to recognize his own essence.

In acquiring more knowledge through open and honest dialogue in schools, children should be given an opportunity to question man's use and misuse of technology. As a result, the space exists for students to recognize that the true essence of technology goes beyond framing. In other words, technology has a life of its own and man sees and frames only what is presented.

Heidegger (1977) examines the change in the view of science. He says that science is not viewed the same as it was in the Middle Ages. He says, "Greek science

was never exact, precisely because, in keeping with its essence, it could not be exact and did not need to be exact" (p. 117). Heidegger (1977) adds, "The humanistic sciences, in contrast, indeed all the sciences concerned with life, must necessarily be inexact just in order to remain rigorous" (p. 120).

Heidegger's (1977) contention is that man must be free to experience the world as the changeable entity that it is. He warns us not to frame the world as we would a picture to hang on the wall.

> Where the world becomes a picture, what is, in its entirety, is juxtaposed as that for which man is prepared and which, correspondingly, he therefore intends to bring before himself and have before himself, and consequently intends in a decisive sense to set in place before himself. A world picture, when understood essentially, does not mean a picture of the world but the world conceived and grasped as picture. (Heidegger, 1977, p. 129)

This picture of the world is nothing more than a limited view that also limits our thinking.

Feenberg's Critical Theory of Technology

In *Critical Theory of Technology*, Feenberg (1991) provides a description of *technology.* "Critical theory argues that technology is not a thing in the ordinary sense of the term, but an ambivalent process of development suspended between different possibilities" (p. 14). Feenberg's description is in contrast to the theory that technology is an instrument or tool, which is the most popular view.

According to Feenberg, the instrumental theory gives technology the characteristic of a neutral entity. In his critique of this theory, Feenberg contends that there are four points implied by the instrumental theory. First, the instrumental theory of technology is based on the idea that technology is a tool that exists to serve the purposes determined by the user. "Technology, as pure instrumentality, is indifferent to the variety of ends it can be employed to achieve" (Feenberg, 1991, p. 5). In other words, the tool

has no ability to control; the user is always in control of the tool. Therefore, the instrumental view suggests that we evaluate the use of the tool because the tool itself has no evaluative quality.

Second, "Technology also appears to be indifferent with respect to politics, at least in the modern world, and especially with respect to capitalist and socialist societies (Feenberg, 1991, p. 6). As a result of this indifference, technology can move from one society to another, and never change its usefulness. For example, a hammer remains a hammer, regardless of the social context. "The transfer of technology, on the contrary, seems to be inhibited only by its cost" (Feenberg. 1991, p. 6).

Third, "The socio-political neutrality of technology is usually attributed to its rational character and the universality of the truth it embodies" (Feenberg. 1991, p. 6). Whatever works in one society will work in another because the same set of standards can be applied universally. Finally, Feenberg (1991) identifies the need to increase productivity as universal. Therefore, the instrumental view of technology posits "Technologies are neutral because they stand essentially under the very same norm of efficiency in any and every context" (p. 6).

Feenberg (1991) describes the substantive theory of technology as the view of technology as "a new type of cultural system that restructures the entire world as an object of control" (p. 7). We are acquainted with the substantive view of technology through the writings of Heidegger, who stated that we become objects of technological processes. Feenberg (1991) adds,

> The substantive theory of technology attempts to make us aware of the arbitrariness of this construction, or rather, its cultural character. The issue is not that machines have 'taken over,' but that in choosing to use them we make many

> unwitting cultural choices. Technology is not simply a means but has become an environment and a way of life: this is its 'substantive' impact. (p. 8)

Feenberg is an advocate of the critical theory of technology. He argues that we should not view technology as separate from ourselves.

> In vocation, the subject is no longer isolated from objects, but is transformed by its own technical relation to them. This relation exceeds passive contemplation or external manipulation and involves the worker as bodily subject and member of a community in the life of the objects. (Feenberg, 1991, p. 190)

In avoiding manipulation, we must be aware of the motives of those who benefit most from developments in technology, and who paint a picture that suggests that "like justice, technology is socially blind" (Feenberg, 1991, p. 68). However, Feenberg (1991) draws a paradoxical image of technology as being both neutral and bias. Feenberg (1991) says, "[In] certain cases neutrality and bias are not different things, but merely different aspects of a single concrete object" (p. 179), even though *neutral* is often used as an antonym of *bias*. Feenberg (1991) explains this paradox by describing how certain standards can be applied to individuals, regardless of their circumstances. In fact, some individuals are more favored than others, although, "the application of a single standard gives the appearance of fairness. In this case neutrality is not the opposite of bias but its essential precondition" (p. 180).

Feenberg (1991) describes how labor was employed in earlier societies in the context of institutions, such as the community as well as the family. Vocations and skills were handed down through generations. Even though workers may have been exploited, they were always at the center of technique and they were never reduced to the position of object. However, under the present system of labor, workers are viewed as components of the machine, rather than as members of a community. According to

Feenberg (1991), “[The] hand, back, and elbow are required to release their schemas of action on exactly the same terms as tree trunks, fire, or oil” (p. 185).

Feenberg (1991) considers the need to restore the positions of community, family, and nature in our labor systems through a democratic approach. Feenberg (1991) reminds us, “We cannot recover what reification has lost by regressing to pretechnological conditions, to some prior unity irrelevant to the contemporary world” (p. 196). To the contrary, we ought to challenge “the structures of daily life that determine a political culture of passivity and dependency” (Feenberg, 1991, p. 17). Feenberg (1991) argues for a critique of technology that actively judges, and holds accountable, institutions that deter efforts towards “democratization of work” (p. 17), and that reduce mankind to mere objects. Feenberg (1991) also reiterates the fact that

> What human beings are and will become is decided in the shape of our tools no less than in the action of statesmen and political movements . . . The exclusion of the vast majority from participation in this decision is the underlying cause of many of our problems. (p. 3)

The Concept of Autonomous Technology

The perspective of technological determinism is grounded in the concept of autonomous technology. Technological determinism considers technology as an independent force with the capacity to determine social change. In his questioning of technology, Heidegger (1977) contends that technology is no longer technological nor instrumental nor a means. His theory that technology is overtaking us to the point that we have been degraded to mere objects of technology's processes supports the concept of autonomous technology. As objects or as Heidegger (1977) also calls "standing reserve," human beings have become dehumanized.

In "Tele-Agency: Telematics, Telerobotics, and the Art of Meaning," Shanken (2000) says that human subjugation can be seen "in the very real ways that implementations of technology threaten agency by displacing human labor, polluting the Earth, and consuming natural resources, or simply by enabling the mass destruction of human life with ever-increasing efficiency" (p. 65). People of every race, gender, and class level will eventually submit to the same consequences brought about by waiving their responsibilities.

Ellul (1964), one of the most notable theorists maintaining this perspective, considers technological determinism to be "the most dangerous form of determinism" (p. xxxiii). Ellul urges us to refrain from a useless questioning of how to get rid of technology but to find ways to transcend it. In order to transcend technological determinism, Ellul (1964) calls our attention to the need to measure and analyze the determinisms, which he considers the actions of a free person. According to Ellul (1964), freedom is a prize that we constantly seek to attain; and when we believe that we have attained freedom, we have been subjected to determinisms. Ellul's statements appear to be contradictory. However, by questioning concepts regarding determinisms, we no longer function blindly.

The concept of autonomous technology views technology as a self-governing entity. In order words, man does not dictate technology's course because it moves according to free will and it cannot be stopped. According to Ellul, having the ability to develop independently of people suggests that technology's chosen course is irreversible and unstoppable. Ellul (1964) says, "Technique has become autonomous; it has fashioned an omnivorous world which obeys its own laws and which has renounced all traditions"

(p. 14). Therefore, traditions do not form its base; but it builds on previous procedures. Ellul (1964) contends that the rapid and complex evolution of technology deters the "integration of old traditions" (p. 14).

In *The Technological Society*, Ellul (1964) describes technology as an autonomous force that controls our lives, a person's thinking, and the future. Ellul (1964) contends that, as long as technique was described as "machine," a person functioned independently of technique. "He was in a position to assert himself apart from the machine; he was able to adopt a position with respect to it" (p. 6). However, technique's external position vanished when technique integrated into every aspect of our lives. According to Ellul (1964), this transformation included our absorption into technology and it "is the result of the fact that technique has become autonomous" (p. 6).

Ellul (1964) compares technology's autonomous nature to our various institutions, such as the police and industrial plants (p. 133). For example, the police are mindful of the laws but efficiency is their primary focus. Today, we watch televised news reports of police use of stun guns on men and women, including the elderly. The police note that their use of stun guns or tasers has decreased the number of fatal shootings. However, reports of death after taser use have been publicized. I find it alarming that anyone can purchase an air taser through the Internet. Because they use air rather than gunpowder, air tasers are not government-regulated.

In "Shock Value: U. S. Stun Devices Pose Human-Rights Risk" (1997), Cusac describes Auto Taser, an automotive device that sends 5,900 milliwatt electrons through the arm of a potential car thief. Auto Tasers and Air Tasers are marketed as efficient methods of self-protection. Obviously, once designed and marketed, such technologies as

government-regulated tasers stimulate the creation of similar devices that generate capital for companies seeking to avoid regulation, while appealing to our need for protection. I consider it our responsibility to question from whom are we being protected. Certainly, such questioning will encourage an ethical discourse. According to Ellul (1964), "The rules obeyed by a technical organization are no longer rules of justice or injustice" (p. 133).

Winner (1977) points out the paradox that a human's creation is also a human's master. Winner (1977) says that autonomous technology presents an "unsettling irony, for the expected relationship of subject and object is exactly reversed" (p. 16). We can note this in the attitude of Shelley's monster towards his creator and mankind. The monster says,

> Yet you, my creator, detest and spurn me, thy creature, to whom thou art bound by ties only dissoluble by the annihilation of one of us. You purpose to kill me. How dare you sport thus with life? Do your duty towards me, and I will do mine towards you and the rest of mankind. If you will comply with my conditions, I will leave them and you at peace; but if you refuse, I will glut the maw of death, until it be satiated with the blood of your remaining friends. (Shelley, 1961, p. 84)

For Marcuse, technology should be designed to benefit humankind and nature. Therefore, the creators and designers of technology should keep this in mind during the pre-planning and planning stages in order to detect whether or not their creations could possibly direct their course in a more destructive manner. Listening to the side effects of drugs, peddled through the media, is as discombobulating as the original problems. For example, take Prozac, but the side effects include nausea, insomnia, and fatigue. When digesting Paxil, expect loss of appetite, dizziness, and impaired thinking. If you give your child Ritalin, he/she may experience palpitations, nausea, blood pressure changes, abdominal pain, and involuntary body and facial movements.

In "Displacing Suffering," Lock (1996) contends that regardless of the course the drugs take once in the body, medical technologies continue because "the interests of powerful elites are often directly involved with the creation, manufacture, distribution, and application of medical technology" (para. 5). It is certainly disturbing to consider that the interest of those in power take precedence over such technologies that are obviously out of control when applied.

Designers of technologies ought to contemplate the possible destructive effects associated with technology. However, I am aware that it is not always possible to determine every consequence to any action. The driver of an automobile can determine the speed of his vehicle; however, this is not the case with new technologies. Ellul (1964) recognizes that our inability to always determine the effects of technology rests with technology's rapid evolution and its departure from tradition or "the transmission of inherited processes that slowly ripen and even more slowly modified . . ." (p. 14). For this reason, Winner (1988) contends that we ought to replace the label "technological determinism" with "technological drift" (p. 88). Winner (1988) adds,

> A multiplicity of technologies, developed and applied under a very narrow range of considerations, act and interact in countless ways beyond the anticipations of any person or institutions . . . As the speed and extent of technological innovation increase, societies face the distinct possibility of going adrift in a vast sea of 'unintended consequences.' (p. 89)

Too often these unintended consequences are uncontrollable and irreversible. "What this means is that possible interest groups which could form around an issue . . . will in many cases simply come too late" (Winner, 1988, p. 89) because the damage has been done. For many people, analyzing the effects of hurricane Katrina is more obvious than realizing that the emission of greenhouse gases and carbon dioxide by industries has

triggered global warming, which resulted in Katrina. With the passing of years we observe a growing number of hurricanes, floods, and challenges to public health. Moreover, on a daily basis we are subjected to air and water pollution; and news reports remind us of our potential loss of privacy due to technology in the hands of private and public entities.

Ellul (1964) describes how technology works independently of human beings. "Man is reduced to the level of a catalyst. Better still, he resembles a slug inserted into a slot machine; he starts the operation without participating in it" (p. 135) because once in operation, technology functions according to its own laws and it is not "influenced by external factors" (p. 137). In other words, human beings are only needed to turn the switch, push the bottom, set the timer, and repair the mechanisms.

Forty years since Ellul, self-repairing software is emerging that eliminates the need for more technicians. This may be a dismal commentary on human beings in relation to technology; however, Ellul (1964) makes a valid point. In using software, I find that once the program begins there is no space for altering it unless the design allows. In addition, operating systems, such as Microsoft, have the capacity to restore itself, clean disk space, and defragment its disk drives with the click of a button. Again, the human being is only engaged in starting the process once technological designers/creators have abdicated these responsibilities to their creations. However, what appears to make human beings less toilsome beings has the capacity to be used to replace us.

We ought to be concerned that technology may be used to replace human beings in the workplace or that the computer has the potential to remedy the problem of teacher

shortages. Working in a high-tech school environment with an electronic curriculum provides me with a glimpse of how easy it could be to replace a large number of teachers. History shows how machines displaced workers; but as we advance technologically, it ought to be our concern to consider the implications of a nonhuman workforce comparable to that in *Rossums' Universal Robots*(1920).

According to Shanken (2000), " . . . when technology is constituted in a surrogate being--a robot--the importance of retaining mastery appears to become more comprehensible and more urgent; the issue can be broken down into anthropomorphic terms of conflict: us against them" (Shanken, 2000, p. 65). Ellul (1964) contends that human beings no longer celebrate their own victories because they function in obedience to technology, which reduces human beings to objects of technology.

Ellul (1964) states that foreshadowing a technological society of 2000 is reminiscent of science fiction. According to Ellul (1964), as long as the predictions compose the text of science fiction, human beings are prone to smile at these literary concerns. When noted scientists begin to utter the same predictions, these "serious" scientists are not questioned (p. 432). However, I contend that science fiction presents an accurate depiction of autonomous technology, especially when man has abdicated his responsibility to the technological.

We ought to ponder the meaning and consequences of Artificial Intelligence, if those who are devoted to this research are successful. There are several definitions of artificial intelligence that should also stimulate concern and action. On its website, the Singularity Institute for Artificial Intelligence (2006) describes AI as follows:

> . . . it means an AI that is smart, that can understand things, that can talk with us intelligently, understand us at least as well as we understand it. A real AI may not

> be able to pass for human, and it may not think the same way humans do, but it will be, fundamentally, the equal of a human being.

Such technology is as unpredictable as human beings. In 2001, Spielberg released "AI." According to Weinberger (2002), this was a time "when scientists in the US and the rest of the developed world were in a race against each other to see who succeeds first in cloning humans and societies were struggling with the ethical questions of this biotechnological reality" (para. 1).

Animal rights advocates and religious organizations question the ethics of scientists. These debates on cloning are covered on editorial pages and news specials on human interests. It does not appear that ethical considerations by scientists were not prevalent when animals were cloned. Again, we approach possibly bringing Shelley's monster into our realities, while reducing ourselves to the objects of our own creations. The monster sought a caring creator, while the desire for an ethic of caring is stressed in "AI." I contend that it is imperative that we enter into discourses regarding these social issues with students in middle and secondary education because the thoughtless and unethical decisions of those in power, as well as the passivity of individuals who have been so conditioned, dictate the present and future laws that govern their lives.

Winner (1977) compares technological systems to legislation or our constitutions. Once implemented, laws are generated to govern our lives (p. 317). Even though we orientate ourselves to following the rules, Winner (1977) warns us to beware of adapting to the rules of change brought about through the thoughtless creation of technologies. In viewing technology from this perspective, man is not stripped of his collective power to work in the interest of humankind and nature. "The choice of civilization is not decided

by the immanent drift of technology, but can be affected by human action" (Feenberg, 1991, p. 14).

According to Marcuse (1941/1998), "[Human individuals] are themselves an integral part and factor of technology, not only as the men who invent or attend to machinery but also as the social groups which direct its application and utilization" (p. 41). However, Winner (1988) reminds us that our greatest point of influence rests within the moment the initial choice is made in introducing technologies. From that moment on, we are committed to our initial choices because flexibility may not be an option. For most of us, structuring or restructuring technological decisions is not an option at all because "different people are situated differently and possess unequal degrees of power as well as unequal levels of awareness" (p. 42).

We often read that "men" are the creators and attendants of technology. Therefore, this contention facilitates our inferring that technology reflects the attitudes of men, and most certainly, men in power. As we consider technology as a cultural institution, we ought to also view it as a reflection of the capitalistic desires of "men" in power. If the design and implementation of technology is driven by the motives of the power elite, we ought to analyze various concepts of autonomous technology. Accepting a pessimistic view of technology as irreversible and unstoppable will deter people's plans of action to utilize technology to benefit human beings and nature.

I contend that we must not trigger or add to technophobia; but we ought to consider the concept of the autonomous nature of technology with less hysteria. Doing so would require that we consider a less intimidating approach to critiquing autonomous technology and it would suggest that we consider the power of individuals to safeguard

society. Otherwise, we are left with a pessimistic outlook or worst yet, an apocalyptic view.

Functioning in hysteria could find individuals making decisions based upon misinterpretations or false information, while other individuals remain passive onlookers. Reflecting on the Salem witch trials and the age of McCarthyism in America ought to remind us of the consequences of hysteria. In addition, reflecting of the origin of the word, "hysteria," provides an added warning. "Hysteria" is a Greek word used to denote a problematic medical condition associated with the uterus. When operating in hysteria, we are unable to birth solutions and implement effective strategies despite the contractions.

We cannot overlook the fact that people often go along for the ride, even when they prefer another course. This situation adds to a pessimistic viewpoint of technology by those who are not included among the powerful. However, I contend that people have the collective power to affect such changes as necessary for the benefit of all humankind. Therefore, it is our responsibility to teach critical thinking and to stimulate active resistance to whatever relegates us to mere objects in a path of dehumanization and/or destruction.

Are we unconsciously becoming the objects of technology that has the inherent capacity to stimulate greed in the power elite? Is greed the underlying factor that motivates those in power to relegate their own people to objects of their own technological innovations. I think that is the case, and that such greed may also overpower the powerful that think themselves to be intelligently in control. Technological systems are too complex for the near-sightedness of the elite.

I contend that technology can be designed and implemented to be progressively responsible to human beings and Earth. However, we ought to engage in a political struggle to alter the capitalistic character and nature of technology as preoccupied with the domination of human beings and nature. Feenberg (1991) points to Simondon's theory of a concrete technology that suggests that progress, in this area, can be brought about through the integration of the natural and the technical. "Such synergies are achieved by creative acts of invention which transcend apparent constraints or trade-offs and generate a relatively autonomous system out of elements that at first seem opposed or disconnected" (Feenberg, 1991, p. 194). I maintain that such synergies are dependent upon human beings and their collective interests in being responsible (just, fair, and caring).

I have continued to refer to people as those in the driver's seat of technological change. "Autonomous technology is ultimately nothing more or less than the question of human autonomy held up to a different light" (Winner, 1977, p. 43). We ought to illuminate the space behind autonomous technology because human beings occupy that space and they too often use technology as a scapegoat when their activities have faltered. When the decision makers, designers, and other power elite find themselves in the hot seat of scrutiny, hopefully, they will recognize that initial choices made in the implementation of technologies ought to reflect the concerns of all people and our natural resources. Reconceptualizing autonomous technology/human autonomy as an unstoppable force, which functions to eradicate our social ills, is a more embraceable concept.

The Bias of Technology

Many critics of technology may contend that technology is neutral and that people simply make decisions on how to use technology. *Guns don't kill people; people kill people. Technology does not determine its purpose, people do*. However, we cannot ignore the fact that technology is a cultural system that has altered our world. Feenberg (1991) argues,

> The issue is not that machines have 'taken over,' but that in choosing to use them we make many unwitting cultural choices. Technology is not simply a means but has become an environment and a way of life: this is its 'substantive' impact." (p. 8)

In fact, technology is structured to serve the interests of those in power. The concept of the bias of technology maintains the notion that "[the] values and interests of ruling classes and elites are installed in the very design of rational procedures and machines even before these are assigned a goal" (Feenberg, 1991, p. 14).

Technology is biased towards the use that its designer has structured. However, human beings are filled with imagination and creativity and we are apt to assign new uses to technology. This inclination starts with children. My sons' drinking mugs became hammers or substitutes for their broken drumsticks. As they grew older, their bikes became their newspaper delivery vehicles. By reading the psalmist, David, I was encouraged to make the same imaginative connection with the airplane, a world-changing technological innovation. David says, "Oh, that I had wings like a dove! I would fly away and be at rest" (Psalm 55:6). David sought to escape a hostile environment just as Daedalus, who designed wings for himself and Icarus as a means of escape.

When children become bored with a toy, they creatively redirect its intended use as a method of escape from boredom or they seek to improve it. In *How We Invented the*

Airplane, Orville Wright (1988) says that their first interest in flight began when their father gave them a toy that could be propelled into the air by a rubber band. They began to design copies of the toy. What started in the imagination as a way to escape boredom, actualized as a toy, later became a means of transportation, and has become a militaristic weapon.

Feenberg (1991) and Ferneding (2003) urge us to view technology from a focal point that magnifies the bias of technology. I contend that this focal point is neither distant nor up close but it is the focal point of our intermediate surroundings. Too often, we are so engaged in critiquing our circumstances up close that we fail to consider that what lies at arms length is a controlled way of thinking and responding to technology.

Ferneding (2003) reminds us that within an instrumental view of technology breeds a cultural bias. Ferneding's (2003) study illuminates a dependency upon technology by globalized market-driven economies and by private industries that view education as a market. Ferneding contends that this cultural bias deters us from recognizing the powerful influence of technology in restructuring identities and the processes of communication.

In "Five Things We Need to Know About Technological Change," a message delivered to the New Tech 98 Conference in Denver, Postman (1998) stated that a non-neutral character of technology is evident in the fact that every technology is different and possesses a different philosophy that is expressed in the way "technology makes people use their minds, in what it makes us do with our bodies, in how it codifies the world, in which of our senses it amplifies, in which of our emotional and intellectual tendencies it disregards" (para. 15). Postman (1998) maintains that the structure of the

technology determines how it is used. He contends that this is the stance of McLuhan in his famous statement, “The medium is the message.”

Postman (1993) also contends that each medium contains a bias (p. 16). It is important to note that technology takes on different forms that have different sensory biases; and these forms, with their biases, have the power to alter other forms. According to McLuhan and Zingrone (1995), "Radio changed the form of the news story as much as it altered the film image in the talkies. TV caused drastic changes in radio programming, and in the form of the thing or documentary novel" (p. 177).

Marshall McLuhan says, "The effects of new media on our sensory lives are similar to the effects of new poetry. They change not our thoughts but the structure of our world" (McLuhan & Zingrone, 1995, p. 273). McLuhan categorized media forms into "hot" (radio and photography) and "cool" (television, cartoon, and the telephone). Cool media stimulates more sensory participation. However, McLuhan contends that all forms of technology have reshaped society. Unlike "tribal man," who viewed the world through a balance of their senses, McLuhan argues that technology has extended our abilities and senses. Therefore, we perceive ourselves, and the world, through technology and its biases.

For marginalized people and those who function in the interest of the oppressed, the social and political biases of technology are obvious as we reflect on the development of America. Before the Civil War, the labor pool of the agricultural industries in the South was comprised of slaves. According to Bridglall and Gordan (2004), slaves designed technology to make their work less burdensome. However, Bridglall and Gordan (2004) explain that slaves were not allowed to patent their inventions due to a

1858 ruling by U. S. Attorney General Jeremiah Black. This ruling stated that, since slaves were not citizens, they could not enter into patent contracts. "As a result, it has been impossible to document, much less prove, the contributions of many unnamed enslaved African Americans to the early industrial growth of the United States" (para. 4).

Bridglall and Gordan (2004) conclude, "African American inventors who were enslaved had the added complication of being denied meaningful recognition for their significant contributions to society" (para. 2). The design and development of numerous technologies were attributed to slave masters, their overseers, and agriculturalists. Wright (2005) maintains,

> In the Western imagination, technology is the exclusive provenance of the West--it is by default always white, almost always male, and sexuality rarely emerges as an imaginative category. The reality is that technology is the product of ten thousand years of world civilizations, of which African civilizations were a central contributor, and African Americans have been regular contributors, from ironing boards to cell phones. The reality of the digital divide, I concluded, bore an uncanny and disturbing resemblance to racist beliefs about race and technology. (p. 48)

Katsh (1995) contends that the bias of technology also became evident with the invention of the printing press, which birthed a print culture. In "Rights, Camera, Action: Cyberspatial Settings and the First Amendment," Katsh (1995) describes this print culture as the nurturer of faith in the printed word. However, Katsh (1995) adds, "Print inevitably fostered more conflicts with the state than did writing, conflicts in which there was both suppression of much information and many successful attempts to avoid suppression" (Katsh, 1995). Parens' (1998) views are described in "Is Better Always Good? The Enhancement Project." Parens (1998) says,

> Access to the tool that is the printing press, for example, no doubt conferred a competitive advantage on those who could afford access to it and its products.

> But how much one could benefit from those new tools and products was to some extent limited by one's draw in the genetic lottery. (para. 54)

From my intermediate focal point, I perceive access to technology as one of privilege or evidence of false generosity, which continues to be demonstrated throughout history. In addition, symbols that appear in technology can generate various perceptions based upon the varied experiences of people. For example, slaves were not taught to read and any objector, who afforded them the opportunity, could experience the wrath of those in power. In fact, the Bible, the holy book of the religious, was used to control the attitude and behavior of the oppressed.

In "Written in Stone" (2000), Rudoff examines the use of the Bible by proslavery churches that declared the abolition of slavery to be contrary to the words of God. Some churches proclaimed slavery as an evil, while many churches in the North and the South used Biblical scriptures to support the institution of slavery. Although the Bible records the history of the Israelites' life in bondage and their flight from slavery, proslavery churches used scriptural content to support their stance. For example, "Bondservants, obey in all things your masters according to the flesh, not with eye service, as men-pleasers, but in sincerity of heart, fearing God" (Colossians 3:22).

Self-denial was emphasized as a means of domination by proslavery churches. Today, denying self can be equally described as a means of domination by technology. "It is a sacrifice of the self, of the subject's own will. This is the new technology of the self" (Foucault, 1988, p. 45). Foucault was aware of the impact of technology in the way we structure our identities and in the way we define others and ourselves in our interactions.

We are socially and culturally constructed human beings or products of our environment. Therefore, our knowledge is socially and culturally derived, which includes technology as a constructor of knowledge. Much of Foucault's work focused on the use of technologies for the purpose of domination. However, he became aware of the need to redirect his focus. Foucault (1988) says, "I am more and more interested in the interaction between oneself and others and in the technologies of individual domination, the history of how an individual acts upon himself, in the technology of self" (Foucault, 1988, p. 19).

An emphasis on pleasing God overshadowed the actual desire to use the printed word to enhance the strength of those in power. Whenever the oppressor finds strength in the oppression of others, this emphasis continues with their gods of wealth, power, domination, and manipulation. This is evident in our institutions that foster a top-down policy, inclusive of those with a technological focus and an attitude of domination and power. According to Feenberg (2001), "This is the paradox of reform from above: since technology is not neutral but fundamentally biased toward a particular hegemony, all action undertaken within its framework tends to reproduce that hegemony" (p. 63).

Although Dewey is less often referenced regarding this attitude, I am mindful of the fact that Dewey's voice does echo these concerns. In *The Quest for Certainty: A Study of the Relation of Knowledge and Action* (1929), Dewey says,

> There is a genuine and extremely serious problem in connection with the application of science in life . . . That is to say, it concerns the economic and legal organization of society in consequence of which the knowledge which regulates activity is so much the monopoly of the few, and is used by them in behalf of private and class interests and not for general and shared use . . . The practical and social problem is one of effecting a more general equitable distribution of the elements of understanding and knowledge in connection with work done,

> activities undertaken, and a consequent freer and more generously shared participation in their results. (p. 80)

Dewey's concern with inequities can be viewed through the work of Winner. Winner (1988) describes how social class and racial biases were built into the structures of the bridges and overpasses in New York. "Robert Moses, the master builder of roads, parks, bridges, and other public works of the 1920s to the 1970s in New York, built his overpasses according to specifications that would discourage the presence of buses on his parkways" (Winner, 1988, p. 37).

Moses considered an automobile as a luxury of White upper and middle classes, who would use the bridges and overpasses for recreation as well as for commuting to and from work. The poor and Blacks were limited to using public transit systems whose buses were taller than the specifications of the overpasses. "One consequence was to limit access of racial minorities and low-income groups to Jones Beach, Moses's widely acclaimed public park" (Winner, 1988, p. 37). Limiting access to Whites only turned a public park into a private space. According to Winner (1988),

> For generations after Moses's death, when the alliances he forged have fallen apart, his public works, especially the highways and bridges he built to favor the use of the automobile over the development of mass transit, will continue to shape that city. Many of his monumental structures of concrete and steel embody a systematic social inequality, a way of engineering relationships among people that, after a time, became just another part of the landscape. (p. 37)

During the 1960s, student protests on college campuses were mounting. Winner (1988) argues that huge concrete buildings and plazas were designed to deter all student demonstrations (p. 38). Today, school districts are actively involved in improving the physical structures of schools. Many buildings have become massive structures with multiple corridors that lead to several extensions. However, the administrative offices are

clearly front and/or center spaces. While focusing on the political and social bias of technology, we ought to question the reasons for such massive school buildings that are far removed from the little red one-room schoolhouses of the past. It is reasonable to assume that teacher unity and student/teacher bonding is deliberately hampered by the physical design of the structure.

Winner (1988) continues, throughout his work, to examine how technologies have been designed to be biased and those whose social interests are met, are quick to herald them, while others view them as serious setbacks. Drawing an analogous relationship to a card game, Winner (1988) says, "Rather one must say that the technological deck has been stacked in advance to favor certain social interests and that some people were bound to receive a better hand than others" (p. 40). Those who have been short-changed include the poor, minorities, and women.

Another political bias relates to the accessibility to technology, which is a problem highlighted in the studies of Cuban (2001) and Ferneding (2003). With so few computers in classrooms, students have few opportunities to use them and teachers are either distraught by their lack of access or they take no interest in developing plans to include computers. In "Who's Wired and Who's Not," Becker (2000) studies school environments of low-income families, and concludes "that home access to computers will be a continued area of inequality in American society, and that schools must play a critical role in ensuring equal opportunity for less-advantaged children" (p. 44). In homes where there are computers, Internet access is unaffordable. We cannot overlook the fact that funding our schools' programs is much too often dependent upon the school's address and technology is costly.

In studying the reasons for resistance to technology integration in education, it is beneficial to also consider the bias of technology through the lenses of feminists. Feminist critiques of science and technology expose the dominance of male perspectives and interests in the creation, use, and misuse of technology. "Men predominate in the decision-making, creative design sectors as venture capitalists, computer scientists, and engineers producing startups, new software, and hardware design" (Rosser, 2005, para. 4). Because middle and upper class White men dominate science and technology, it is not difficult to determine whose interests and needs are met. Wajcman (1991) urges us to analyze "the social interests that structure the knowledge and practice . . . of technology" (p. 162).

Wajcman (1991) contends that male-centered technology exists because Western philosophy is "distinctly masculine" (p. 5). In comparison to laws restricting slaves from obtaining patents, our history records evidence that women were disallowed opportunities to patent inventions. Therefore, women's inventions were "credited to their husbands" (Wajcman, 1991, p. 16). Wajcman (1991) also points out the fact that women inventors were ridiculed during the Industrial Revolution. Today, women are not well represented in technological fields. "It's easy to see the problem if one looks at the small number of women entering technology fields in college and graduate school or tries to find the few women actually working in computer-related jobs . . ." (Weinman and Cain, 1999, para. 2). Weinman and Cain (1999) contend that the problem begins within the classroom. In "Technology - The New Gender Gap," Weinman and Cain (1999) add,

> A report released in October 1998 by the American Association of University Women (AAUW) Educational Foundation shows that girls come to school with less computer experience than boys and, years later, leave the same way,

> effectively shutting the first in a series of doors on high-end technology careers. (para. 2)

"Research has demonstrated that the lack of gender-sensitive computer games and lack of girls' early exposure to technology have compounded this gender gap" (Miller, 2001, p. 125).

Exposure to violence and sexually explicit material on the Internet and in video games continues to be the subject of public debate. The American Psychological Association press release (April 23, 2000), "Violent Video Games Can Increase Aggression," concludes that "violent video games may be more harmful than violent television and movies because they are interactive, very engrossing and require the player to identify with the aggressor." However, "[less] national attention has been paid to other potentially detrimental effects, such as the perpetuation of social biases and stereotyping, and to other forms of technology, such as educational software" (Sheldon, 2004, para. 1).

Educational software presents a wholesome image of scholarship, which provides it with a space of escape from the same critique of the Internet and video games. Nevertheless, social biases and stereotyping lurk within the content of various forms of technology. For example, Milburn, Carney, and Ramirez (2001) conducted a study of clipart, inclusive of clipart used in educational software. According to their findings, males are presented in more active and diverse roles, while females are characterized as more nurturing.

I am aware that Milburn, Carney, and Ramirez's (2001) findings are apparent in the software packages available in my classroom. Few images of middle-aged and elderly women are included. Males are more often depicted as the producers, while females are the onlookers. "Again, this parallels research on other media demonstrating that males are

accorded more prominent and powerful activities in photographs and illustrations" (Milburn, Carney & Ramirez, 2001, p. 277).

In "Gender Bias in the Classroom," Frawley (2005) contends that teachers are utilizing technology, in the classroom, without recognizing that there is a different orientation to technology for boys. Girls have had less experience with technology because of technology's masculine character and the feminine conditioning to avoid its combative and masculine nature. "This imbalance may be prevented if teachers avoid selecting sexist software that is typically 'masculine' or 'combative,' and if they encourage girls to learn computer skills by not allowing boys to dominate the time spent in front of the computer terminals" (Frawley, 2005, para. 41). This would work towards eliminating the gender bias in the use of technology in the classroom.

Frawley's (2005) suggestion stimulates us to consider the fact that the majority of classroom teachers are females whose conditioning is comparable to that of their female students. Therefore, teacher resistance to the integration of technology in education could be based upon this conditioning and the notion that they are merely the institutions' objects of delivery. Nevertheless, teachers are in a position to affect change because "teachers have also been privileged as gatekeepers who, through their resistance, defend the lifeworld of schools and the underlying democratic ideals of the educational institution" (Ferneding, 2003, p. 9).

As we continue to critique the bias of technology, we recognize that Dewey's concern for a shared interest in all science and technology applications continues to manifest itself in the twenty-first century. Furthermore, we ought to engage a discourse that unmasks the biases of technology, which will reveal a dark side that is characteristic

of a setting that harbors death and destruction, a displaced workforce, unsafe virtual communities, potentially damaging educational software and games, and the domination of women, minorities, and the poor. However, behind technology lurks the power elite that designs technology with bias, while disregarding past, present, and future catastrophes. In addition to placing the world's people in the midst of war-ravaged communities, those who have the propensity to find power within oppressive situations continue to deplete our natural resources. Kimbrell (2001) states

> The crisis over the technosphere's destruction of the natural and social milieus has created an historic dilemma. Our society and much of the world's population has become fully dependent on, and deeply addicted to, the technological environment. Yet this technological milieu is threatening the very viability of life on Earth—not to mention our own sanity. It is becoming increasingly clear that we cannot survive with our technology, yet we can't imagine living without it.

The Education of Space-Bred Generations

Major efforts at education reform were spurred by the launching of Sputnik in 1957. "Thus began what has been called the 'golden age' of education" (Molnar, 1997). The focus was on mathematics and, particularly, science. According to Lynch (2000), The science education reform initiated in the 1950s and 1960s was an ambitious national effort that encouraged hands-on, inquiry-based teaching methods, with the aim of preparing the best students for science careers. Tracking or ability grouping for science within schools became a norm that few questioned (p. 156).

Molnar (1997) points out five changes that affected the basic structure of education at that point: (1) There was the move to provide an education for all people; (2) Children were to be prepared for a future society; (3) Formal education extended beyond high school and college because workers were predicted to change careers; (4) Because of modern information technologies, schools were not the only sites for information; and

(5) “[New] emerging educational technologies were to become an important catalyst for rethinking education.”

Lynch (2000) explains that magnet schools emerged after desegregation. These schools were designed for gifted and talented students, as an effort to entice White families back to urban areas. Mathematics, science, and technology were their emphasis areas. These programs received the resources needed to operate them, efficiently.

In the 1960s, the Educational Resources Information Center (ERIC) was established as a national information system funded by the U. S. Department of Education's Institute of Education Sciences. ERIC is the largest education database in the world. ERIC provides articles of interest to educators. These articles are published in scholarly journals, while others are unpublished. Overviews of each article are provided and full-length articles can be obtained electronically. ERIC has made research less tedious, by its easy access through the electronic libraries of universities or through direct access through the Internet.

In 1983, *A Nation At Risk* was published. It also spurred education reform in the direction of mathematics, science, and technology. The report suggested that the American system of education was in such poor condition that they trailed other developed countries. The Net began as a military project. Paul Baran, who was a researcher at the Rand Corporation in Santa Monica, came up with the idea of small, digitized packages that could be sent through the military's network. "Package switching is still the basic technology underlying Internet operations" (Dizard, 1997, p. 146). In 1968, the Department of Defense's research agency contracted for the creation of ARPAnet. Due to the efforts of graduate students, ARPA was successful. Vinton Cerf

later became a leading proponent of the Internet. Another student involved in this project was Doug Engelbart, who invented the computer mouse.

In 1983, ARPAnet linked military and civilian research institutions. The civilian part became known as the Internet. The Internet received its funding from the National Science Foundation because of the efforts of "an up-and-coming U.S. senator from Tennessee, Al Gore" (Dizard, 1997, p. 146). In approximately ten years, the number of hosts grew from 300 to 10 million.

Proponents of the Internet saw value in it as a method of improving instruction in science. "One of the best known and earliest of these efforts is National Geographic Kids Network--a curriculum that was initially developed by TERC and the National Geographic Society in the late 1980s with funding from the National Science Foundation" (Feldman et al., 2000, p. xv). However, few schools had access to the Internet. Since then there have been tremendous numbers of efforts that cross disciplines. "In early 1999, the U.S. Department of Education announced that over half the classrooms in the United States have Internet access" (Feldman et al., 2000, p. ix).

Apple Classrooms of Tomorrow (ACOT) was initiated in 1985 at five schools: one elementary school in California; an elementary school in a Tennessee suburb; an elementary school in rural Tennessee; an elementary school in rural Minnesota; and a high school in urban Ohio. Apple provided select teachers with access to computers and software. This was an experimental program to show teachers the effectiveness of blending technology with instruction. "Originally conceived as a program to study what happens when 'tomorrow's' resources are routinely available in classrooms, ACOT provided students and teachers an Apple computer both at school and at home" (Baker &

O'Neil, 1994, p. 173). After ten (10) years, Apple reported positive findings. However, in a 1998 issue of *Gender Relations in Educational Applications of Technology*, the following report appeared under "Apple Classrooms of Tomorrow:"

> But ACOT did not just produce positive results. The study raises a number of ethical questions that must be addressed. Many disparities were revealed between children of differing socioeconomic and ethnic backgrounds. Students who had parents who were knowledgeable about computers were leaps and bounds ahead of those who didn't. ACOT gave students computers to use in the home, but in any other scenario, many children would only have access to computers while they were in school. These students were severely disadvantaged compared to those who had access to technology at home. (para. 5)

In 1995, the Office of Technology Assessment (OTA) released the report, *Teachers & Technology: Making the Connection,* uncovering the lack of technology preparation in teacher preparation programs, and finding that "most technology instruction . . . is teaching about technology . . . not teaching with technology across the curriculum" (p. 10). Thirty-five percent of the schools had access to computers and the majority was equipped with televisions and VCRs. Students were using computers to conduct international research projects, to prepare multimedia presentations, and to contact other researchers and scientists through e-mail. However, technologies were not frequently used in the study of traditional subjects in high schools.

Although the findings suggested an increase in access to new technologies, the OTA found that many schools were not wired sufficiently. In addition, most teachers had not received adequate training in the use the various types of educational technologies. Even less training was given in how to enhance instruction with technology. The OTA suggests that teacher education programs fail to focus on technology as a teaching tool.

The OTA concluded that the greatest obstacle to technological use in education is time. There is not enough training time; teachers have little time to experiment with new

technology; and even less time is available for teachers to build technology support systems among themselves. The vision of proponents of technology in education will be slow to emerge unless time is available for training and support.

Classroom Connect, a professional development initiative, offered WebQuests to classrooms around the world in 1995.

> WebQuests represent a valuable strategy for learning about the Internet while reinforcing course content concerning teaching approaches. By adopting pedagogical roles (such as the technology enthusiast, the innovator, the traditionalist), students can evaluate Internet material, gain insight into teaching approaches, and further their knowledge of technology. (Deal, 1998, p. 50)

From 1995 to 1999, the United States Department of Education provided funding to schools and businesses for implementing technology initiatives. For example, the "Technology Innovation Challenge" grants were designed for schools K-12, but encouraged these schools to collaborate with colleges and universities. "Technology Literacy Challenge Fund," was introduced to assist states in integrating technology. "Preparing Tomorrow's Teachers to Use Technology (PT3)," awarded $75 million in competitive grants to various organizations to help better prepare pre-service teachers to be proficient users of technology.

In 1999, the American Council of Education (ACE) published "To Touch the Future: Transforming the Way Teachers are Taught." Student success is dependent upon a competent teacher. However, the ACE found that teacher education programs inadequately prepare teachers to utilize technology in instruction. This report called for the need for teacher education programs to provide the equipment and training needed for teachers to be proficient in using technology. Furthermore, current control systems falter

in guaranteeing a profession of highly qualified teachers. These systems are identified as colleges and universities, state and local school systems, and policymakers.

The ACE report addressed the problem of teacher shortage. Those efforts needed to reduce teacher attrition included incentives for teachers in high-poverty schools and in special needs programs. Special effort to attract teachers to the sciences was also a priority. As a result of increasing the efforts to attract and maintain a competent teaching force, this report projected a transformation in the quality of teachers, within ten years from its publishing.

With the present demands for improvement in teacher preparation, we cannot lose sight of the influence children have played in the incorporation of technology in education. The children have been the main influence in driving computer technology to its position in education today. Goldfarb's (2002) study shows "Children raised on video and home computer games were crucial participants in spreading the computer from facilitator of mundane everyday transactions and mindless home recreation to core educational and communications technology" (Goldfarb, 2002, p. 9).

Critical Pedagogy

Paulo Freire was the first to introduce the theory of critical pedagogy. "Its focus is to create critically conscientious and thinking individuals through dialogue, collective experience, and collective action, who with their newly found voices and knowledge will transform their community and challenge the oppressive educational institutions" (Walsh, 1996, p. 137). So many requirements in education deter teachers and students from collective action. We hear complaints of prepackaged curriculum, standardized tests, and limited time for dialogue, if any. Kanpol (1999) contends that the emergence of

technology in education presents another problem. In addition to education becoming a lucrative market for pre-packaged programs, ". . . teachers' skills are being eroded" (p. 38). In *Teachers and Texts,* Apple (1988) says

> The reliance on pre-packaged software can have a number of long-term effects. First, it can cause a decided loss of important skills and dispositions on the part of teachers. When the skill of the local curriculum planning, individual evaluation, and so on are not used, they atrophy. The tendency to look outside of one's own or one's colleagues' historical experiences about curriculum and teaching is lessened as considerably more of the curriculum, and teaching and evaluative practices that surround it, is viewed as something one purchases--the school itself is turned into a lucrative market. (p. 163)

Darder (2002) examines how schools should be structured to eliminate the present concerns of teachers. He wanted to know what kind of education could both improve the social needs of students, while improving our knowledge of techno-science. However, his questioning of education goes deeper. Darder (2002) asks us to question in whose interest is technology in education functioning. How are students initiated to accept technology without critically analyzing it? "Do teachers recognize the privilege of access afforded by computers" (p.78)? Darder adds, ". . . education needs to embrace philosophy; we need not only - exclusively - technology and science but also philosophy of science, philosophy of technology, philosophy of knowledge. We must seriously question how we think and how we know" (p. xii).

"Understanding that critical pedagogy in the classroom involves first and foremost an examination of power, I had to learn how to read the existing power relationships within the school system in which I was teaching" (Darder, 2002, p. 154). Darder points out the fact that throughout the school systems of this country, access to computers in the classrooms is one of privilege. "Whether at home or school, the question of computer access and availability is an increasingly important issue, as computers in the

form of multimedia learning systems and gateways to the Internet become increasingly important vehicles for the transmission of information and knowledge" (Gabbard, 2000, p. 301). Students in low-income schools have less access, to computers and the Internet, than wealthier schools with state-of-the-art equipment. Nevertheless, ". . . students are expected to compete academically as if they lived and learned on an equal playing field (Darder, 2002, p. 78).

Gabbard (2000) challenges the popular view of educational technology's neutrality. He perceives educational technology as having the power to provide us with the ways we interpret our world. Gabbard (2000) adds,

> When combined with questions of who has access to educational technology and how that access can function to empower or disempower specific groups, the role of educational technologies, particularly emerging ones such as computers and the Internet, suggest that their importance in shaping educational and cultural discourse has been severely underestimated and requires much greater attention from both theorists and practitioners in the field. (p. 302)

Specific groups *are* targeted. Brosio (1998) states that the American school systems place emphasis on gifted programs. Resources and funds are deposited into these programs for the underlying motive to maintain economic dominance in the world. *Gifted* children are motivated to excellence in science, technology, and math. "Some critics argued that the search for gifted students will worsen the stratification of schools according to social class, race, ethnicity, gender, region, and so forth" (p. 35). As teachers take a critical view of power, technology, and privilege, they ought to guide their students through the same processes of examining the implications of a free market society. According to Darder (2002),

> . . . very young students already measure their relationships according to the brand of tennis shoe or style of clothing worn or the number of Pokeman cards or computer games owned. The rapidity with which new fads move in and out is also

> linked to the way the marketplace instills very early in children the notion that the power to consume to their hearts' content is the epitome of justice and freedom for all. (p. 79)

Rather than perpetuating education's market for big business ventures, proponents of critical pedagogy support cooperative learning experiences. Cooperative learning is a relational building approach that is endorsed by the theory of critical pedagogy. Cannella (1997) states that our growth is dependent upon this cooperation (p. 7). In fact, a dependency on social interaction for growth is not limited to race, gender, sexuality, or age. According to Kanpol (1999),

> More cooperative learning (which implies far less lecturing and student regurgitation of regurgitation of facts on exams, forever to be forgotten), less stress on the value of success as the major reason for coming to schools in the first place, and more individual student participation in written, verbal, or math projects will allow for the possibility of student voices to be heard. In a democratic environment, a critical pedagogue teacher must attempt to hear that student voice. (p. 50)

This approach is based upon "a critical democratic system of meaning concerned with analyzing knowledge for the purpose of understanding oneself and one's relation to society, naming and then changing social situations that impede the development of egalitarian communities committed to economic and social justice, and understanding how world views and self-concepts come to be constructed" (Glanz & Behar-Horenstein, 2002, p. 135).

Critical pedagogy is "doing" critical theory. Critical pedagogy has hope that the present education systems will look at human difference, seriously, so that these systems will break down the walls of injustices. "In its most radical sense, critical pedagogy seeks to unoppress the oppressed and unite people in a shared language of critique, struggle, and hope to end various forms of human suffering" (Kanpol, 1999, p. 27).

Freire's work is highly relevant in today's world where the poor and oppressed are still accepted as being fixtures within a class system whose affluent members maintain their status and the silence of the underprivileged is nurtured. Manipulative forces move through their use of science and technology to guarantee the continued place of the oppressed in this society. Freire's (1970/2000) perception of the oppressor warrants consideration in a society that too often creates oxymoronic situations of generosity and injustice that thrive side by side in the lives of the oppressed. In fact, Freire (1970/2000) describes such generosity as *false generosity*, the effort of the oppressors to add to their egotistical nature based on humanitarianism rather than humanism (p. 54). Nevertheless, regarding the source of change and freedom, Freire (1970/2000) contends, "Only the power that springs from the weakness of the oppressed will be sufficiently strong to free both [the oppressed and the oppressor]" (p. 44).

For Freire (1973), the ability to make meaning places us in a non-adaptive position to shape our world (p. 4) and with technology comes a host of challenges. Freire (1970/2000) describes a banking system of education that has not managed to disappear from our present system, even within technology reform efforts. "A careful analysis of the teacher-student relationship at any level, inside or outside the school, reveals its fundamentally narrative character. This relationship involves a narrating Subject (the teacher) and patient listening objects (the students)" (p. 71). In high tech situations, the subject may be the computer and teachers and students become the objects.

According to Freire, the more students are treated as receptacles, the less likely they are to become critically conscious change agents. They are more likely to adapt to a world in dire need of change. Freire's pedagogy urges us to question our history and our

place as social subjects in this world. As Heidegger encourages us to be critical thinkers, Freire also urges teachers and students to question, reflect, and find meaning together. Freire (1970/2000) argues that all people, regardless of how ignorant or silent, have the capacity to critically look at the world when in dialogue with others (p. 14).

Teachers must dare to teach and care. For Freire (1998), however, caring alone is not enough. Teachers are often labeled as "parents away from home," "coddling nurturers," and "grandparents," depending upon their age. Before my introduction to Freire, I considered these labels as endearing terms for caring teachers. However, Freire (1998) warns us that these labels are traps designed "to soften the teachers' capacity to struggle or to keep them occupied in the implementation of their day-to-day tasks" (p. 15).

I have often been subjected to attempts to persuade me to carry out an agenda by using such phrases as "Do it for the children," "We are all here for the students," or "Remember why you here." I must admit that this strategy worked when I was a novice. However, it did not take too many years to recognize that I was being manipulated and I began to verbally reject that approach. Education reform efforts ought to be designed and implemented to meet the needs of *all* children but, too often, I have seen the contrary. Students are expected to meet the needs of the programs.

According to Freire (1998), teachers' capacity to struggle is one in which teachers dare to teach their students that there is a urgent need to not only discuss complex issues regarding the haves and the have-nots but to become aggressive in doing something about it. A discourse about the use of technology to dominate others does not change that course of action. Recognizing the struggles of the poor does not eradicate poverty. The

disappearance of oppression does not occur by simply reading Freire's (1970/2000) *Pedagogy of the Oppressed*. We can embrace an ethic of caring; however, if this caring attitude is not demonstrated through a radical voice that is much more than a whisper, then our caring has lost is savor. Freire (1998) says,

> It does not seem ethical to me to live this way or to defend this contradiction as acceptable behavior. It is not with these kinds of practices that we foster a vigilant citizenry, which is indispensable to the development of democracy. Finally, the thesis that teachers should be teachers and not coddling parents points to the fact that we all have the privilege and the duty to fight for the right to be ourselves, to opt, to decide, and to unveil truths . . . It is possible to be a parent without loving one's children, without even liking being a parent, but it is not possible to be a teacher [not one who masquerades as such] without loving one's students, even realizing that love alone is not enough. (p. 15)

Those day-to-day tasks, which are expected of teachers, are usually guarantees that teachers will remain in the classroom on task and out-of-the-way during closed-door sessions in which decisions are made that affect them and their students. However, we ought to not abdicate our responsibilities in the face of such obstacles. Freire (1998) reminds us that such difficulties are accompanied by fear. Teachers often fear being ostracized, losing job security, lacking effectiveness, and being placed in marginal situations within the school, even when the schools are marginalized. However, Freire (1998) says, "The issue is not allowing that fear to paralyze us, not allowing that fear to persuade us to quit, to face a challenging situation without an effort, without a fight" (p. 27). Recognizing our own struggles as teachers is an impetus to encouraging students to be critical problem solvers that analyze the effects of and reasons for oppression and who understand that "if an obstacle cannot be overcome right away, one must determine what steps to take toward becoming better capable of overcoming it tomorrow" (Freire, 1998, p. 27).

Extensions of Education

Manovich (2001) notes that today we are in a new media revolution with the computer at the center. This revolution "affects all stages of communication, including acquisition, manipulation, storage, and distribution; it also affects all types of media – texts, still images, moving images, sound, and spatial constructions" (p. 19). Movies and television have enhanced their plots and given superhuman capabilities to their characters as a result of computer enhancements. As educators, we must remain open minded in focusing on these various forms of media entertainment and its capacity to educate, and then instruct our students and their parents to do likewise.

In every area of our culture, including education, we can find technology extending itself. What is made even more obvious, through cultural studies, is the fact that technology has become one of our major cultural structures that has the power to influence the construction of our identities. Therefore, we must consider America as technoculture. In *Feminism Confronts Technology*, Judy Wajcman (1991) recognizes technology as "more than a set of physical objects or artefacts. It also fundamentally embodies a culture or set of social relations made up of certain sorts of knowledge, beliefs, desires, and practices" (p. 149). In addition, Wajcman reveals how technology is shaped by the patriarchal traditions of interests, power, and authority.

Turkle (1995) points out concerns of critics that technology breaks down an individual's identity. However, she speaks of Gergen's view that individualism vanishes and is replaced by interrelatedness, which is a view also held by McLuhan (1961). Turkle (1995) contends that we are multiple personalities that live in the voices, actions, brains, and images of every one of us (p. 257). Yet, there are those who suffer an identity

crisis in participating in cyberspace communities. We are told that we are born with one personality, a unitary notion of identity. Turkle (1995) challenges this notion because "many manifestations of multiplicity in our culture, including the adoption of online personae are contributing to a general reconsideration of traditional, unitary notions of identity" (p. 260).

Popular culture has challenged education's traditions, especially as it relates to dress, music, and technology, each of which contributes to identity formation. According to Giroux, Simon, and Freire (1989), "popular culture represents a significant pedagogical site that raises important questions about the relevance of everyday life, student voice, and the investments of meaning and pleasure that structure and anchor the why and how of learning" (p. 221). Giroux, Simon, and Freire (1989) urge educators to be receptive of popular culture because it provides "a field of possibilities within which students can be empowered so as to appropriate cultural forms on terms that dignify and extend their human capabilities" (p. 18).

Cohen (1994) offers a different direction from that of resistance. It is one which is "an empowering 'critical perspective' [that] discovers multiple and diverse positions between these extremes" (p. 104). Many staff members, within my school, refuse to acknowledge the influence of popular culture. As a result, there are continuous arguments over hairstyles, clothes, music, and the use of technology. However, Grossberg (1997) says,

> Only in this messy terrain can we begin to sort out how people recognize and transform themselves and their world within and through popular cultural practices. Thus we need to address how specific forms of popular culture, forms that may produce a variety of pleasures and that may empower their audiences in a variety of ways, are themselves struggled over and articulated to larger historically specific political projects. Hence 'the popular' also defines a focus, for

> cultural studies' interventions will not succeed if it does not enter onto the terrain of people's own lives in order to offer them new possibilities, and to locate the ways in which 'the people' are themselves constructed through their cultural practices. It is only by entering into the popular -- popular languages, cultures, logics, emotions, experiences, moralities, desires, consciousnesses -- that we can gain a better sense of the field of forces, that we can see where struggles are actualized and possible, that we can help articulate, nurture, and support them. (p. 243)

Jukes and Dosaj (2004) in their article, *Understanding Digital Kids (DKs): Teaching & Learning in the New Digital Landscape*, label this generation as "Today's Instant Messenger Generation." While many educators seek to describe these students, they do so within their own histories. However, the answers are not simply because these kids have orange hair, body piercings, or because they wear their clothes three sizes larger. According to Jukes and Dosaj (2004), "[They have] grown up in a new digital landscape" (p.1). They were born into a technological landscape of cell phones, virtual games, the Internet, and the computer. In fact, the children have been the main influence in driving computer technology to its position in education today.

Goldfarb's (2002) study shows "Children raised on video and home computer games were crucial participants in spreading the computer from facilitator of mundane everyday transactions and mindless home recreation to core educational and communications technology" (Goldfarb, 2002, p. 9). The problem, for many of us, is that we are struggling to make sense of all of this, without considering the differences in our world as children and the techno-culture into which our children are born.

Technology, as a part of education reform, is not destined to be removed from the spotlight of current education reform. In *Reality by Design,* Petraglia (1998) provides the following rationale for using technology:

> Other commonly stated rationales for the use of other media and modalities in learning include learner engagement through sheer novelty value and/ or enthusiasm for technology; improvement of the logistics of teaching (i.e., technologies have traditionally been seen as labor-saving devices with the potential to deliver more personalized instruction than a human teacher has the time to do, and, more recently, distance learning has become an issue of note); and the increased effectiveness of information delivered using new media. Still, authenticity is perhaps the most interesting of these other possible arguments for investment in educational technology both for its apparent imperviousness to empirical investigation and for its rhetorical force. (p. 6)

Ferneding (2004) summarizes the current policy as follows "(1) standards and accountability schemes; (2) a focus on the diffusion of computer and information technologies; and (3) a particular means of restructuring education that is based on a marketplace approach" (p. 184). The Georgia Department of Education's (GDOE) technology focus gives credibility to Ferneding's analysis. This focus also explains how technology is an extension of education. Georgia's In-Tech aims include the following: (1) Change instruction to meet the needs of 21st century learners; (2) Put Georgia in a national spotlight as the first wireless state; (3) Restructure the staff to indicate an emphasis on technology in instruction; and (4) Change the emphasis on "Educating about technology to making technology an integral part of instruction."

Georgia's DOE justifies these aims as a result of America's place in the world; and such was the attitude that generated *A Nation at Risk,* twenty-one years ago. Citing a report from the National Commission on Mathematics and Science Teaching for the 21st Century (9/27/2000), the GDOE's technology leaders urge the need to restructure past emphases before it is too late. Why? Singapore has the most technological workforce in the world. Israel produces twice as many engineers as the United States. Outside of the Silicon Valley, Israel has more technology-based startups. On January 7, 2005, the U.S.

Department of Education's press release announced the "National Education Technology Plan," which reflects the emphasis of all state in-tech plans. The press release states,

> According to the report, the technology that has so dramatically changed the world outside our schools is now changing the learning and teaching environment within them. This change is driven by an increasingly competitive global economy and the students themselves, who are 'born and comfortable in the age of the Internet.' (para. 7)

With these reasons in mind, Georgia's technology initiative requires teachers to regard technology as an embedded "piece of the curriculum" rather than as an add-on. "Instead of being integral to curriculum development and completely integrated into it, the computer environment remains peripheral, an 'add-on' in space and time that many teachers and administrators can reject" (Morton, 1996). Current studies by Cuban (2001) and Ferneding (2003) support Morton's contention that the computer's place within the school environment is peripheral, even though policymakers' decisions differ.

Extensions of the Curriculum

In comparing America's factory-model of education, Morris (2004) describes it as "the great American clonescape" (p. 38). It is the place where kids' individuality is discouraged and sameness is the norm. Morris's (2004) description of our schools as a "wasteland" reminds me of just how useless our activities can be within the classrooms. Students' work, which is often produced with their soaring imaginations, finds its place in trashcans or it is sent home to parents to discard.

Whether or not we are prepared to teach "Digital Kids" is definitely a question for concern. According to Weaver (2004), "Curriculum theorists too often erase techno-culture from their discourses, and schools are still enamored with the factory model where students are not computer hackers but empty vessels waiting to be enlightened" (p.

31). Even though my own work environment is a high-tech school, there are some teachers who refuse to consider any positive aspects of technology or recognize its interactive nature. They are veteran teachers whose skepticism is apparent in their lack of enthusiasm, as reflected in their behavior. It would appear that Weaver (2004) has been a "fly on the wall" of most schools because his descriptions are right on target: "In a post-human generation classroom, the only empty vessel is the teacher who is not wired and the classroom theorists who still envision technology as a deterrent to learning and creativity" (p. 31).

Of all educators, teachers have the most influence on students. However, positive outcomes in education, from the integration of technology, are few and far between. We may label techno-phobia as the reason; but we cannot overlook the top-down approach to policy making as eliminating teachers from involvement in the decisions that affect them all. This situation is not new. Ferneding (2004) says, ". . . from the development of 'teacher proof' materials in the 1960s to the present, teachers have had little power over the politics of reform which have directly affected their working conditions" (p.186). Nonetheless, we must have teachers willing to move into spaces where they can affect change. They must be willing to transgress and enter into complicated discourses for the sake of education.

According to bell hooks (1994), “The classroom remains the most radical space of possibility in the academy” and she urges all educators “to open our minds and hearts so that we can know beyond the boundaries of what is acceptable . . . , so that we can create new visions” (p. 12). In teaching "Digital Kids," teacher educators are urged to reflect upon and acknowledge their own agendas. In doing so, we force ourselves to

accept the fact that there are many ways to read our world. “Through this reflective stance, we attempt to develop a classroom practice that puts the students’ knowledge and voice before our own, allowing us to ‘read’ our students and ourselves in an effort to create a classroom dialogue that is free from agenda yet is not value free” (Daspit & Weaver, 2000, p. 53). Damarin (2004) also is aware of the need for teachers who are not afraid of change. In fact, she says that teachers must be "cyborg-witch-goddess-guide" (p. 68) for students who are "becoming."

Damarin (2004) and Weaver (2004) remind us that militarism/war is the attitude that accompanies technology because it was war that stimulated its growth. However, we are left to decide whether to allow militaristic tones as references to the mood of education or do we incorporate technology into the curriculum in such a way that students would recognize their social responsibilities. According to Damarin (2004),

> Instead, recognizing that war, technology, and the drive toward progress are always already with us, the context for all we do, the curriculum must provide opportunities for smoothing the spaces of the technological 'what is' with our desires for the human 'what is not,' for creating new life forms from materials as common as seawater which surrounds us, and for being fully in this world. (p. 68)

Educating our students about the destructive needs of people changes the perception of technology as evil and it unlocks the possibility to create responsibility for the earth. According to Doll et al. (2001), we cannot be responsible to ourselves or to the natural world in which we live ”as long as we continue to see these two worlds [science/society and technology/culture] and their habits of thought and patterns of action as absolutely separated." (p. 29). Science fiction literature relates man's destructive course, even when they fail to demonstrate foresight. Shelley's (1831) *Frankenstein* and

Capek's (1920) *Rossum's Universal Robots* provide clear pictures of what could happen when man's technological creativity is irresponsible.

The curriculum must aim to teach social responsibility. Ferneding (2004) adds that "we indirectly abdicate our responsibility toward our children by offering them our legacy of irresponsibility toward our own technological creations, manifested as the potential for a nuclear holocaust and ecological breakdown" (p. 197). Consequently, there must be balance in anything we do and there must be the possibility to travel in various spaces that ultimately give rise to a better society for all of nature and mankind. If not utilized productively, technology will continue to destroy masses while making life comfortable for a few. In an atmosphere promoted by an ethic of caring, teachers can provide students opportunities to evaluate both the negative and positive effects of technology. This process can stimulate them to engage in the use and creation of technology for the improvement of all, without functioning at the expense of others.

Educators have begun to look at the positive effects of technological advancements in the classroom. For example, digital imaging has become an essential element. Copying supplemental materials for student use is a daily activity. Downloading pictures from the Internet enhances student projects and schools' plans of action and yearly reports. Digital camera companies have created software that is easily applicable. In addition, the dot matrix printer has been shelved for laser and inkjet printers whose price ranges make them affordable for home and business use. Within the walls of our classrooms is an abundance of prosthetics in the guise of digital imaging equipment, computer keyboards, and other technology that improves teacher delivery.

Although simulation games were militaristic in original usage, they have found their way into the classrooms as extensions to the curriculum. The Internet provides teacher resources for simulation games and activities for every discipline. SimCity is a simulation game that allows the user to control the development of their urban environment, while SimLife simulates the evolution process. The Electronic United Nations is a multidiscipline interactive simulation game in which students develop their own economy, judicial system, and constitution. In such simulations, Stone (1998) says that those who inhabit this space have been "refigured" while "their physical bodies were parked in 'normal' space" (p. 34). As we reflect on our childhood, we are reminded of having constructed various identities through the games we played. Furthermore, Turkle (1995) explicitly states that we use the computer as a medium for acting out our own fantasies. She adds, "we are using life on computer screens to become comfortable with new ways of thinking about evolution, relationships, sexuality, politics, and identity" (p.26).

The use of simulation games, as well as other multimedia programs, provides both fun and challenges to students. Optimal flow is described as the space in which students become so lost in enjoying the process that they lose sight of time. It is that space where unlimited possibilities for growth are experienced as serious fun.

> In other words, when students experience a balanced interaction between highly interesting tasks that offer exciting opportunities for challenge seeking and highly important tasks that allow calm opportunities for mastery attainment, they tend to experience the complex attraction of serious fun. (Rea, 2001, p. 157)

Rea (2001) contends that serious-mindedness and fun-mindedness are conditions that must operate in unison in order to obtain achievement motivation. The curriculum ought to reflect an agenda of serious fun.

Reconceptualizing education is essential in order to move toward building a relational community without boundaries. The roles of administrators, teachers, and students must change as well as the curriculum focus and the schools themselves. This process includes many processes that are reminiscent of Deleuze rhizomes. Damarin (2004) points us toward "a curriculum of better living" (p. 51), which is a curriculum that welcomes both pain and pleasure and which moves us into nomadic spaces. We ought to turn our attention to the need to allow for the interaction of social, political, economic, artistic, and cultural forces in curriculum, all of which involve technology. In this manner, students will not only make personal improvements, but they will also transform the society in which they live.

Fellow Travelers' Field Experiences: Cuban and Ferneding

Larry Cuban

In *Oversold & Underused: Computers in the Classroom*, Cuban (2001) provides a brief introduction to education reform in America and he notes that public education was viewed as the source of economic improvement. Cuban (2001) states, “Businesslike efficiency and vocational education in secondary schools and colleges were seen as critical to preparing students for work in an economy that was then competing with Great Britain and Germany” (p. 9).

In order to actuate this efficiency in education, technology was embraced. Citing Archer and Walsh from the April 3, 1996 article “Summit Garners Mixed Reviews from Pundits, Practitioners,” Cuban (2001) writes, “ We are convinced that technology, if applied thoughtfully and well-integrated into a curriculum, can be utilized as a helpful

tool to assist student learning, provide access to valuable information, and ensure a competitive edge for our workforce" (p. 16).

Cuban's (2001) study focused on the site where he believed technology is most celebrated: California's Silicon Valley. "There, technology cheerleaders and resources are abundant, and schools offer a best case for exploring whether reformers' assumptions have materialized as predicted" (p. 18). Participants included teachers and students in early childhood programs, high schools, and postsecondary education environments. Two (2) Silicon Valley high schools were included in this study: Las Montañas and Flatland. Las Montañas has a student population of 1262, and a staff of 60. Flatland has a student population of 1854, and a staff of 81.

Cuban describes Las Montañas as a high school having experienced many changes over the years. Presently, it is a high-tech high school that is supported by a state Digital High School Grant, and grants from reform groups in the Bay Area. In contrast, Flatland is the district's vocational education school, whose goal is to prepare students for the workplace. Most Flatland families are minorities whose economic status ranges from low to middle income. Also included in this study are eleven preschool and kindergarten classrooms as well as Stanford, the only university in the study.

Cuban's (2001) research questions consisted of the following: (1) In schools where computers are readily available, how do teachers and students use the machines in classrooms for instruction? (2) Have teaching and learning changed as a consequence of two decades of heavy promotion and investment in computers and other technologies? If so, what explains the changes? If not, what explains the stability? (3) Has the investment in computers and other technologies been worth the cost (p. 19)?

The findings at Stanford suggest that students and faculty were more prone to use technology on university campuses because of the increased accessibility to information (Cuban, 2001, p. 104). Professors use technology for research. However, Cuban (2001) notes that the majority of the faculty rarely uses technology for instructional purposes. Lectures and seminars remain central (p. 116). The majority of the faculty limits the use of technology for class preparation. "Both professors and students use the machines and software extensively to research, write, communicate, and prepare for courses. Yet for direct classroom instruction there is little use of these new technologies" (p. 130).

Cuban studied eleven (11) preschool and kindergarten classrooms. In only two preschool classrooms, favored by parents as providing excellent educational experiences, the computers remained on all day; however, only two preschoolers frequented them at a time. Each of these classroom teachers integrated technology into instruction, and created materials using the computers. Cuban identifies three additional teachers as being effective in integrating technology. However, none of them were reluctant to admit that even though parents marveled at the environment, they saw the need for more than just two computers for a class of thirty preschoolers. In questioning the preschool and kindergarten students, Cuban found that the majority was taught to use computers by family members. They had access to computers at home; therefore, when entering school they brought with them a certain amount of fluency.

Within the remaining six classrooms, teachers had access to computers in their classrooms, but they did not integrate them into instruction. The preschool and kindergarten teachers valued the use of computers in education. However, those six who did not integrate technology throughout instruction, believed that the computers should

be viewed as “an enrichment activity or as a learning tool rather than as a central task for their children to perform” (Cuban, 2001, p. 57).

In comparing findings from Flatland and Las Montañas, Cuban (2001) states, "In academic performance, as measured by standardized tests, the results are roughly the same, although Flatland's scores on the state test are closer to national norms than those of Las Montañas" (p. 82). In addition, access to computers and other types of technology are basically the same at both high schools. However, the teachers interviewed reported that they primarily used computers to prepare for their classes, rather than for instructional purposes. The thirty-three students interviewed reported more use of computers in their business classes, than in their other academic classes. Teachers, both veteran and the novice, considered lack of training, irrelevant workshops and a lack of support as reasons for infrequent computer use.

Cuban’s (2001) research uncovered the following main goals for implementing new technology in schools: (1) To improve schools’ efficiency and productivity; (2) To actively engage students and teachers in relevant experiences; and (3) To prepare students for the workplace (p. 15). However, Cuban was left to question why, in such a high-tech environment as the Silicon Valley, is there a scarcity as well as a lack of use of computers in the classroom. Cuban determined that the classroom environment would need to make structural changes to integrate technology. Such changes ought to include more student-centered and less teacher-controlled activities.

Cuban (2001) noted that many teachers were not receptive to changing their traditions, regardless of what was expected of them (p. 97). This study also concluded that policymakers and practitioners should direct their attention to guaranteeing that the

following should take place in education reform: (1) Computers should be made available in every classroom; (2) The gap between urban and suburban schools' access to the Internet should be eliminated; (3) More funds should be invested in online curriculum and distance learning; (4) Technical support should be readily available to teachers; and (5) More professional development should be afforded teachers (p. 180). Cuban's findings stressed the need for respect for teachers, and noted that failure to pay close attention to the needs of the classroom environment would continue to result in oversold and underused computers in education.

Karen Ferneding

In *Questioning Technology: Electronic Technologies and Educational Reform,* Ferneding (2003) deems it necessary to rethink the process of restructuring of our schools around technology based upon our cultural bias. Ferneding (2003) says,

> Our cultural bias is to view technology as a mere tool or artifact. This position is inherently apolitical and therefore leads to technology adoption without much reflection on how technology may change the social environment or inadvertently enable negative unexpected outcomes. (p. 9)

We often view pencils and pens as mere classroom tools and questioning their use is not a necessity. However, considering technology adoption is a more complex process because of the complex nature of technology. Technology influences our identity as teachers, students, and provides itself as a mirror capable of reflecting who we are as social beings. According to Ferneding (2003), "There is much more to understanding the process of technology adoption if one understands technology not only as a tool but as a 'social process'" (p. 10).

Ferneding's (2003) study suggests that current education reform efforts look towards technology as a *quick fix* to the problems within education. She contends that

this notion has been constructed for us to accept without questioning whether or not we are being subjected to exploitation. In addressing this issue, Ferneding (2003) examined the most recognized reform documents: *A Nation at Risk*; Goals 2000; and Educate America Act. Efforts that emerged focused on teacher accountability in the delivery and outcomes of instruction.

Ferneding (2003) examines alternative visions of technology. Proponents of alternative approaches have included those who urge the restructuring of schools to align with business-like climates because improving the economy rests within the walls of education. Other visionaries warn us about falling into such a trap of manipulation and control. Ferneding contends that technology in education has become big business; therefore, new players enter the arena, who view education as a lucrative market (p. 54).

The neutrality of technology is questioned in this study. Current reform efforts present technology as a tool to use for the purpose of improving test scores, etc. However, Ferneding (2003) examines an alternative view of technology as a social structure. As a social structure, we cannot escape recognizing the contributions of technology in our lives.

Ferneding (2003) contends that technologies are contributing factors in identity formation (p.59). Consequently, she provides a challenge to the idea that technology is neutral by questioning technocentrism, which accepts the concept of technology as a tool. "Do educators possess a commonsense perspective whereby technology is simply a tool that improves society . . . Or, is their perception more complex and how does it relate to their social vision" (p. 231)? Ferneding (2003) encourages us to recognize "the need for considering social visions within a broader sociopolitical or technopolitical context . . .

[because of] a technocentric vision of education that is being created, infused, and financed without serious public debate . . .” (p. 253).

Ferneding's (2003) research involves case studies of two Texas schools: Shelton Valley Middle School and Zepeda Elementary School. Shelton Valley has a student population of approximately 780 seventh and eighth graders. "Throughout its history the school has served rural, white students from low to medium income families" (p. 109). However, Ferneding explains that wealthy families, fleeing the problems of urban areas, have moved into the area of Shelton Valley, making it more upscale than before. In contrast, Zepeda is an elementary school that is located in a poor area of a metropolitan Texas city. Ferneding notes the rundown conditions of the surrounding area in which the school is located and she describes the student population as Hispanic and African American students.

Ferneding (2003) found that Shelton Valley Middle School, with its technology-driven approach, lacked a sense of community. School decisions were from the top down. Therefore, teachers were expected to blindly move to the tune of the techno-centric policymakers. "Thus Shelton Valley was poised to accommodate a performance-based culture rather than an authentic culture" (p. 145). It was the decision of the policymakers that Shelton Valley's use of technology would be aimed at improving test scores and efficiency.

In contrast to Shelton Valley, Zepeda's story is that of "a school's struggle for reform in terms of how the school functioned as a place that was significant to an economically marginalized community" (Ferneding, 2003, p. 146). Access to computers by the families of Zepeda was nonexistent and computer use within the school was at the

margin. Teachers were not required to acquire technology training above the minimal required by the state. Therefore, they minimized computer use with students. As a result, "Zepeda students were far behind their suburban counterparts in middle school in such skills . . . " (Ferneding, 2003, p. 196). However, when their test scores dropped, the community sought answers. Teachers, parents and community leaders worked together to remedy the problem.

Zepeda's approach was "traditional and highly structured" (p. 204). Computers were used for drill and practice. What is unique about Zepeda is that in the midst of attempting to improve student performance, social programs were designed to improve their community. Unfortunately, Zepeda's teachers were excluded from designing reform centered on the core curriculum and instruction.

In contrast to Zepeda's social reform efforts and community building strategies, Shelton Valley's technology-driven reform efforts were at the core of their struggle to find an identity that excluded the community. "In addition, the schools' technology adoption plan had no pedagogically based framework" (p. 206). Few discussions centered on community, practices, strategies, and the curriculum. There were no project and problem-based learning activities. Teachers were expected to embrace the techno-centric attitudes of the policy elite without questions. Naturally, feelings of alienation surfaced among teachers and site administrators because it was determined that changes resulted without much thought being given to changes within the culture of the school (p. 208).

Ferneding (2003) argues that Zepeda, unlike Shelton Valley, had protected itself from falling into a trap that excluded community building as essential to the growth and

success of a school. She does not imply that technology in education should be avoided, but she urges educators to question how it is used. She contends that teachers' voices in reform should be heard. Ferneding (2003) suggests that education reform should offer a discourse that stimulates visions of possibilities in a world of peace, love, joy, and justice (p. 254).

An Overview of Science Fiction

Definition of Science Fiction

There are varied definitions of science fiction. According to Weldes (2003), science fiction is a "contested term," (p. 8). This lack of consensus is not a flaw. "Rather, it reflects the presence of different critical communities with their own distinctive values, interests and priorities" (Parrinder, 2000, p. 2). In “The SF of Theory: Baudrillard and Haraway, Csicery-Ronay” (1991) says, “. . . since SF is concerned mainly with the role of science and technology in defining human—i.e., cultural—value, there can be as many kinds of SF as there are theories of culture” (para. 4).

Science fiction critic, Darko Suvin provides a general definition. Suvin (1988) defines it as “a literary genre whose necessary and sufficient conditions are the presence and interaction of estrangement and cognition . . .” (p. 66). Suvin (1988) adds that an imaginative framework is the formal device of science fiction, which is an “alternative to the author's empirical environment, and … it is distinguished by the narrative dominance or hegemony of a fictional ‘novum’ (novelty, innovation) validated by cognitive logic” (p. 66). Furthermore, “SF is a 'serious game', a play with realities which teaches us to understand and, if need be, to modify our empirical reality” (Suvin, 1988, p. 42). Csicery-Ronay (1991) supports Suvin’s description and adds, “SF, then, is not a genre of

literary entertainment only, but a mode of awareness, a complex hesitation about the relationship between imaginary conceptions and historical reality unfolding into the future" (para. 5).

In support of Suvin, Roberts (2000) states that science fiction "requires material, physical rationalization, rather than a supernatural or arbitrary one. This grounding of SF in the material rather than the supernatural becomes one of its key features" (p. 5) and it is what separates science fiction from fantasy or other types of imaginative literature. In addition, the alternative worlds of science fiction "must be *possible,* by which [Suvin] means it must reflect the constraints of science. This is how [Suvin] distinguishes SF from the looser category of fantasy" (Roberts, 2000, p. 8).

Characteristics of Science Fiction

Estrangement, cognition, and novum are characteristics of science fiction. Parrinder (2000) explores Suvin's theory of cognitive estrangement that "by imagining strange worlds we come to see our own conditions of life in a new and potentially revolutionary perspective" (Parrinder, 2000, p. 4). *Estrangement* or *alienation* refers to what we understand to be different from our empirical reality. "Cognition, with its rational, logical implications, refers to that aspect of SF that prompts us to try and understand, to comprehend the alien landscape of a given SF book, film or story" (Roberts, 2000, p. 8).

Roberts (2000) explains the need for cognition and estrangement to co-exist in an interactive state. "If the SF text were entirely concerned with 'estrangement' then we would not be able to understand it; if it were entirely to do with 'cognition' then it would be scientific or documentary rather than science fiction" (p. 8). "Estrangement or

alienation is based on what Darko Suvin dubbed the nouvem," (Weldes, 2003, p. 9) which is Latin for *a new thing*. Suvin (1979) explained the hegemonic nature of the novum. Suvin (1979) contends that the novum is “so central and significant that it determines the whole narrative logic . . . regardless of any impurities that might be present” (p. 70).

Novum is situated in "a discourse of possibility, which is usually called science or technology" (Roberts, 2000, p. 7). In science fiction, the *novum* is inclusive of alien landscapes, space travel, imagined futures, time machines, and bizarre characters within even more bizarre plots. One novem could be the basis of a science fiction text, such as Well's time machine. "More usually it will be predicated on a number of interrelated nova, such as the varieties of futuristic technology found aboard the starship *Enterprise* in *Star Trek* . . ." (Roberts, 2000, p. 6). Roberts (as cited in Weldes, 2003) notes that these nova present "a door through which we step into a different way of looking at things."

As a function of engaging our imagination in a thoroughgoing manner, the novum puts us in the position of rewriting, reconceptualising, the reality with which we are familiar—of constructing a whole and wholly different society, for instance, in which dilating doors might be a part (Roberts, 2000, p. 20).

Technology (novum) is an obvious extension of our empirical reality. As a result, it is difficult for some people to recognize technology's oxymoronic presence as both an extension of who we are, and as the Other. "Technology is something with which we are simultaneously familiar and already estranged from; familiar because it plays so large a part in our life" (Roberts, 2000, p. 147). We are estranged from it because our knowledge

of how it works is limited or nonexistent. In fact, we may find it difficult to predict what technologies are yet to come.

Critics of science fiction may suggest that a lack of its ability to accurately make predictions negates its effectiveness in stimulating an awareness of our predicaments. Roberts (2000) says, "we needn't be embarrassed on this account, because the recent developments in 'Chaos Theory' have taught us that the business of accurate prediction in a chaotic system like 'The World' is literally impossible" (p. 33). However, we are capable of predicting that, without change in the interest of all people, we are moving into a future of more death and destruction.

Brief History of Science Fiction

"Many SF fans can become very heated when it comes to . . . history" (Roberts, 2000, p. 52). Suvin (1988) contends that SF began before its recognition and that "genre traditions are legitimately established in retrospect and that SF can in that sense be said to begin at the latest with Plato and the Hellenic marvellous voyages and utopias . . . " (p. 75). Suvin examines the works of such writers as Lucian, Cyrano, Swift, and Shelley and he argues that SF's "tradition is as old as literature - as the marvellous countries and beings in tribal tales, *Gilgamesh* or Lucian . . ." (Suvin, 1988, p. 99).

Before the development of Bacon's scientific method, and before science fiction was a recognized genre, writers were using their imaginations to create stories with some elements of science fiction. For example, *The Epic of Gilgamesh*, considered the oldest written story, which dates back to around 2700 B. C., comes from ancient Sumeria. This epic describes the adventurous life of a protagonist who fights supernatural beings and monsters. According to Roberts (2000), "[*The Epic of Gilgamesh*] provides us with the

metaphorical basis of an encounter with difference. The monsters of such a work function as nova, in a manner of speaking" (p. 49).

Lucian of Samosata, a Syrian writer, wrote *True History* during the second century A. D. In this story, the narrator is traveling by way of a ship that sails into a hurricane, which sweeps them up and carries them through the sky to the moon. "In another Lucian work, the *Icaromenippus* [*Journey Through the Air*], the protagonist uses the wings of a vulture and an eagle in order to fly to the Moon" (Roberts, 2000, p. 48). This could possibly be the first description of man's use of prosthetics or the first look at the nature of the cyborg.

During the seventeenth century, we were presented with such texts as Godwin's *The Man in the Moone* (1638) and Cyrano de Bergerac *The Comical History of the States and Empires of the World of the Moon* (1656). Cyrano followed with *Trip to the Moon*, which was posthumously published in 1657. In this story, the protagonist is swept away to the Moon by the Sun's attraction to the dew filled bottles that he has attached to his body. "In the course of the book, he suggested several methods of reaching the moon, and one was to tie rockets to a chariot, light them, and zoom off" (Asimov, 1976, p. 39). Asimov (1976) says,

> Oddly enough, the first suggestion of the one possible means of reaching the moon through the vacuum beyond the earth's atmosphere came not from a man of science but from a science-fiction writer—none other than Cyrano de Bergerac. Cyrano, the long-nosed duelist, really existed, really had a long nose, really fought duels, and was also a clever writer. (p. 39)

The creative imagination of Cyrano and other SF writers leaves us to contemplate one viable question: Is the imagination the seat of reality?

The seventeenth and eighteenth centuries were the periods in which Jonathan Swift's (1667-1745) lived experiences became the stimuli for his writings. Swift worked as secretary in the Whig Party and he became a chaplain, after taking his religious orders in 1694. Swift had hoped for a position in the Church of England, which never materialized. Instead, Swift became dean at St. Patrick's in Dublin.

Swift wrote *Gulliver's Travels* in 1726 as a criticism of the society in which he lived. Swift found hypocrisy within the government, the court system, and the religious sector. The focus of this novel was the same as Swift's concern for life: "Issues far more social and moral than theological" (Clareson, 1971, p. 155). In a letter to Viscount Bolinbroke, dated March 21, 1729, Swift says, "It would seem to me that corruption, like avarice, has no bounds" (Eddy, 1932, p. 440). Of the government and church, Swift adds, "Christian governments, . . . always had some established religion, leaving at best a toleration to others" (Eddy, 1932, p. 446).

Those merely tolerated were the poor people of Swift's time. Swift biographer, W. E. H. Lecky, notes that Swift's connections to the poor included expeditions into humble inns where he learned much about mankind through conversations. Lecky states, "Probably no other English writer ever understood so well or reproduced so faithfully the thoughts, feelings, and dialect of servants; of the cook, the valet, the chambermaid . . ." (http://www.jaffebros.com/lee/gulliver/biography/bio_lecky.html). Swift's convictions are further noted in "A True and Faithful Narrative of What Passed in London." Swift says,

> It was remarkable that several of our very richest Tradesmen of the City, in common Charity, gave away Shillings and Six-pences to the Beggers, who ply'd about the Church Doors; and at a particular Church in the City, a Wealthy Church-warden with his own Hands distributed Fifty twelve-penny Loaves to the

> Poor, by way of Restitution for the many great and costly Feasts, which he had eaten of at their [expense]. (Eddy, 1932, p. 97)

Parrinder (2000) considers Swift's *Gulliver's Travels* (1726) as "probably the finest utopian work produced in the two centuries after More" (p. 72). Monk (as cited by Suvin, 1979) says that *Gulliver's Travels* is "at once science fiction and a witty parody of science" (p. 107). Gulliver's third voyage demonstrates science as dehumanized. Rather than working to perpetuate life and mankind's relationships with each other and nature, science does just the opposite. According to Suvin (1979), "The Laputans -the first 'mad scientists' in SF - have one eye turned 'up to the zenith' of mathematical abstraction, and the other inward, as befits a subjective Individualism" (p. 109). Swift's writing speaks of the need to consider and work against concern for only self but rather focus on concern for mankind and nature. Suvin (1979) contends,

> Only somebody who deeply cared about man's potentials could have been so outraged at his Yahoodom. By this utopian outrage, in his imaginary voyages and marvelous islands, Swift created the great model for all subsequent SF. It is a wise interweaving of utopias taking on anti-utopian functions . . . (p. 113)

Suvin (1979; 1988) describes science fiction as literature of cognitive estrangement and a novum. "True, SF also has to find a way to present its alternative world, but this is usually done through a skeleton of epical adventure hurried along at a fairly brisk pace in which panoramic and close-up shots alternate" (Suvin, 1988, p. 41). Swift's *Gulliver's Travels* presents strange worlds visited by a traveler who confronts inhabitants that he perceives as alien. As a result, Gulliver has a concern for his own identity, as well. Manlove (1986) notes, "With what else is Swift's Gulliver faced as he is now a giant, now a pygmy, now a man of sense, now a madman, but the problem of what he is and of what it is to be human" (p. 218)? The strange worlds that Gulliver visits are

difficult for him to understand. These worlds are radically different from our empirical environment. However, the plot and settings can be analyzed in such a way that they relate to our empirical environment.

Mary Shelley's *Frankenstein* (1818) is often recognized as the first true science fiction text. According to Freedman (2000),

> Now, however, we must consider Mary Shelley's novel in more strictly generic terms, as the 'first' work of science fiction, or, more precisely, as the first work in which the science-fictional tendency reaches a certain level of self-consciousness, thus enabling a line of fiction that, at least in retrospect, can be construed as the early history of science fiction proper – that is, fiction in which the tendency of science fiction is clearly dominant. (p. 48)

"Brian Aldiss [also] sees Mary Shelley's *Frankenstein* (1818) as the first SF text; the originary scientific fable about the power of the scientist to create, matched with the unforeseeable nature of the consequences of that creation" (Roberts, 2000, p. 48). Rather than the scientist demonstrating a sense of responsibility for and control over his creation, through his verbalizing, the monster appears to be more rational. The monster says, "Here then I retreated, and lay down happy to have found a shelter, however miserable, from the inclemency of the season, and still more from the barbarity of man" (Shelley, 1818/1961, p. 90).

Frankenstein's influence continues to be felt today, through film and television as well as through versions that followed. For example, *The Island of Doctor Moreau* (1896) exemplifies a Shelley influence. In fact, "James Cameron's *Terminator* (1984) is Mary Shelley's *Frankenstein* revisioned via gleaming machines instead of body parts" (Roberts, 2000, p. 146).

In "Frankenstein and the Spark of Being," James and Field (1994) draw attention to the question of whether Shelley's book should be considered science fiction and the

answer is yes. Any criticism regarding maturity in dealing with scientific and social issues is attributed to the fact that Shelley was only nineteen at the time she wrote *Frankenstein*. However, we cannot overlook the strong influences in her life: Her father, William Godwin, was a political philosopher. Shelley's mother, Mary Wollstonecraft, was a famous feminist and her husband was author Percy Bysshe Shelley. Unfortunately, their influences on Shelley's life were not always positive. Kucich (2003) recounts a life of alienation from her father; a constant questioning of the death of her mother at childbirth; the death of two of her children; and the drowning of her husband.

Kucich (2003) recognizes Shelley's painful personal history as the reason for a less than optimistic attitude about life. Suvin (1979) recognizes that "the vitality of [*Frankenstein*] shows that Mary Shelley's personal history and imagination fused here with the passions and nightmares of a whole social class . . . " (p. 133). Suvin (1979) adds that Shelley's contribution lays claim for SF's "concern for a personalized working out of overriding sociopolitical and scientific dilemmas" (p. 137). Just as Shelley wrote from her lived experiences, "Mary Shelley ensured that, working from our own experience and historical position, we can read into her text meanings that belong to us" (James & Field, 1994, para. 4), as we confront our dilemmas.

Verne (1828-1905) and Wells (1866-1946) have been credited for the significant growth of SF as a meaningful genre (Roberts, 2000, p. 59). In fact, both writers have been labeled "The Father of Science Fiction," and their influence cannot be denied. However, it is only in science fiction that a child can have two biological fathers, with no contesting of the fact, and a mother (Mary Shelley) who does not receive the same parental honor with the same magnitude. In reference to the parentage of SF, Roberts

(2000) also states, ". . . only in [a] SF tale could a child have two fathers and no mother" (p. 48), which is a statement eliminating Shelley, altogether, as a parent. This is not surprising of a genre that has been primarily male dominated.

Suvin (1988) notes, "It is certainly incorrect to say that SF, even in the strictest sense, begins with Jules Verne and H. G. Wells" (p. 75). However, Suvin (1988) does suggest that the SF novel "becomes sustained and indeed dominant" (p. 75*)* because of Verne and Wells. Although Verne or Wells did not invent SF, both writers were successful in commercializing it. According to Roberts (2000),

> Both Verne and Wells were writing deliberately popular fiction, and working within the traditions of popular publishing of their day; so it is that Wells's writing grew out of his speculative, mass-market journalism; whilst Verne struck up a lucrative deal with a publisher called Jules Hetzel, who marketed the novels under the popularising rubric of 'Voyages extraordinaires.' In America, the popular market also dictated the beginnings of SF as a serious genre. (Roberts, 2000, p. 67)

Many works of Verne are considered to be in the same Gothic category as Shelley's *Frankenstein*. His characters include monsters and dinosaurs and the settings are cellars, caverns, and dungeons. However, Verne also wrote from an optimistic viewpoint of technology as demonstrated in his famous *Twenty Thousand Leagues Under the Sea* (1872) as well as the earlier written book, *From Earth to the Moon* (1865). Of all of Verne's works, Freedman (2000) considers *Around the World in Eighty Days* as being more concerned with "technological and social innovations of increasing rapid travel" (p. 52) than with the lands covered.

Wells included varied themes in his writings: biological experiments gone awry; war; alien invasions; time travel; and galactic travel. "Wells masterfully translates some of man's oldest terrors" (Suvin, 1979, p. 209) that continue to travel with man into the

future. Suvin (1979) contends that the plots of Wells' stories are less safe than those of Verne. "Though powerful, since it brings about the future, science is a hard master" (Suvin, 1979, p. 210) and Wells demonstrates this, effectively. For example, in *The Island of Dr. Moreau* (1896), Wells developed a character, which was an adventurous scientist, whose experiments were designed to uncover new areas. However, Dr. Moreau demonstrates no social responsibility in his drive.

Contemporaries of Wells include: Bram Stoker (1847 - 1912); Howard Phillips Lovecraft (1890-1937); Robert Howard (1906-36); H. Rider Haggard (1856 - 1925); Arthur Conan Doyle (1859 - 1930); and Edgar Rice Burroughs (1875-1950). Stoker developed a plot of darkness by developing a character that has become his greatest creation, Count Dracula. Stoker's theme of darkness in *Dracula* (1897) has inspired subsequent vampire stories. In comparison, Lovecraft also represents the irrational and themes of darkness and the occult. Lovecraft became notable when his stories appeared in *Weird Tales*, an American SF pulp magazine. However, "poverty was a constant beast at [Lovecraft's] door" (Kyle, 1976, p. 54).

Weird Tales was also responsible for the success of Robert E. Howard (Kyle, 1976, p. 69). Howard's "Conan the Conqueror" stories were published in *Weird Tales* during the 1930s. In "The Future in the Social Sciences," an article featured in *Futures,* Bainbridge (2003) contends that Howard found hope in a person's courage to "defy supernaturally-ordained fate" (para. 28). This attitude is prevalent in Conan, which has become a popular character today.

Haggard's theme is "the lost race," as developed in his novels, *King Solomon's Mines* (1885) and *She* (1887). Kyle (1976) listed Allan Quartermain, the protagonist of

King Solomon's Mines, as one of greatest adventurers created. In comparison to Haggard, Arthur Conan Doyle found value in the "lost race" motif, and published *The Lost World* (1912). However, Doyle did not receive notoriety for his attempt at SF. Doyle's success was derived from his detective stories (Clareson, 1971, p. 100).

Although Burroughs is best remembered for Tarzan, he wrote eleven Mars novels known as *Barsoom.* "The first of these, *A Princess of Mars*, first appeared as early as 1912, in All-Story Magazine; but Burroughs was still writing them in the 1940s" (Roberts, 2000, p. 70). Roberts (2000) points out the racism and sexism that are apparent in Burrough's writings (p. 70). In "Write, Right, White, Rite," an article appearing in *Studies in American Fiction*, Jeff Berglund (1999) does not accuse Burroughs of being a racist, but he questions the choices Burroughs makes in portraying Africans in degrading manners - "we see them wailing, screaming, or waving their arms or spears." According to Berglund (1999), "Such limited explanations demonstrate how entrenched his narrative is in dominant mythologies of Africa." Irwin Porges, Burroughs' biographer, attempted to defend Burroughs. Porges (1975) says,

> The obvious criticisms can be made; it is no longer possible to accept the false picture of the Negro as servile, treacherous, fiendishly sadistic, cowardly, and without loyalty or honor. But viewing him understandingly in modern times and depicting him according to assumptions, distorted and prejudiced, of earlier periods are two different matters. Burroughs, forced to devise African jungle settings continuously, accepted the popular concept of the Black native, considering him as a customary stage prop to accompany a jungle drama. (p. 256)

Such treatment in the Mars novels may be a carryover from the characterization of Africans in *Tarzan*. For example: Carter, the protagonist of the Mars story, battles aliens who have blue, black, and/or green skin. In fact, he marries a red-skinned Martian who has the ability to lay eggs. Regardless of questions of racism and sexism, Burroughs

receives his accolades for the Martian novels. Kyle (1976), in his reference to Burroughs' work, provides a clear distinction between science fiction and science fantasy. Kyle (1976) says, " . . . they are science fiction adventures - sometimes described as science fantasies to indicate that the science in them should not be taken too seriously" (p. 49).

Pulp Science Fiction Magazines

Verne and Wells were contributors to pulp science fiction magazines. Pulp magazines were popular magazines printed by the most inexpensive means. The magazines were, initially, printed on 7x10 inch rough, off-white pulp paper. According to Kyle (1976), the paper had "a distinctive, aromatic smell, impossible to describe but equally impossible not to notice" (p. 42). However, the main objective of the publishers was to make issues of the magazine available as often as possible, regardless of the durability of the paper on which the magazines were printed. Respect for the pulp writers was initially in question. "The reputation for pulp writing generally was not of high esteem" (Kyle, 1976, p. 49), but as the readers' demands increased, the reputation changed.

Frank Munsey's *The Argosy*, first published in 1896, is considered the first pulp magazine (Kyle, 1976, p. 42). This magazine resulted from Munsey's "shift towards an adult audience" (Ashley, 2000, p. 21) from his profitable interest in publishing stories for children. "Science fiction did not feature strongly in *The Argosy* at this time, though each year would see half a dozen or so stories and serials" (Ashley, 2000, p. 22).

"Science fiction received a boost when Munsey started a new magazine called *All-Story* in January 1905. It was here, under the strong editorial guidance of Robert H. Davis, that pulp science fiction began to develop" (Ashley, 2000, p. 26). E. R. Burroughs

was one of the most notable writers of *The All-Story Magazine*. This magazine's appearance was quite different from *The Argosy*. "One important change was to dress up the package with three-colour covers" (Kyle, 1976, p. 43) and colorful illustrations, which enticed readers. Both *The Argosy* and *The All-Story Magazine* included many types of fiction, rather than exclusively science fiction.

J. C. Henneberger started *Weird Tales* in 1923. It contained mixtures of horror stories and fantasy. According to Ashley (2000), "*Weird Tales* was the first magazine to be devoted entirely to fantasy and occult fiction" (p. 41). Amiss (1960) notes that horror fiction writer, H. P. Lovecraft, was the "most representative writer of the *Weird Tales* school . . ." (p. 36). *Weird Tales* provided Lovecraft with "a market for his unusual imagination" (Kyle, 1976, p. 54).

In 1926, Hugo Gernsback introduced *Amazing Stories*, which was "the first journal exclusively dedicated to science fiction" (Amiss, 1960, p. 36). Gernsback (1884-1967) coined the term *scientification* and he was the first to use the term *science fiction,* which appeared in *Science Wonder Stories* (Clareson, 1971, p.30). Roberts (2000) contends that *Amazing Stories* was "the first magazine with any commercial durability" (p. 67). Contributors included Wells and Poe; however, Jules Verne's *Off on a Comet* was the first two-part story to appear in the magazine. Kyle (1976) says that the printing of Verne's story, in *Amazing Stories*, "establish[ed] the soul of scientification" (p. 62). However, Ashley (2000) contends,

> [By 1926] science fiction had become a major part of the content of popular magazines and many of the features and story-lines that Gernsback would develop had already been explored by the growing generation of writers fascinated with the possibilities of science. (p. 27)

Westfahl (2000) argues that science fiction, as a genre, was tainted by the need to sell a product. Westfahl accused Gernsback of promoting scientific research and technologies for profit. Westfahl (2000) adds, "[Gernsback's] efforts to promote science fiction, such as the proclamation of 'Science Fiction Week' and the founding of the Science Fiction League, were clearly and largely inspired by greed" (p. 89). This same attitude is apparent today as we watch the development of SF series that generate megabucks paydays.

William Clayton introduced *Astounding Stories of Super Science* in January 1930. From that time, the magazine's title was changed twice. The title became *Astounding Science Fiction* in 1938, with John Campbell as editor; and it continued until January 1960 when the title became *Analog* (Kyle, 1976, p. 147). "More than Gernsback, Campbell believed that SF should be about more than just machines and ideas, that the focus should rather be on the ways people responded to and were shaped by those ideas" (Roberts, 2000, p. 68).

"*Astounding* was first and always a straight adventure pulp magazine. It had no intention of educating through science and shared no ideals with Gernsback" (Ashley, 2000, p. 69). The protagonists, in *Astounding*'s stories, were nonconforming scientists who waged war against the scientific establishment (Carter, 1986, p. 148). Asimov and Vogt were its notable contributors. Campbell required contributors to follow guidelines of writing hard science. Slusser (1986) explains the focus of hard science:

> The tacit goal here is to integrate the alien into our technology. Casting off the soft part of its existence, defeating its biological drives, man can keep the hard things -- those machines and inventions that we can write into our text of evolutionary expansion, devices that can be motivated by the steel-cased intelligence that is its dynamic core. (p. 232)

The vintage pulp magazines were published at a time when acts of prejudice were obvious. Therefore, the covers themselves may be extremely offensive. However, we cannot overlook the fact that this was the climate of that age. Many magazine covers display violent acts against women and negative stereotyping of minorities. White women are scantily clothed on the covers of many vintage pulps. Obviously sex was a highly profitable selling point in that era as well. Ashley (2000) says,

> The women were invariably wearing ridiculous spacesuits which left them half-naked, or were wearing brass-brassières. They took on the style of pin-up paintings and were almost certainly popular with young readers and the troops, but they gave a totally misleading image to science fiction. (p. 188)

On the cover of the November 1928 issue of *Weird Tales*, is the picture of a Mexican male flogging a White woman. *The Thrill Book*, issued on October 15, 1919, depicts an African whose facial features are those of the stereotypical Devil. The text between the covers of some pulp magazines may be offensive to feminists. For example, Thomas Gardner's short story, "The Last Woman," published in the April 1932 issue of *Wonder Stories*, treats love as animalistic. Men "evolve beyond the need to breed and keep the last woman as a museum exhibit" (Ashley, 2000, p. 74). In contrast, however, *Wonder Stories Quarterly* (Spring 1932) published Richard Vaughan's "The Woman from Space," in which women were left to establish a utopia because the men had nearly extinguished themselves through warfare.

The audience of the pulps was predominantly comprised of white males whose average age was in the twenties and their writers fit the same profile. A large percentage of the readers, according to *Astounding*, worked in technical or scientific positions (Kyle, 1976, p. 50). However, in pulp's beginnings, Munsey catered "to a population of meagre, unexciting lives . . . and offered unsophisticated entertainment in return" (Kyle, 1976, p.

42), simply for the purpose of enhancing his profits. Munsey's earlier publishing interests had catered to its wealthy and educated clientele, until economic problems arose and his attention was refocused for the sake of survival. "Still, quality fiction worked its way into the pulps and was accepted, including all qualities of sf" (Kyle, 1976, p. 42).

Pulp magazines were affected, during World War II, when paper was required to be used for essential printing, only. "At the end of World War II, *Astounding* was the only monthly in the field; *Amazing*, *Fantastic*, *Weird*, and *Famous Fantastic Mysteries* were bi-monthlies; *Planet*, *Startling*, and *Thrilling Wonder Stories*, quarterlies—four magazines a month altogether" (Clareson, 1971, p. 72). Nevertheless, the pulps' influence continues today. "Doubleday, Simon and Schuster, Pellegrini and Cudahy, as well as most of the paperback houses, were all firmly in the science fiction business, and there were half a dozen specialty houses" (Clareson, 1971, p. 73).

Presently, Knopf, Bantam, Penguin, and Warner Aspect are among those publishers in the business of SF. SF e-zines, online magazines, are prevalent. For example: *Simulacrum: The Magazine of Speculative Transformation* is published in PDF format and includes poetry and interviews as well as fiction. *Analog Science Fiction and Fact*, which was originally *Astounding* (1930), can be obtained in electronic format, a vast change from the inexpensive wood-pulp print version of the 1930s.

Utopias in Science Fiction

Thomas More coined the term "utopia" as the title to his novel, published in 1516. The term was derived from the Greek words outopia (no place) and eutopia (happy place). The setting of *Utopia* is a republic in which inhabitants do not engage in war and resources are held in common. There are no laws in this society and the people live in

peace and harmony. More's republic is an island separated from the rest of an unjust world. Roberts (2000) labels More's *Utopia* as proto-sf. "It is partly satire on the shortcomings of actual English society, partly a blueprint for a better way of ordering society; and in this latter capacity it is couched in exclusively *possible* terms" (p. 53).

Suvin (1988) examines utopia as “the socio-political sub-genre of Science Fiction” (p. 61). However, “Every valid theoretical description of utopia is . . . paradoxical” (Freedman, 2000, p. 65). Utopia is termed *homeland* even though no one has visited this place. Nevertheless, attempts to arrive at this destination constitute the purpose of time travel, which Damarin (2004) labels as “an essential part of much feminist science fiction” (p. 64). Freedman (2000) uses the analogy of the Israelites’ exodus in search of the promised land to explain the need for a departure from *this* place. Martusewicz (2001) also speaks of the need for a departure. Martusewicz (2001) says,

> Our pedagogical relations, in whatever contexts we may find them, create the energy needed to embark on the journey. Our interpretations, our questions, and our meaning making push us out across the given boundaries. Leaving home is a way to recommence, to embark again, on the inevitable search for passages toward more ethical and just ways of being in the world. With embarking, we enact a new series of events, a series of places and attachments, traces displaced, carried along, gathered up, a bouquet of homes. (p. 37)

When we think of utopia, we consider a departure from the present in search of a more rewarding future for everyone. However, this future is by no means chronological in nature. According to Bloch, utopia’s nature is founded in hope. This hope “possesses an inherently collective character and at bottom has nothing in common with individualist impulses like greed” (Freedman, 2000, p. 64). It is, rather, hope for the whole world and it is free of selfish interests that lead to oppression. Edward Bellamy's (1888) *Looking Backward: 2000-1887* stimulates the imagination to hope by relating the story of Julian

West, an American who awakens from a century-long sleep to find that the United States has undergone dramatic changes. The ills of society have been eradicated and West is guided through a just and equitable society.

The lost race theme has also been used to explore the possibility for perfecting human conditions. In 1933, James Hilton wrote *Lost Horizon*, whose film version was released in 1937. In his novel, Hilton describes a mystical place called Shangri-La. People of varying religions and races live blissfully among natural Himalayan surroundings that have not been destroyed or altered. In this utopian society, violence, poverty, and problems accompanying aging are non-existent. In *The Other Side of Realism*, Clareson (1971) addresses the importance of the lost race theme in SF:

> The most popular motif, however, portrayed the remnant of some "lost race" surviving in an as yet unexplored corner of the world. It could become the vehicle for diagramming a utopia, or at least praising the virtues of some primitive or classical civilization that had not known the fever of modern times. (p. 11)

In *A Modern Utopia*, H. G. Wells (1967) suggests that utopia serves as a witness to the need for possible alternatives to the lives that people are presently leading. Therefore, we ought to critique our present circumstances through the lens of utopia, even though the present is an atrocious trek for the oppressed. Nevertheless, it is within the darkest circumstances that hope is found. According to Wells (1967),

> A thousand million things lie outside in the darkness beyond this lit inn of ours, unthought-of possibilities, overlooked considerations, surprises, riddles, incommensurables, a whole monstrous intricate universe of consequences that I have to do my best to unravel. I attempt impossible recapitulations and mingle the weird quality of dream stuff with my thoughts. (p. 69)

Dystopias in Science Fiction

According to Damarin (2004), utopias and dystopias are inseparable (p. 57). Huxley's *Brave New World* (1932) has been identified as both utopian and dystopian.

Even though the inhabitants live a pleasurable life (utopian), they have no control over their emotions (dystopian). *Gulliver's Travels* (1926) can also be classified as both utopian and dystopian. In his final voyage to the land of the Houyhnhnms, Gulliver finds that the country is governed by a rational society of horses (utopian), while the people (yahoos) are perceived as evidence of nature's imperfections (dystopian). I contend that *Brave New World* and *Gulliver's Travels* support Damarin's (2004) position that utopias and dystopias are co-producers of the plots of our lives (p. 57).

A dystopia paints a picture of a continued life of oppression, and warns us of a dismal finale. However, Moylan (2000) explains that the effectiveness of the dystopian text is determined by the novum's ability to merge hope and reality in a situation that is open-ended, regardless of whether the narrative's ending is one of victory or defeat (p. 65). This view is in keeping with Reynolds' (2004) description of an open-ended quality as a continuous movement through good and evil. This quality is "Never resting always being in the AND" (p. 117).

The dystopian process causes us to question what could possibly occur if the present situation continues. Therefore, the dystopia presents a critical didactic venture, within the present society, that is embarked on by a rebellious person willing to face opposition. Not only are the symptoms of an ailing society depicted in the dystopian text, but also the causes are revealed (Moylan, 2000, p. 71). For example, Butler's *Parable of the Sower* (1995) depicts a society infested with drugs, poverty, chaos, destruction, and premature death. Butler identifies the cause of these symptoms as corporate greed. Even the police and fire departments require a fee for service, which portrays the government as functioning as a private entity.

The dystopian text presents a society that aims to control the thinking and activities of its members. In fact, people are constantly under surveillance by government agencies. *The Space Merchants* (1953) is Pohl and Kornbluth's attempt to extrapolate a world governed by corporate tyrants that focus on covert strategies of manipulation. Bradbury's *Fahrenheit 451* (1953) warns of a society that programs and enslaves men's minds through the use of wall-sized televisions, hearing aids, and drugs. The government's fear of an uprising of independent thinkers causes the creation of a fire department that burns books. The people are told that reading books will cause them to be miserable and anti-social. In comparison, Vonnegut's "Harrison Bergeron" (1961) stimulates us to imagine a society in which people wear devices to control their thinking and limit their capabilities. Bergeron's society is based on the concept that it is the responsibility of the government to make people equal, since they are not born equal. However, the process involves using surgical procedures and the media in order to create levels of average intelligence.

Dystopian literature tends to depict a future society where technology is used in far more advanced methods than in the present. For example, the film "Gattaca" (1997) extrapolates a world in which genetic engineering is used to control a person's social class. Children born from traditional methods are assigned a lower class standing. "Equilibrium" (2000) imagines a world that uses drugs to suppress emotions. World leaders, fearing mankind's extinction, require people to ingest Prozium, a drug that is designed to create a society of conformists.

Dystopian literature and film explore the effects of war and the devastating alterations to society that are possible. In 1968, Philip K. Dick wrote *Do Androids Dream*

of Electric Sheep? that inspired the film, "Blade Runner" (1972). This novel traces the effects of a war that destroyed most of the planet. Some people moved to other worlds, and were provided androids as servants. The inability to express emotions was one factor that distinguished androids from humans.

Though they functioned as servants, androids were more intelligent than those they served. Therefore, the androids had the desire for a better life than that of servitude, which they demonstrated by fleeing to Earth. Only animals were considered precious and owning one was a status symbol. However, *Do Androids Dream of Electric Sheep?* (1968) includes more dystopian elements than the hostile movement of androids. For example, the protagonist, Deckard, has a sexual encounter with an android; Deckard uses devices to alter his moods and to have religious experiences; and there is a continuous display of the forces of destruction and rejuvination. According to Roberts (2000), "Science fiction as a whole shares much of Dick's dual fascination with and suspicion of the power of things, things that in this mode of writing almost acquire a life of their own" (p. 151).

Dramatic changes and dehumanization in society are exemplified in dystopian literature and film. The film "Twelve Monkeys" (1995) critiques the present and imagines the future of psychiatric institutions. Although some people consider these institutions as spaces for resolving mental issues, the protagonist (Coles) finds sites of techno-scientific control and manipulation, as he travels back in time. Oddly enough, Coles' present is virtually the same: There is little difference between a penal system and a psychiatric institution.

Vonnegut's *Player Piano* (1952) provides a futuristic description of America as an automated society of displaced workers. The setting is New York, a technological society that is divided into three sections. The northwest is home to the managers and engineers; the machines are found in the northeast, while the displaced working class lives in the south. As a result of family alienation, the managers and engineers attempt to establish replicas of family and they address the wife of their boss as their mother. Again, we find control in the hands of corporate and technological bureaucracies that obliterate principles of democracy.

Robotic Themes

Robotic themes are prevalent in SF literature and the film industry. *I, Robot*, the 2004 film version of Asimov's 1950 series of robot stories, has shown the profit generating capacity of SF, along with other SF film interests. However, the word *robot* has a history that preceded both English print and American film. This word *robot* appears in Capek's *Rossum's Universal Robots* (1921), "where the word is used to refer to automatic labourers of organic origin, what today we would be more likely to call 'androids'" (Roberts, 2000, p. 185).

Capek's story traces the development of Rossum's robots, which are designed for the purpose of creating a lifestyle that is labor-free, and where poverty would be non-existent. However, only one human was left as the story concludes. In *Giant Brains or Machines That Think*, Berkeley (1949) examines Capek's play as an excellent example of the need for a social point of view. "The social point of view is equitable, it is inspiring, and it is probably required now in order for human beings to survive" (p. 208).

Milojevic and Inayatullah (2003) remind us that Capek was not the first to introduce the theme of robotics. Chinese literature, since the fourth century, has robotic themes. "The earliest robot story . . . appeared in China in the fourth century. In Zhang Zhan "Tangwen" in *The Book of Lie Zi, circa 307-313,* there is a story about Yanshi's robot" (Dingbo, 1994, p. 258). Yanshi designs a robot to entertain the emperor. However, the robot's constant gaze at the queen angers the emperor, who sentences the robot to death. Yanshi proves to the emperor that the robot is merely a machine.

Community

Science fiction is a genre with an emphasis on community. It is a collective presentation of a destiny for a group, a race, nature, and the world. "Therefore the final horizon of individualistic — psychological and/or ethical — criticism is simply inadequate and (if used as the dominant critical approach and not as an initial tool) ideological" (Suvin, 1988, p. 54). The community depicted in the utopian fiction is in sharp contrast "to the author's delimited environment and its way of life" (Suvin, 1988, p. 40). According to Suvin (1988), this is a community "where socio-political institutions, norms and individual relationships are organized on a more perfect principle than in the author's environment" (Suvin, 1988, p. 37). That principle replaces an exclusive focus on individualism and replaces it with community.

Parrinder (2000) noted the importance of science fiction in benefiting the community by citing from Gernsback's first edition of *Amazing Stories*. Gernsback believed that science fiction has the potential to benefit families, working people, and scientists. Gernback (as cited in Parrinder, 2000) says,

> Not only is science fiction an idea of tremendous import, but it is to be an important factor in making the world a better place to live in, through educating

> the public to the possibilities of science on life which, even today, are not appreciated by the man on the street … If every man, woman, boy and girl, could be induced to read science fiction right along, there would certainly be a great resulting benefit to the community, in that the educational standards of its people would be raised tremendously. Science fiction would make people happier, give them a broader understanding of the world, make them more tolerant. (p. 22)

Change

Science fiction places emphasis on the cyborgian nature of its characters, which is less obviously observed within us. Haraway (1991) contends that, as cyborgs, we are creatures of both social reality and fiction. Consequently, Haraway (1991) views our social reality as “a world-changing fiction . . . [therefore] the boundary between science fiction and social reality is an optical illusion” (p. 149). In comparison, Suvin (1988) says, "SF is the literature of change, more realistic than realism" (p. 23). In accepting Haraway and Suvin’s views, we alter our perceptions of the existence of a barrier between fiction and social reality and we accept Reynolds’ (2004) position that “The self is fiction” (p. 119). As a result, concerns for an ethical self will emerge.

Damarin (2004) believes that "because science fiction often struggles with issues of ethics in relation to technological development, it offers insights and methods for resolving ethical dilemmas posed by advanced technologies" (p. 53). Science fiction is a great stimulator of discussions on cloning, robotical household devices, etc. Science fiction offers an excellent focal point from which we can analyze political issues, such as the need for technological and social change, while providing alternatives to existing situations (Weldes, 2003, p. 10). It does so by starting with the known and it proceeds to project itself into the future. However, Weldes (2003) concurs with William Gibson that concern for the future is not paramount. "Neither prophetic futurology nor an empty game like chess, SF is also an 'as if', an imaginative experiment, a methodical organ for

the New in the history of human relationships toward society and nature, a cognitive model" (Suvin, 1988, p. 42). Recognizing ways to come to terms with present situations is essential in science fiction studies.

According to Doll (2000), "Fiction--more than fact--teaches wisdoms about the human condition precisely because fiction connects readers with what courses within themselves. To connect with this coursing is to attend to social, outer issues addressed by traditional pedagogies with greater, deeper awareness" (p. xi). For this reason, science fiction has a strong appeal to African Americans. In *Futures Dreaming Outside and on the Margins of the Western World*, Milojevic and Inayatullah (2003) contend " . . . science fiction itself has also been a marginal genre. This marginality has allowed and has been a cause of its ability to open spaces for thinking the unthinkable, and exploring unknown unknowns." In "Black to the Future," a commentary appearing in Thomas' (2001) *Dark Matter: A Century of Speculative Fiction from the African Diaspora*, Walter Mosley contends,

> The genre speaks most clearly to those who are dissatisfied with the way things are: adolescents, post adolescents, escapists, dreamers, and those who have been made to feel powerless. And this may explain the appeal that science fiction holds for a great many African Americans . . . Through science fiction you can have a black president, a black world, or simply a say in the way things are. This power to imagine is the first step in changing the world. (p. 405)

A child's mind is full of imagination. However, we must consider the images viewed by the marginalized. Usually, the image is European; but there have been small strides, by the media, towards acknowledging those who are within this supposedly *melting pot*. Although the media place great emphasis on music and fashion, marginalized children *can* dream of being pilots, doctors, lawyers, and teachers. However, we still question whether or not there are limits within their dreams. Mosley

(2000) contends that through science fiction we are able to remove the walls, windows, and laws that keep a person in a marginalized position, by stimulating a *what if* attitude. "The destroyer-creator must first be able to imagine a world beyond his mental prison. The hardest thing to do is to break the chains of reality and go beyond into a world of your own creation" (Mosley, 2000, p. 407).

The workings of our imaginations are obvious as we read and listen to the narratives of others. "Those stories become legends, myths, the defining elements of a culture" (Saunders, 2000, p. 404). Therefore, African American science fiction writer, Charles Saunders (2000), urges us to take responsibility for telling our own stories, rather than allowing others to inject their own perspectives in them.

> The onus is on us. We have to bring some to get some in outer space and other space, as we have done here on Earth. Just as our ancestors sang their songs in a strange land when they were kidnapped and sold from Africa, we must, now and in the future, continue to sing our songs under strange stars. (p. 404)

Mosley's (2000) stance is supportive of Saunders. Mosley speaks of how African Americans were excluded from history, and were cut off from their ancestry by the chains of slavery. "For [African Americans], science fiction offers an alternative where that which deviates from the norm is the norm" (p. 405).

In a 1999 interview with G. E. Rutledge, Nalo Hopkinson spoke of Mosley's view that "sf makes it possible to create visions which will shout down the realism imprisoning us behind a wall of alienating culture." When asked to describe science fiction, Hopkinson stated, "I like to believe that [science fiction and fantasy] can also be more like . . . guided imagery . . . If black people can imagine our futures, imagine--among other things--cultures in which we aren't alienated, then we can begin to see our way clear to creating them" (para. 21).

A close mirror image of one's empirical environment is noted in the dystopic writings of African Americans. For example: In 1987, Octavia Butler wrote "The Evening and the Morning and the Night." According to Butler, this dystopic story "grew from [her] ongoing fascination with biology, medicine, and social responsibility" (Thomas, 2000, p. 195). This story deals with the emotional and physical horrors experienced by people who inherit diseases, who become the focus and guinea pigs of medical studies, and who are subjects of abuse generated from being alienated.

In 1993, Butler wrote *Parable of the Sower,* followed by *Parable of the Talents* (1998). Butler's *Parable* series "presents a world in which multi-national corporations have prevailed, but only by destroying the social and natural ecology that had sustained capitalism through its many stages" (Moylan, 2000, p. 224). The main character in the series is Lauren, a seventeen-year-old African American who is both teacher and minister. Lauren becomes the leader of a multi-cultural group of people who must find a safe haven from the violence and destruction that plague the world. Wars continue to afflict the globe; and technological developments are used to control lives. Lauren describes corporate desire for profit and the governments' choice to allow unrestricted corporate activities as the causes of society's decay.

Then, there is Derrick Bell's (1992) "Space Traders." This is an unusual and controversial story in which aliens offer technology, gold, and minerals, to the government, in exchange for all African Americans. Corporate entities are less favorable to the offer because they are concerned about losing enthusiastic customers, characteristic of a predatory culture. Nevertheless, for African Americans in "Space Traders," "there was no escape, no alternative. Heads bowed, arms now linked by slender chains, black

people left the New World as their forebears had arrived" (Thomas, 2000, p. 354). Butler and Bell's stories are typical of dystopian pictures of oppression and a dismal ending that manages to still generate hope. Although victory appears to elude these characters, the finale has an open-ended quality and the ANDs continue. Both authors ought to be read as seeking to actively challenge society's treatment of the oppressed.

> The prayer, however, is not a cry for salvation, or deliverance. Rather, as one would send to a skilled organizer, it is an emergency message for help in mobilizing 'change'. And change begins with work, with the re-creation of a head, that site of radical cognition, to enliven the alienated torso of flesh and desire, and so to stand upright against the life-denying system. (Moylan, 2000, p. 68)

Feminist Science Fiction

Prior to 1900, women in science fiction were rarely characterized as the protagonists, but were cast in minor roles. Moreover, few women were seriously considered as science fiction writers. In fact, "With the exception of Mary Shelley, whose Frankenstein was probably the most influential work of science fiction written by a woman, almost all science fiction authors were male and wrote from a male point of view" (Romaine, 1999, p. 330). Gernsback commented in the June 1927 issue of *Amazing* that women are rarely good science fiction writers because they are limited in their knowledge of science. However, Claire Winger Harris was one of Gernsback's regular writers. Although Harris is considered the first female writer for the pulp magazines, Gertrude Barrows Bennett preceded Harris by publishing the first segment of *Citadel of Fear* in the September 1918 issue of *Argosy*. Bennett published her work using the male pseudonym, Francis Stevens (Ashley, 2000, p. 52). As Francis Stevens, Bennett received praise in the company of Edgar Rice Burroughs and Abraham Merritt.

"Feminist science fiction, is a more recent development [dating from the 1960s] than the genre as a whole, but today constitutes one of the most exciting and most vigorous aspects of the mode, in terms both of actual SF texts and of criticism" (Roberts, 2000, p. 91). Romaine (1999) notes that one purpose of feminist science fiction is to construct a space in which women can take control of creating a positive future. Romaine describes this space as "Somewhere that exists in antithesis to a world with Nowhere for women" (p. 332).

In examining feminist science fiction, Weaver (2004) says, “They construct a world where their knowledge and experiences are valued” (p. 34). Women become the protagonists who seek to reconstruct the world based upon *peace and equality*, which is in sharp contrast to a male-centered world. In fact, this world is in accordance with the feminist theory of care. “Although both males and females are present in this world, the differences between them are of little consequence” (Damarin, 2004, p. 59). Damarin (2004) contends that feminist science fiction is a genre that "represents mothering as a shared responsibility. In addition, teenagers, like women, are not treated as property but as important participants in every aspect of society" (p. 59).

When every participant in society is viewed as essential, we ought to opt to view emotions as central to our understanding of how perceptions are drawn. These perceptions guide self-esteem and relationship building. Crawford (2003) says, “We are thinking and feeling, self-interested and other-regarding” (p. 213). Therefore, it is important that we consider placing more efforts on being empathetic and hopeful, and on understanding anger and love. According to Crawford (2003), feminist utopian and dystopian science fiction use this route of understanding to provide insights “about when

and why humanitarian interventions occur, when crises yield to war, and how identities and aspirations are formed and modified" (p. 213). Rather than relying on an argumentative stance of attempting to convince another, feminist science fiction relies on listening to the Other, while engaging the imagination to stimulate us to become more unwavering in eliminating oppressive structures.

Feminist science fiction breaks down the patriarchic structures of the world through imaginative frameworks "that use stars to point toward woman-centered directions that are never positioned second to the conservative right and straight on to female mourning" (Barr, 1993, p. 13). Barr (1993) adds that when we find these directions, there will no longer be a need to ask victims a perplexing question: *Girl, why are you crying?* As a result, women can remove the lid from the patriarchic boxes that hold hostage their freedom to explore all possibilities. The illusion of impossibilities is revealed through the broken silence of women seeking passage into unlimited spaces where the imagination begins to create a hopeful future, and to recreate a positive present.

As feminist science fiction confronts technology, Barr (1993) insists that Suvin's definition of and requirements for science fiction may take a turn. For example, when reproduction is depicted in feminist science fiction, it is a mirror image of that in one's empirical environment (p. 82). Elizabeth Baines, in *The Birth Machine* (1983), developed the character of Zelda as the pregnant protagonist who is attached to a machine that controls the stages of her pregnancy. "Baines thus describes what began in the 1960s when women in labor became increasingly helpless, their bodies controlled by machines and (usually) male doctors" (Barr, 1993, p. 82).

Sexuality, as portrayed in science fiction literature of many feminists, creates discomfort for some readers. Joanna Russ' "When It Changed" was highly criticized when it was published in 1972. This story depicts women enjoying a life of freedom without men. According to Sargent (1975) in the "Introduction" to *Women of Wonder: Science Fiction Stories by Women about Women*, " . . . there is such an abundance of science fiction in which well-characterized, likeable men get along without women" (p. liii); therefore, it is strange that feminist science fiction should receive such criticism. Barr (1993) contends that when women are degraded and abused in fiction, criticism is too often withheld. As it relates to feminist utopian science fiction,

> [Critics] prefer not to notice that rape, pornography, and other forms of sexual violence do not exist in these utopian societies, while such violence is a routine-almost normal--aspect of our daily lives. Although many people are entertained by images of women in dehumanizing sexual situations, they do not welcome imaginative visions of sexuality that enable women to enjoy dignity and freedom. (Barr, 1993, p. 40)

SF's Parables and Lessons

This world is viewed as one whose barriers are designed to deter efforts to aggressively question oppression. According to Suvin (1988), science fiction has the capacity to break down "the barriers of a closed and immutable world" (p. 91). "Science fiction's ability to transport us to other worlds, and to draw improving lessons from them, could not be more clearly stated" (Parrinder, 2000, p. 1). "[These] are other worlds which seek to engage us in dialogue, and from which we can and should learn" (Parrinder, 2000, p. 15). This process involves "drawing lessons about the open future as against the intolerable present out of a critically reworked past" (Suvin, 2000, p. 267).

In *What's Curriculum Theory*, Pinar (2004) addresses our need to revisit the past in order to make sense of the present. According to Pinar (2004), events of the past,

displaced and deferred, have been transported into the present. Science fiction demonstrates this best. In fact, "SF does not project us into the future; it relates to us stories about our present, and more importantly about the past that has led to this present" (Roberts, 2000, p. 35). Moreover, science fiction allows us to either rewrite history, to ignore it altogether, or to even regret the circumstances (Mosley, 2000, p. 405).

Science fiction plots contain constructed parables and metaphors that "are as far-reaching, as radical and as estranging as any that literature can show" (Parrinder, 2000, p. 15). Suvin (1979) argues that "'any significant SF text is always to be read as an analogy [to the writer's present], somewhere between a vague symbol and a precisely aimed parable . . ." (p. 76). Suvin (2000) describes the nature of the parable as a "re-examination of empirical norms in the light of alternative possibilities" (p. 252). Suvin (1988) adds that creating metaphors "redescribes the known world and opens up new possibilities of intervening into it" (p. 189). Science fiction "relates to a significant problem of the social addressee in indirect ways, through estrangement into a seemingly unrelated concrete and possible set of situations" (Suvin, 1988, p. 207).

Ricoeur (as cited in Suvin, 1988) states that the construction of parables and metaphors provides characteristics of "another world that corresponds to other possibilities of existence, to possibilities that would be most deeply our own . . ." However, Suvin (1988) suggests that we are only able to construct a mental image of a possible world when our empirical reality interacts with a science fiction text that explicitly provides modifications to our original concepts.

Even though we are not able to verify the objects and events of science fiction text, within our empirical reality, "[the] resulting alternate reality or possible world is, in

turn, not a prophecy or even extrapolation but an *analogy* to unrealized possibilities in [our] empirical world" (Suvin, 1988, p. 37). In other words, all nova, either fictional or metaphoric, “always refer and are relevant to a common human history” (Suvin, 1988, p. 203). In concurrence, Roberts (2000) states, "Each of these [nova] connects with a particular ‘estranged’ version of our reality" (p. 13).

> The aliens – utopians, monsters, or simply differing strangers – are [mirrors] to man just as the differing country is a mirror for his world. But the mirror is not only a reflecting one, it is also a transforming one, virgin womb and alchemical dynamo: the mirror is a crucible. (Suvin, 1979, p. 5)

We are Machines in a Posthuman Culture

> [We] discover that when man prolongs his arms five to ten yards by making an implement and therefore no longer needs to catch his prey with his hands, he has created culture. By transferring not only the use of the implement, but the incipient technology of its manufacture, to younger generations, he has created education. (Freire, 1973, p. 67)

Posthuman is a term used to describe what mankind could become, if technological advancements remove the limitations that we experience as humans. Hayles (1999) defines *posthuman* as the product of the deterioration of the line that points to the difference between man and the machine. Hayles (1999) adds,

> The posthuman view configures human being so that it can be seamlessly articulated with intelligent machines. In the posthuman, there are no essential differences or absolute demarcations between bodily existence and computer simulation, cybernetic mechanism and biological organism, robot teleology and human goals. (p. 3)

Because of the rapid developments in technology, we can consider our culture as a posthuman culture. How is our culture posthuman? We have only to turn to the media for introductions to products of technology that are designed to make life more long lasting, comfortable, entertaining, and efficient. According to Hayles (1999), “The posthuman subject is an amalgam, a collection of heterogeneous components, a material-

informational entity whose boundaries undergo continuous construction and reconstruction" (p. 3).

In *SF Curriculum, Cyborg Teachers, & Youth Culture*, Weaver (2004) examines the posthuman nature of our culture. The youth of popular culture comprise a post-human generation that "has been constructed to meet the needs of the military and corporate worlds" (Weaver, 2004, p. 29). Weaver (2004) contends that they are smart enough to handle warring situations but obedient enough not to question the wars.

Educators have used schools as the arena for meeting military and corporate agendas. In *Giving Kids the Business: The commercialization of America's schools,* Molnar (1996) examines the rise of corporate involvement following the publishing of *A Nation at Risk* in 1983. School improvement was cited as the source of the survival of the American economy. Therefore, "businesspeople took the lead in collaborating with politicians and educators to promote a grab bag of reforms intended to improve the performance of America's public schools" (Molnar, 1996, p. 2). Molnar (1996) also adds, "[The] introduction of information technology may well usher in tomorrow's world of even more dramatic inequalities in our public school system" (p. 18). As a result, education will continue to produce students as a factory does robots.

We are all familiar with the popular cyborg characters, such as Spawn and Robocop. However, many of us would be surprised to find that we are cyborgs. Those who wear such appendages as glasses, corrective shoes, hearing aids, or artificial limbs are cyborgs. Whenever we make use of old and new technology in order to enhance our physical and mental capabilities, we become cyborgs in action. Any alterations to the self we inherited, genetically, make us cyborgs. Gough (2004) lists such alterations to include

pacemakers, various implants, as well as artificial skin and joints. In addition, Gough (2004) recognizes the influence of technological devices in the workplace as a contributing factor to man's cyborg self (p. 97).

In *Civilization and Its Discontents*, Freud (1930) says, "Man has, as it were, become a kind of prosthetic god. When he puts on all his auxiliary organs, he is magnificent; but these organs have not grown on him, and they still give him trouble at times" (p. 39). Nevertheless, Freud remained optimistic about the future. Freud (1930) adds,

> Nevertheless, he is entitled to console himself with the thought that this development will not come to an end precisely with the year 1930 A.D. Future ages will bring with them new and probably unimaginably great advances in this field of civilization and will increase man's likeness to God still more. (p. 39)

Marshall McLuhan is known as the high priest of popular culture and the metaphysician of media. In 1964, McLuhan published *Understanding Media: The Extensions of Man.* McLuhan maintains that all media have influences on the lives of individuals, and on society as well. In using the description *an extension of man*, McLuhan (1964) means that we are utilizing something in such a way that our physical and mental human faculties are extended beyond their natural capabilities. These extensions are known as prostheses.

What is becoming more difficult to determine is what is natural. When does the body cease being a natural construction? According to McLuhan (2001),

> During the mechanical ages we had extended our bodies in space. Today, after more than a century of electric technology, we have extended our central nervous system itself in a global embrace, abolishing both space and time as far as our planet is concerned. Rapidly, we approach the final phase of the extensions of man - the technological simulation of consciousness, when the creative process of knowing will be collectively and corporately extended to the whole of human society, much as we have already extended our senses and our nerves by the

> various media . . . Any extension, whether of skin, hand, or foot, affects the whole psychic and social complex. (p. 3)

Reconceptualizing the human body is necessary and we must ask another viable question: Has the human body become both a natural and technological system? Those who have watched the metamorphosis of Michael Jackson would have a definite answer: *Yes*. Jackson's high-tech and science fiction interests have extended into his physical presence and environment through the use of techno-scientific procedures. Jackson has become his Peter Pan, living in his own Neverland and he is a perfect example of Weaver's (2004) description of a cyborg.

According to Johnson (1993), Jackson's techno-body represents the body as a machine that works with clockwork precision (p. 61). Moreover, 21st century technological influence is apparent in Jackson's limitless possibilities to physically improve upon his perception of self. However, Hayles (1999) takes a somewhat different view and she places us all in states of prosthetic change. “The posthuman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born” (Hayles, 1999, p. 3).

We are quickly reminded of Freud’s (1930) observation that such extensions will often generate problems. The weekly TV series, *Nip/Tuck,* exposes not only the techno-scientific procedures sought, but the program describes dangers that could develop as a result. Balsamo (1996) contends, "Although the popularization of new body tech-nologies disseminates new hopes and dreams of corporeal reconstruction and physical immortality, it also represses and obfuscates our awareness of new strains on and threats to the material body" (p. 1).

We must picture the difference between the financial situations of prostheses needed by those who have physical handicaps, as described by the medical profession, and those sought for cosmetic enhancements. "Industry mostly has ignored the challenges of prosthetics and orthotics because there is not much money to be made in it; payers are typically third party insurers or the government itself" (Sheridan, Van Lunteren, & Stassen, 1997, p. 3). In contrast, the cosmetic surgical industry is thriving because their nip/tuck clients are able to afford the high costs of the enhancements.

The use of prosthetics has found a lucrative space in media production. Fans of science fiction expect spectacular creations and the wealthy film industry obliges us. As we watch movies and music videos, we recognize how far we have come because of technological advancements. At one time, make-up was the main source of altering characters' appearances. Today, simple make-up has relinquished its seat to elaborate prostheses.

Michael Westmore has been a make-up supervisor for the Star Trek movies and the series, since 1986. Westmore has won numerous awards for special effects. In an online video interview, Westmore, who is currently working on *Enterprise,* discusses and demonstrates the technical construction of prostheses for science fiction movies.

Westmore begins with an artistic drawing of his concept for an alien, which causes one to reflect on Heidegger's treatment of technology as art. Westmore proceeds to create the physical prosthesis, and notes that most of this is done before the actors are hired. This is a tremendous undertaking and it is a much greater artistic production than in the early stages of the process. Television sci-fi movies use make-up that is not as elaborate as film, due to budgets. However, we are able to view the industry's high

budget films when they come to TV. The following films sport creative prosthetics: *The Nutty Professor*; *Star Wars*; *Matrix*; *Robocop*; and *Men in Black.* All of these are far more advanced than the 1974 series, *The Six Million Dollar Man*.

In viewing life on the screen, it is suggested that we are merely presented simulations of *reality*. According to Poster (1995), our culture is composed of simulations, making it "hyperreal." Our simulations, which no longer have originals, point out the concept that the real does not exist. "Culture consists of constructed realities, Disneylands, which are more real than the real they are supposed to refer back to. But in the end there is no reference back . . ." (Poster, 1995, p. 63).

In considering all that is around us as simulations, I am reminded of the film *Matrix*. The protagonist in the story realizes that he is no longer in the real world. He is in a simulated virtual world constructed by the machines that man once controlled. Then there is *The Truman Show*, a reality show designed by producers to air the entire life of a man. Simulations continue in the much publicized and viewed reality shows that networks are actively seeking because of their marketing appeal. We ought to consider whether we are viewing reality shows from a simulated environment. McLuhan (2001) writes, "The movie, by which we roll up the real world on a spool in order to unroll it as a magic carpet of fantasy, is a spectacular wedding of the old mechanical technology and the new electric world" (p. 301). McLuhan sees the goal of filmmakers to extend the viewers from his own world into the world depicted in film.

McLuhan's most famous paradoxical statement is *the medium is the message.* In recognizing what he meant, we should not think of the message as content, such as the words on a printed page or the statements made in a political debate. McLuhan (2001)

defines the *message* as "the change of scale or pace or pattern that it introduces into human affairs" (p. 8). For example, the change that occurs as a result of a political debate is the message. Schools' implementation of metal detecting devices is the message that developed from widespread school violence. The *medium* is whatever causes the change to occur. Therefore, we are capable of understanding media by its effects upon our lives. In fact, our changing lives are connected to those living throughout the world.

McLuhan (2001) speaks of the world as a global village. "After three thousand years of specialist explosion and of increasing specialism and alienation in the technological extensions of our bodies, our world has become compressional by dramatic reversal" (p. 5). The way we view our world is changed by technology. Turkle (1995) also reminds us that various types of technologies have an affect on the way we view the world. We view art through the eyes of the artists and we enjoy music through the ears of their composers. Videotapes and photographs are simulations of special events in our lives. The events no longer exist, except in our minds and within their simulations, which we accept as real. Our technologies are powerful sources to create simulations. According to Turkle (1995),

> Computers, too, lead us to construct things in new ways. With computers we can simulate nature in a program or leave nature aside and build second natures limited only by our powers of imagination and abstractions . . . In a sense, life on the screen is without origins and foundation. It is a place where signs taken for reality may substitute for the real. Its aesthetic has to do with manipulation and recombination. (p. 47)

Understanding Media: The Extensions of Man examines how games and technologies are extensions of man. McLuhan (2001) states,

> Games are popular art, collective social *reactions* to the main drive or action of any culture. Games, like institutions, are extensions of social man and of the body politic, as technologies are extensions of the animal organism. Both games and

> technologies are counter-irritants or ways of adjusting to the stress of the specialized actions that occur in any social group. As extensions of the popular response to the workaday stress, games become faithful models of a culture. They incorporate both the actions and the reactions of whole populations in a single dynamic image. (p. 255)

Although McLuhan addressed games and technology as separate entities in his book, today, almost every game imaginable can be found on CD or diskette formats. Among my friends and associates, computer games, such as Solitaire and FreeCell are popular stress relievers. McLuhan (2001) contends that all games have the ability to communicate with us. They make meaning for us because they have become "extensions of our immediate inner lives" (p. 258) "not of our private but of our social selves . . ." (p. 266).

McLuhan (2001) examines other extensions of man. The television and the telephone provide man with an extra "sensory perception," according to McLuhan. "With the telephone, there occurs the extension of ear and voice" (p. 289). With television all the senses are involved. The phonograph is another extension of the voice. However, McLuhan (1961) believes that the phonograph has slowed down vocal activity, "much as the car had reduced pedestrian activity" (p. 301).

McLuhan's (2001) description of the typewriter is comparable to that of today's use of computers in many classrooms across this country. He says, "Now eighty years later, the typewriter is used only in experimental classrooms. The ordinary classroom still holds the typewriter at bay as a merely attractive and distractive toy" (p. 282). McLuhan adds, "Even newspapers were lukewarm about this machine for some time" (p. 286). The same is the case for the computer in educational reform. Many teachers are lukewarm to that machine.

In *Bodies in Technology*, Ihde (2001), who considers himself neither utopian nor dystopian, examines the manners in which we experience and develop relations with technology. These relations are reciprocal because when we use technology we are also being "used by and employed by technology" (p. 137). Human-technology relations, such a wearing glasses and using tools, are far less complex than those relations that involve our identities. According to Ihde (2001), "They include the full range of our desires and imaginations" (p. xii) that move us, within fantasy, beyond the limitations of our bodies and eradicate societal problems. "In this mode of technofantasy, our technologies become our idols and overcome our finitude" (p. xiii), which supports the claim that, because reality is filled with shortcomings, the oxymoronic virtual reality is superior.

Ihde (2001) considers how we begin to engage in technofantasy at an early age. He relates the lived classroom experience of his wife who chose to involve her students in drawing robots. The girls drew pink and yellow robots, while the boys' robots were of the transformer type. Gender identification was obvious. Mrs. Ihde follows this activity a year later by having students imagine what robots could do. Their responses were in the form of those things the students did not like to do or could not do themselves, such as washing dishes and protecting themselves from harmful animals. It is again obvious to see that at an early age, we tend to imagine designing extensions of ourselves to make our lives easier.

Ihde (2001) finds temptation in comparing technofantasy with science fiction. Unsure of the origins of science fiction, Ihde (2001) acknowledges Roger Bacon's thirteenth-century fantasy of winged machines that transport man through the air similar

to birds in flight. “Technological fantasies about extended possibilities actually well preceded what we much later called early modern science” (Ihde, 2001, p. xiv).

As we entered the twenty first century, we brought concerns about artificial intelligence. Ihde (2001) reminds us that technological concerns have always been apparent. Our history reminds of us of worries over the machine replacing the human but Ihde (2002) says that these worries will always exist “because they reoccur with each new advance. . .” (p. 3). Ihde (2001) views hyperreality as the new worry.

Is hyperreality more real than real life? According to Ihde (2001), hyperreality is illusionary and it is harmless as long as one recognizes that it is theatrical illusion. “This would be the Platonic solution. For Plato it was the liberation from the cave and the emergence into sunlight that taught the difference” (Ihde, 2001, p. 13). Nevertheless, Ihde (2001) contends that our life world includes virtual reality, which is “both ‘real’ as a positive presence and a part of [real life]” (p. 13).

In considering the place of our desires and imaginations in the development of technologies, Ihde (2001) describes its positive and negative elements. The user wants what technology has to offer; however, the user seeks to reject any limitations associated with technology. For example, a person uses glasses to see but seeing through the use of a lens is a limitation that is often not welcomed. Many people now opt for laser surgery, simply to avoid glasses. Yet, some experience side effects from surgery, another negative occurrence.

Ihde (2001) provides an example of how a person who uses a prosthetic device finds the device viable but would prefer that the device is transparent. However, “It’s just that we apparently can’t have both the technological empowerment and the perfect

transparency at the same time" (p. 14). However, when a person is in extreme discomfort, their fantasies become stronger, so strong that bypassing the physical and the desire "of becoming embodied anew, even through a computer, was understandable" (Ihde, 2001, p. 15). Ihde (2001) adds,

> The fantasy that says we can simultaneously have the powers and capacities of the technologizing medium without its ambiguous limitations, so thoroughly incorporated into ourselves that it becomes living body, is a fantasy of desire. And when we emerge from the shadows, effects, and hyperrealities of the theater into the sunlight in the street, it is not Plato's heaven we find, but the mundane world in which we can walk, converse, and even find a place in which to eat. (p. 15)

Although we may extend ourselves with technologies to relieve mental, emotional, or physical discomforts, we are still our bodies. But Ihde (2001) suggests that even though we are aware of this, we also will discover that the polymorphic nature of our bodies becomes apparent when we enter into a reciprocal relation with technologies. According to Ihde (2001), "We are bodies in technologies" (p. 138) and computers and their networks are the most important of all technologies (p. 134).

A Tri-Focal Lens: Critical Theory, Science Fiction, and Techno-Reform

I moved through various stages in the implementation of instructional technology, I became aware of its complex nature. Although other educators in the field of my experiences define technology as a mere tool, I recognize the profound impact of technology on our lives. As Morpheus ("The Matrix," 1999) reminds us, "Throughout human history, we have been dependent on machines to survive." Unfortunately, proponents of education reform and the policymakers have failed to question the powerful influences of technology.

As a result, theorists caution us to be mindful of the need to question technology. Heidegger (1977) urges us to question our relationship to the essence of technology,

rather than to the technological. In questioning the essence of technology, Heidegger (1977) prompts us to recognize those static qualities that make technology what it is because once in relationship with its essence, we will be free to experience technology. Otherwise, we are apt to avoid it or to reluctantly submit to technology.

In "Techno-Reformers and Classroom Teachers," Cuban (1996) asks us to question the claims by techno-reformers that technology will bring about a revolution in education because such claims are being made within a "less attractive picture of computer access and use [that] stirs doubt" (para. 11). Feenberg's (1991) critical theory of technology is founded on a democratic perspective that insists that we question the liberating potential of technology. In other words, Feenberg (1991) believes that our interests in technology should be directed towards questioning how technology can be an entity that improves human life. As it relates to the adoption of educational technologies, Ferneding (2003) suggests that we question technology "by means of a democratic process of discussion and deliberation" (p. 244). This process involves parents, teachers, school administrators, and members of the community. Ferneding (2003) contends that a democratic process is a critical approach that supports them all.

The main questions asked by reformists are focused on accountability and productivity. Teachers feel the pressure of using technology to merely improve test scores because teachers are the focus of accountability, with test scores as the measure of performance. As a result, the school environment can easily become the mirror image of the setting of a science fiction story. In fact, we can draw as many analogies of SF and education as there are narratives of our lived experiences. It is Anijar, Weaver, and Daspit's (2004) contention "that science fiction provides both a better description and a

better metaphor for human conditions . . .” (p. 14). Even though science fiction has its skeptics, it is “a better future alternative than the ‘real’ world we inhabit today” (Anijar, Weaver, and Daspit, 2004, p. 14). Radio astronomer, Ellie Arroway says,

> Science fiction. You're right. It's crazy. In fact, it's even worse than that. It's nuts. You wanna hear something really nutty? I heard of a couple of guys who wanna build something called an airplane. You know you get people to go in, and fly around like birds. It's ridiculous! Right? And what about breaking the sound barrier, or rockets to the moon? Atomic energy or a mission to Mars? Science fiction, right? Look, all I'm asking is for you to just have the tiniest bit of vision. ("Contact," 1997)

Through the lens of science fiction, we glimpse the metaphorical exposition of our narratives. *The Epic of Gilgamesh* (2700 B.C.), which is considered the oldest story written, provides a metaphorical representation of school experiences. This epic gives an account of the adventures of a protagonist who is challenged by the presence of monsters. Teachers, the protagonists of their own stories, have had moments of viewing their educational experiences as battles with monsters or aliens. Some middle school teachers have described their students as “beings from another planet.” Although teachers perceive themselves as having accepted positions in order to help students, they cannot escape moments of frustration that are generated by unpleasant work environments that often mimic an alien battlefield. Kanpol (1990) records a question by one such frustrated teacher: “Are you sure I haven't been transported to another planet" (p. 77)?

Educators’ experiences are also analogous to Lucian’s *True History*, which was written during the second century. This story relates the experiences of the narrator who, while at sea, sails into a hurricane and is carried to the moon. I have often felt swept away, while working in educational situations that mimic a storm-tossed sea (*novum*). I

have also felt the estrangement or alienation accompanying the experiences, and attempted to understand any logical reasons for their existence.

Berggren (1994) accurately describes our system of education as analogous to the Buddhist idea that an eye can see everything but itself. Berggren captures "a sense of the Buddhist notion of 'enlightenment' in a recognition of the non-boundedness or inter-connectedness of everything" (p. 28). But in order to affect change in education and within self, we must look at ourselves through the eyes of others, and recognize just how connected we are to everything that exists in this world.

The visions that we experience are filled with difference. Our power lies in welcoming this difference, and in building a relational community with difference as its foundation. Willis and Jeriba ("Enemy Mine," 1985), two soldiers who view each other as an antagonistic alien, are examples of individuals who find an urgent need to welcome difference. Both characters find themselves on a hostile planet. In order to survive, they must learn to understand and appreciate each other. With differences welcomed, each begins to care about the well being of the other. Willis quotes from the Taalman: ". . . let him extend love to the enemy, that love might unite them" ("Enemy Mine," 1985).

The X-Men are examples of individuals who are alienated because of their belief that society should welcome difference. According to Appelbaum (2000), "The *X-Men* are people we are to like and they are the potential harbingers of an increasingly pluralist society, yet they live on the margins in a perpetual state of alienation and isolation, frozen in interminable, 'illegal' immigration" (p. 93). We can often express or internalize anger because of our marginal positions. However, Storm ("X-Men 2," 2003) reminds us, "Sometimes anger can help you survive."

Anger is a rational response to alienation, violence, and exploitation. It is the same anger that ruptured within Del Spooner ("I Robot," 2004) when robots began to take over the world. This is an anger in sharp contrast to the uncontrollable and destructive anger of Shelley's monster. Storm ("X-Men 2," 2003) speaks of a controlled anger that prompts us to resist being marginalized or stimulates us to break down those structures that keep others in oppressed situations. Without a doubt, controlled anger begets change. According to Octavia Butler's character, Lauren, (1993), "All that you touch you Change. All that you Change Changes you. The only lasting truth is Change . . ." (p. 3).

Strange and oppressive settings in education have often emerged from familiar surroundings undergoing change. For example, many educators in the field may have found themselves bombarded with new requirements and new reform packages of which they had no voice in selecting. This is reminiscent of Gulliver's experiences in Laputa, the flying island inhabited and controlled by scientific thinkers, who exercise power over the inhabitants of Balnibarbi, the land below. This exercise of power is not demonstrated through the physical but through technology. Adorno and Horkheimer (1947/1992) identify man's aim as the domination of nature and other men. Marcuse (1964/1992) urges man to release the liberating potential of technology by using it to improve the conditions of life.

An analogous relationship exists between Laputa and the departments of education that control all the school districts in its state, which in turn, filter down information as well as their frustrations to their schools. The inhabitants of Balnibari view the Laputans as having no interests in their concerns, which is a perception shared

by many teachers, especially as it relates to technology, and the top-down approach of policymakers. Georges, a respondent in Ferneding's (2003) research, indicated that exclusion from educational decisions that affect students and teachers has been a painful experience for teachers (p. 185).

In comparison to the inhabitants of Balnibari and Laputa's top-down approach, teachers often feel reduced to objects when their concerns are considered irrelevant, yet their physical presence is required as a means to an end. In *Dialectic of Enlightenment*, Adorno and Horkheimer (1947/1992) challenge us to consider our place as objects in society. Feenberg (1991) recommends that we hold our cultural institutions accountable for creating "a political culture of passivity and dependency" (p. 17), which promotes mankind as objects, rather than as subjects.

A critical analysis of the relationship between Laputa and Balnibari provides an image of our relationships to cultural institutions, as well as insight into the emotions generated from being regarded as objects. For example, teachers/educators and the inhabitants of Balnibari share feelings of deception, manipulation, isolation, neglect, exploitation, and possible elimination. Many teachers question their job security as policymakers become even more financially supportive of technology in the classroom. Horkheimer viewed technology as a reason for unemployment and Adorno (1953/1994) also perceived it as a threat.

Apple (1989) argues that teachers are undergoing the restructuring of their jobs and they are being deskilled because of technical control (p. 32). Aronowitz & Giroux (1993) add, "Teachers have become increasingly deskilled through an emphasis on

accountability schemes, teaching to the tests, and management by objective approaches that reduce their work to reductionist, instrumental, and demeaning procedures" (p. 2).

Too often we become comfortable suffering in uncomfortable situations that threaten job security and personal satisfaction. However, "You have to understand, most of these people are not ready to be unplugged. And many of them are so inured, so hopelessly dependent on the system, that they will fight to protect it" (Morpheus, "The Matrix," 1999), rather than fight to improve it. For this reason, Marcuse (1964/1992) considered suffering to be a "natural" order of things, and so natural that it portrays a world as both powerless and insensitive (p. 110).

From *Gulliver's Travels*, we recognize how techno-science is not used to perpetuate life and build community relationships. This is also apparent in Shelley's *Frankenstein*, in which Dr. Frankenstein demonstrates a lack of social responsibility for his creation. However, the monster he creates recognizes "the barbarity of man" (Shelley, 1818/1961, p. 90). The monster views man's lack of concern for others from his alienated space. The female colleague in "Artificial Intelligence" (2001) says, "Today, it isn't just a question of creating a robot that can love. Isn't the real conundrum, can you get a human to love them back?" In comparison to Shelley's monster, teachers feel alienated from the community of policymakers and regulators, who map the course of education; and teachers seek to be valued by administration as well as by their colleagues.

Policymakers follow what Horkheimer (1937/1992) describes as traditional theory, which suggests that individuals adhere to the rules and regulations established for them without dissension (p. 244). Marcuse's (1964) *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society* depicts these individuals as one-dimensional

people functioning in a one-dimensional society. Teachers are expected to accept the process, and to find fulfillment in being able to satisfy accountability measures. This attitude reflects a one-dimensional institution without opposition.

In a one-dimensional society, there are opportunities for the continued existence of desolation, poverty, and hostility - the inheritance of our youth. Teachers can view the dilemmas that plague youth through the lens of science fiction. Octavia Butler's (1995) *Parable of the Sower* is a dystopic view of the ills of the inner-city. Lauren, Butler's seventeen-year-old protagonist, attempts to lead a group of people to a safe space where they are able to build a community that is free from violence and poverty (p. 9), catastrophes created by corporate greed. However, Lauren struggles to convince others to prepare for a disastrous future. This experience is in keeping with those educators who see the need for effective techno-reforms that are socially inspired, and who become actively engaged in stimulating others to build a proactive educational community. Lauren stressed the need to plan by envisioning new possibilities.

Research findings have shown that teachers' concerns for techno-reform efforts include their lack of involvement in the planning stages as well as a lack of training and technical resources (Cuban, 2001; Ferneding, 2003). A successful technology-driven reform will address these concerns (Cuban, 2001; Ferneding, 2003), and contribute to an optimistic view of technology in education. In "Understanding Teachers Technological Pessimism Through the Eyes of Mary Shelley," Ferneding (2004) says, "The complexity of technology adoption within educational settings only makes the success of policy makers' technology-driven reforms more uncertain . . ." (p. 187). In fact, it is just as uncertain as the future of Frankenstein's monster.

Education reform proponents are certain that technology will remedy the ills of education, and place our society in the forefront of world leaders in technological advancements. Regarding technology, Berkeley (1949) recognizes the need for a social point of view (p. 208), which is omitted from the focus of reform efforts in favor of, what appears to be, an easier route to the forefront.

We ought to look toward Čapek and Asimov's robots, which were designed to make life easier for mankind. Robot V.I.K.I. ("I Robot," 2004) says, "You charge us with your safekeeping, yet despite our best efforts, your countries wage wars; you toxify your Earth, and pursue ever more imaginative means of self-destruction. You cannot be trusted with your own survival." Through robot V.I.K.I., we are reminded of Benjamin's (1936/1968) position:

> The destructiveness of war furnishes proof that society has not been mature enough to incorporate technology as its organ, . . . Instead of draining rivers, society directs a human stream into a bed of trenches; instead of dropping seeds from airplanes, it drops incendiary bombs over cities . . . (p. 242)

Robot V.I.K.I. also utters Heidegger's (1977) contention that technology is not the demon (p. 28) because it is man's decision to use it for either destruction or peace. According to Domin, the human worker in *Rossum's Universal Robots* (1921/2004), "No one can hate more than man hates man! Transform stones into people and they'll stone us" (p. 58). From these robot stories, we gain a glimpse of what could possibly occur when mankind fails to be socially responsible.

Marcuse (1964/1992) considered destruction, violence and suffering as evidence "of a helpless and heartless universe" (p. 110). "I have been witness to a world consumed by hatred and bent on self-destruction, watched as we have taken what was to be a paradise and failed in our responsibilities as its steward" (Dr. Totenkopf, "Sky Captain

and the World of Tomorrow," 2004). Recognizing the need for social responsibility in the creation and use of technology requires that we apply a critical approach. Peter Parker ("Spiderman," 2002) says, "Whatever life holds in store for me, I will never forget these words: 'With great power comes great responsibility.' This is my gift, my curse."

Thinking critically may begin with an individual who feels cursed; but it actualizes when individuals build relationships in which communication is the cornerstone, even in the midst of chaos and confusion that mimic a curse. With community comes power. Therefore, as critical thinkers, we ought to refuse to function in alienation or estrangement from the community (Horkheimer, 1937/1992, p. 246) but accept a mutual responsibility to improve life.

Knowing these facts is not enough. "[S]ooner or later you're going to realize, just as I did, that there's a difference between knowing the path and walking the path" (Morpheus, "The Matrix," 1999). We ought to be actively engaged in developing a relational community. Doll (2002) says, "Community . . . is what helps elevate us above ourselves" (p. 50) because it is based on an ethic of caring. As we become community-oriented, we redirect our focus towards nature and all of Earth's people with their needs and concerns.

Our technological responsibilities extend into our lives in many ways. We must consider the influences of technology in structuring our identities. Feenberg (1991), Ferneding (2003), and Gabbard (2000) challenge the popular view of technology's neutrality. They contend that technology has the power to provide us with the ways we structure our identities as well as the way we interpret our world.

Roger, a respondent in Ferneding's (2003) study, recognizes the influence of technology in shaping our reality. Roger considers mankind as being "blinded by the machine" (p. 233), which makes it difficult to analyze its influence. However, through the eyes of others we are able to awaken to an awareness that is mind-boggling. For example, Sherry Turkle (1997) describes the impact of the Internet and virtual reality. McLuhan (1961) examines how games and simulations are extended into our lives. In addition, both Turkle (1997) and McLuhan (1961) remind us that various types of technologies also influence our perceptions of the world.

Technology is vastly altering our physical selves. We are now the cyborgs of SF, living in an empirical reality that is less real than fantasy. Lucian's *Icaromenippus*, also known as *Journey Through Air* and *Up in the Clouds,* written around the second century, describes the cyborg and the use of prosthetics that are the focus of the works of Haraway (1991), McLuhan (1964/2001), and Weaver (2000; 2004).

Lucian's protagonist, Mennipus, flies to the Moon with the help of wings designed from those of a vulture and an eagle. Mennipus says, "[It] was Daedalus that gave me the idea of making myself some wings" (Lucian, nd/1990, p. 112). However, Mennipus learned from the mistakes of Icarus and Daedalus and avoided the use of wax. Mennipus describes the difference to his friend. "Well, it was like this. I caught a large eagle, and a very powerful type of vulture. I amputated their wings, *radius, ulna*, and all . . ." (Lucian, nd/1990, p. 113).

Within our lives, it is becoming more difficult to determine what is natural, if indeed the natural still exists. Metaphorically, Mennipus' wings are all the technologies that extend our capabilities: eyeglasses; artificial limbs; pacemakers; hearing aids; and

dentures/braces, etc. Technologies have become so much of an extension of ourselves that we find difficulty in explaining where we stop and where technology begins. In “The Six Million Dollar Man” (1974), Oscar Goldman convinces his co-workers to save the life of Steve Austin by extending his life through technology. Goldman says, “Gentlemen, we can rebuild him. We have the technology. We have the capability to build the world's first bionic man . . . Better than he was before. Better, stronger, faster.”

Dr. Goldman's perspective is in keeping with McLuhan's (2001) explanation of technology as an entity that has the capacity to move us beyond our genetically provided capabilities and towards a posthuman self (Hayles, 1999 & Weaver 2000; 2004). However, when we are careless with our technological innovations, we may find ourselves in the position of Dr. Octavius ("Spiderman," 2004) whose experiment went awry when the tentacles he used in order to handle dangerous materials became fused to his body. Dr. Octavius became his own menace, reminding us of Freud's (1930/1962) contention that prosthetics can often become troubling mechanisms. When questioned about the menacing Dr. Octavius with his troubling mechanisms, Peter Parker says that Dr. Octavius, himself, ". . . doesn't [even] know what to think" ("Spiderman," 2004). However, Parker recognizes the importance of responsibility. Addressing Dr. Octavius, Parker says,

> You once spoke to me about intelligence. That it was a gift to be used for the good of mankind . . . Sometimes to do what's right, we have to be steady and give up the thing we want the most, even our dreams. ("Spiderman," 2004)

For many educators in the field, technology appears to be their nightmare or the monster (*novum*) in their SF thriller, rather than the hero. Without considering technology as a culture or as Ferneding (2003) terms “a social process,” education reform policymakers

are, unconsciously, providing educators in the field with an H. G. Wells time machine experience. A constant attempt is made to recapture the present, while traveling between the past and the future with no connections being made. Optimistically, Über-Morlock says, "We all have our time machines. Some take us back; they're called memories. Some take us forward; they're called dreams" ("The Time Machine," 2002).

SF stimulates us to unlock the imagination, and moves us into a creative and progressive space where we contemplate nature, our relationships with it, and our responsibility to nature. Lucian's Mennipus takes a critical view of man and nature. Mennipus says,

> Well, the moment I started thinking about life, I realized that the things most people care about, wealth, position, and power, were absurdly unimportant and ephemeral. I soon began to regard them as mere obstacles to the pursuit of what really mattered, and tried to look beyond them and contemplate Nature as a whole. (Lucian, nd/1990, p. 113)

In "The Hitchhiker's Guide to the Galaxy" (2005), the dolphins are anticipating mass destruction and they begin to chant:

> So long, and thanks for all the fish. So sad that it should come to this. We tried to warn you all. But, oh dear! You may not share our intellect, which might explain your disrespect for all the natural wonders that grow around you.

Some may consider natural wonders as useless within a technological world. For this reason, forests are destroyed and industries are polluting the waters. However, Freud (1930/1962) urges us to care for such useless things as "green spaces necessary in a town as playgrounds and as reservoirs of fresh air . . . laid out with flower-beds" (p. 39). For children, the green spaces of parks and playgrounds are settings for their communal experiences with nature, and for the unbounded release of their imagination. At the age of three, my son Doug related experiences of how trees are able to speak to us, and that they

have eyes. Certainly, nature observes its destruction because nature speaks to us through children.

Although society has stifled the imagination, Marcuse (1964/1992) challenges us to free it from its abusive state. The freedom to imagine emancipates us from the confines of oppressed situations. Educators can best find their teachers of imagination among the children. In Edmunds' (2005) article, "Sensitivity," there appears a poem by eight-year-old Geoffrey that encourages us to revive the child within. Geoffrey says,

> I wish I was more like an eagle,
> and my imagination could fly like an eagle
> with my mind as open as the sky
> because of the vast expanse of nature.

Appelbaum (2000) states that adults do not understand how technology functions; therefore, accidentally, uncontrolled technology creates the catastrophes that endanger mankind's existence. This is evident in Niven's (2004) *Ringworld's Children*. Ringworld, a high-tech project inhabited by trillions of humans and nonhumans, is in danger of extension. The children, Tunesmith, Acolyte, and Wembleth, must protect Ringworld. "[It] is the children alone who are capable of harnessing the sometimes frightening applications of technology, or understanding the inner struggles and gentle nature of the monsters mutantly wrought from toxic spills and nuclear accidents" (Appelbaum, 2000, p. 92). Marcuse (1968/1992) says, "To free [the imagination] for the construction of a more beautiful and happier world remains the prerogative of children and fools" (p. 16).

The hope of a secure and livable world lies with disciplined nonconformists who are dedicated to justice, peace and brotherhood.
- Martin Luther King Jr. (*Strength to Love,* 1981)

CHAPTER 3

AN EMISSARY'S METHODOLOGICAL MISSION GUIDE

I do seem to remember a process where you people ask me questions and I give you answers, and then I ask you questions and you give me answers, and that's the way we find out things.

- Dr. Heywood Floyd ("2010: The Year We Made Contact," 1984)

This study recognizes that there is a tremendous need for educators to continue to ask and find a viable answer to one major question: During an age of rapid growth and advancements due to science and technology, how does education in America continue to be plagued with challenges in using technology to enrich students' learning for life and to promote their need to be socially responsible? Since the 1983 publishing of *A Nation at Risk*, an emphasis has been placed upon developing and implementing technology plans in education that would move America to the forefront in technoscience. *No Child Left Behind (NCLB)* has continued this emphasis through "Enhancing Education Through Technology" as outlined in Title II D of NCLB, which serves as a guide in the development of technology plans that have been designed and revised to close gaps in student performance. However, states face challenges to implementing effective technology plans.

An examination of educators' perceptions of technology reform efforts can uncover the reasons for these continued challenges. The majority of the participants in this study are teachers that work within a non-traditional high-tech school environment. Engaging in qualitative research affords me an opportunity to gain insight into their past and present thoughts and reactions to technology integration. I believe that we can derive

the meaning and reasons for our present challenges in technology reform from the lived experiences of educators as storied.

I consider qualitative research appropriate for this study because educators' experiences shape their own interpretations as well as the interpretations of others when they speak. Qualitative research provides a space in which the varying points of view of participants are welcomed and the study creates a storied environment. According to Lincoln and Guba (1985), qualitative research is more adaptable to the multiple realities of participants (p. 40), which I refer to as multiple perspectives of experiences in the field. I contend that it is crucial that we provide a space for studying their narratives because their stories have too often been confined to the walls of their schools.

This study involved in-depth interviews, direct observation, document review, and a story map. During interviews, I became aware of the need to review the technology plans for participants' school district and the state as well as news articles. Qualitative research is considered multi-method. Using multiple methods or triangulation "reflects an attempt to secure an in-depth understanding of the phenomenon in question" (Denzin & Lincoln, 2003, p. 188).

The narrative analysis process focused on developing the elements of narrative and incorporating science fiction narratives as metaphors for experiences and settings. I am aware that readers' involvement with the text, as well as my own involvement in structuring the text, will continuously influence the analysis of these narratives.

Imagining the Mission

The desire to conduct this study was stimulated by my experiences as a facilitator in a technology-oriented school environment. As I considered the problematic events

surrounding the integration of technology in my school, I began to imagine how other educators were embracing or rejecting technology reform efforts. From my vantage point, I recognized how technology integration could benefit classroom instruction because it could open spaces that my students would possibly never experience. However, there were those who totally rejected the use of technology. Certainly, the Internet could be the vehicle for travel to exotic places as well as the entrance to massive amounts of literature. It could also be the space for examining the ills of this world. In fact, I began to reflect on the need to assist my students in developing an awareness of how technology is used to nurture those ills, while dominant forces strengthen their power over the oppressed.

My orientation to technology is rooted in the experiences I shared with my sons, who are more digitally adept than I. They were my teachers and I was their receptive student, opened to the introduction of new technology as any inquisitive child. In planning for this study, I wondered how others' experiences affect their approach and whether they critique themselves. Denzin (1989) encourages researchers "to think reflectively, historically, comparatively, and biographically" (p. 49) and I choose to provide participants opportunities to do the same.

My first crucial step was to imagine myself within the problematic concerns of this study, and to examine my experiences within my school. In order to understand these experiences, it is necessary to listen to the storied experiences of others within and outside of my present educational environment. I have listened to the problems of technology integration during various educational meetings and I recognize that these educators' views of technology's place in our lives vary from one generation to another and from one gender to another; and these views vary across economic lines. Regardless

of these varied viewpoints, the Department of Education continues to stress urgency in integrating technology into American schools or this country will continue to lag behind. However, we ought to consider how technology can be used to perpetuate life and thereby, lead to social justice.

During my school's technological transformation, I was not involved in the initial planning stage. This lead me to question the involvement of other educators in designing and implementing technology plans within their schools. But how is our involvement or lack of involvement affected by historical power struggles and our own perceptions of technology? Because perceptions of technology's influence in our lives vary within my own family, I am certain that it varies within the family of humankind. Therefore, I was lead to consider Denzin's (1989) position that researchers "examine how problematic turning point experiences are organized, perceived, constructed, and given meaning by interacting individuals . . . [but that we also seek] to uncover how the problematic act, or event, in question organizes and gives meaning to the persons studies" (p. 49).

Role of the Researcher

For the last three years, my school environment can be described as a high technology business-oriented high school. However, I have had twenty-six years of experience in a non-traditional small school that functioned in accordance with the districts traditional settings. The advantage that these experiences have afforded me is having more than one perception of education reform's focus on technology. Although I have an optimistic outlook regarding technology in education, I have witnessed productive and non-productive use of technology in classrooms.

In my role as researcher, I was an observer and a participant as well as an interviewer. I expressed my opinions without negating the opinions of participants. In fact, I opened up the pages of my experiences during interviews. This decision is influenced by Kincheloe and McLaren's (2003) position that " critical researchers enter into an investigation with their assumptions on the table, so no one is confused concerning the epistemological and political baggage they bring with them to the research site" (p. 453), although these assumptions are subject to change during their experiences in the field. Denzin (1989) adds, "All researchers take sides . . . because every researcher brings preconceptions and interpretations to the problem being studied" (p. 23). However, using this interactive-relational approach provided me with new insights that led me to reevaluate my position regarding technology integration.

As a researcher, I was aware of my position as interpreter (Clandinin & Connelly, 2000; Denzin, 1989; Denzin & Lincoln, 2003; Polkinghorne, 1988). I was influenced by Denzin's (1989) attitude concerning interpretation. Denzin (1989) holds that interpretation is vital to the work of critical theorists whose research aims to influence the positive redevelopment of society. His first position states that because our world is one of human experiences, "there is only interpretation" (p. 8). We are constantly attempting to make meaning of our lives as relational beings.

Many are functioning on margins that generate even more margins within them. In those marginalized positions, inclusive of education, are people who interpret their circumstances in various ways, which supports Denzin (1989) second position. "[It] is a worthy goal to attempt to make these interpretations available to others" (p.8). Opening

the pages of educators' experiences with technology reform, through their stories, will provide opportunities for others to create an understanding of their own situations.

In choosing the narrative as a method to analyze or interpret our circumstances within education's technology reform, I also recognize its complexity. I am reminded of Kincheloe's (2002) contention that questioning what is deemed unquestionable has never been "a picnic in the park" (P. 19). Nevertheless, critical researchers, who are teachers, "develop the capacity to expose the assumptions behind, the interest served by, and the unarticulated purposes of particular forms of educational activity" (Kincheloe, 2002, p. 20). Doing so leads me to Denzin's (1989) third contention that "all interpretations are unfinished and inconclusive" (p. 8).

Clandinin and Connelly (2000) stress the importance of relationship building and contend that, "Whenever researchers enter the field, they experience shifts and changes, constantly negotiating, constantly reevaluating, and maintaining flexibility and openness to an ever-changing landscape" (p. 71). Therefore, developing a relationship with the participants will be a continuous process. In my role as a researcher within the field of education, I am equally aware of my role as educator, which is an inseparable relationship that I will share with participants.

Kincheloe (2002) notes the importance of connecting the "knower and the known, purpose and technique by utilizing the human as instrument" (p. 54). This connection or relationship gives us access to the private experiences of participants and thereby, expanding our own experiences to include those of participants. "Thus not only do we learn about the educational world surrounding us, but we gain new insights into the private world within us . . ." (Kincheloe, 2002, P. 54).

Confidentiality is my ethical responsibility and it is a difficult one. "Even when we try to disguise what we are doing in the place, others may say that we are there as researchers" (Clandinin & Connelly, 2000, p. 174). I will make every effort to protect the identity of participants and settings. Otherwise, there would be a cloud over confidentiality. Therefore, I will neither discuss my relationship to participants nor their responses with others. In my role as researcher, I will "cloak an individual or a site from an external audience" (Lincoln & Guba, 1985, p. 365), by masking the names and locations of the participants and the settings.

The Settings

The settings for this study will include two urban high technology high schools, a non-traditional rural middle school, and a rural high technology high school within public school districts. Each of these schools follows a small school concept.

The name that I have provided each school, as a method of protecting their identities, is reference to a sci-fi film. Klaatu, the humanoid from another planet in “The Day the Earth Stood Still” (1951), travels to Earth with a warning to end violence or be subjected to annihilation. Klaatu, the main character of this social parable, studies mankind’s positive and negative dispositions. “Metropolis” (1927) is a futuristic society with two class distinctions, the workers and the thinkers. The workers, who achieve the goals of the thinkers, have no imaginations needed in order to plan because of their isolation. On the other hand, the thinkers are able to plan but they cannot implement their plans. Neither group can experience completeness in isolation. Earthseed is reference to Octavia Butler’s book, *Parable of the Sower* (1995). Earthseed is a religion based upon establishing a world that remedies the ills of a society controlled by corporate greed.

Dagobah is the marsh-like planet that is home to Yoda, the Jedi sage of “Star Wars: The Empire Strikes Back” (1980). Yoda holds the secrets needed to successfully compete with the Dark Side of the Force.

Klaatu is a high-tech high school in a low to middle income urban, historic community. This high school is located in a freestanding building that was renovated for the school and it operates according to the school district's school calendar. This school incorporates a computer-based curriculum that is aligned to state standards. Other components to this program include service learning, project-based learning, mentoring, job shadowing, and dual enrollment with local colleges.

Klaatu has been in operation for 30 years as a dropout prevention program. It was redesigned in 2002 as a high technology, business-like program following a small school concept. There are eighteen computers in each math, science, social studies, and language arts classrooms.

This program is a joint venture between the school district and a dropout prevention initiative. The administrative staff is comprised of a principal on special assignment, a director, a social service coordinator, a counselor, and an administrative assistant. There are six teachers/facilitators, each of whom has a Master's degree or higher. One paraprofessional assists the staff as needed. The average school population is 70 eleventh and twelfth grade students. African American students are in the majority at Klaatu. These students enter Klaatu from traditional high schools by way of the school district's tribunal system.

Metropolis is a rural alternative high school program, serving students in grades 9-12. During the racial segregation years of the 1950s, this school originated as a school

for African Americans. In 1987, Metropolis became its county's in-school suspension program. In 2002, Metropolis began to offer a performance-based accelerated program to high school students in the county.

Metropolis affords students opportunities to recuperate course credits through the use of computer-assisted learning. Contributors to their website state, "Our success rate with improved academic performance, attendance, discipline, and service learning has brought statewide recognition to [our] County Schools."

Metropolis ' performance-based program accommodates 68 to 72 day students and 20 night students. Caucasian students are now in the majority at Metropolis. The administrative staff consists of an on-site administrator, a services coordinator, a counselor, and a secretary. The teaching staff consists of five day-program facilitators and four night-program facilitators.

Earthseed is a rural non-traditional middle school program. This program is an alternative setting that serves two traditional middle schools from two different rural cities. It is housed on the campus of the county's non-traditional high school. The administrative staff consists of an on-site administrator, a services coordinator, a counselor, and a secretary. The staff consists of five teachers and two paraprofessionals. This middle school serves a maximum of 60 students in grades 6-8. The racial composition of Earthseed is majority African American.

Dagobah is a technology school in a large urban school district. This school, which opened in 2005, also follows the small school concept. This school boasts of a rigorous academic program, a state-of-the-art facility, and a strong link with community

resources. Dagobah honors the past by maintaining the historic structures on its campus, while capturing the present and future through web access, high-tech labs, and studios.

Dagobah 's population will never exceed 400 students. At the present, there are 100, predominantly African American, ninth grade students. The administrative staff consists of a principal, a services coordinator, a counselor, a registrar, and a secretary. At the time of this study, the faculty consists of five teachers and two paraprofessionals.

Entry and Permission Procedures

In order to conduct this research, it was necessary to obtain the permission of the schools involved. I contacted the administrative offices, by phone, in order to obtain their guidelines for observing and conducting interviews with teachers, support staff, and site administrators. The guidelines were followed and evidence of this researcher's enrollment in this Doctoral program at Georgia Southern University was provided. A letter was sent to the school district seeking permission to conduct research in their schools. Attachments included the story/map questionnaire (Appendix A), interview questions (Appendices B and C), and my IRB approval. The rural school districts' administration approved the research but informed me that their principals made the final decision regarding research in their schools. A letter was sent to the on-site administrators and follow-up calls were made. The administrators agreed to allow their schools to be a part of the study, excluding students.

Participants were informed of the purpose of this research. A cover letter and a story map (Appendix A) were sent to all teachers and the administration at the address of the research sites. Those who agreed to participate were asked to complete the story map

and to return it to me via fax or at the address listed on the cover letter. The time frame for this process was seven (7) business days.

Eleven potential participants returned their story maps within this time frame, inclusive of one administrator who later decided not to personally participate in the study. I studied the story maps to determine which types of experiences with technology would support this study's purpose. From the eleven story maps returned, I chose six participants for this study. These six have worked in both traditional and non-traditional school settings, which satisfies the profile for participants. Letters of approval and the story maps were filed and secured in my home office. I contacted the participants to schedule the interviews and I also contacted the principals to make sure that the scheduled times were appropriate.

Participants

Participants came from the teaching and support staff of each school site described in this study. Approximately six participants were included in this research. Gender, race, and age did not influence the selection process but I chose staff members who had both traditional and non-traditional experiences in education. All staff members received a letter informing them of the nature of this study, along with a story map/questionnaire that served as informed consent upon its return. After participants returned their story maps, I studied each one in an effort to determine the types of experiences with technology that I wanted to understand (Denzin, 1989).

Those who agreed to participate constitute the primary voices whose stories are individually presented and then compiled for analysis. These voices include: Pauline, a science teacher; Carolyn, a paraprofessional; Allison, an itinerant counselor; Joyce, a

vocational education teacher; Karen, a social studies facilitator; and Robert, a math teacher.

Inhibitors and Self-Imposed Restraints

I limited the participants to teachers and school support staff. Data was collected from participants who have experienced traditional and non-traditional school settings. This study took place on the school sites and I identified the characteristics of those schools but I masked the identities of participants and their schools. Conducting this research was limited to teacher planning periods and after school hours.

The stories of participants' lives are learning experiences. But it is important to recognize that there are differences between the *life* as related to us, the *life* as experienced, and the *life* as lived. According to E. M. Bruner (1984), events that actually occur comprise a life lived, while the life as experienced contains a person's emotions, thoughts, images, and desires. "A life as told, a life history, is a narrative, influenced by the cultural conventions of telling, by the audience, and by the social context" (p. 7). “We cannot live other people’s lives, and it is a piece of bad faith to try. We can but listen to what, in words, in images, in actions, they say about their lives . . . It’s all a matter of scratching surfaces” (Geertz, 1986, p. 373) in order to gain one level of understanding after another.

I do not have access to peoples' lives beyond what I am told or presented. As a result, another limitation to address is the challenge to texturally represent peoples' lives as they live them. Denzin (1989) summarized Derrida's contention that we cannot peer through the window of a person's inner life because "any window is always filtered through the glaze of language, signs, and the process of signification" (p. 2). Denzin

(1997) points out, "Language and speech do not mirror experience; they create experience and in the process of creation constantly transform and defer that which is being described" (p. 5). Therefore, our statements are never free of ambiguity and our written and oral interpretations are never complete.

Data Collection and Management

According to Denzin and Lincoln (1998), qualitative research has a multi-method focus, which interconnects these methods in order to "get a better fix on the subject at hand" (p. 3). I used five collection methods: (1) direct observation; (2) participant observation in the settings; (3) in-depth interviews; (4) a questionnaire (story map); and (5) document review. "These methods form the core of qualitative inquiry - the staples of the diet" (Marshall & Rossman, 1999, p. 105). Denzin and Lincoln (1998) note, "The combination of multiple methods, empirical materials, perspectives, and observers in a single study is best understood, then, as a strategy that adds rigor, breadth, and depth to any investigation" (p. 4).

A key advantage of the direct method of observation is that "it provides here-and-now experience in depth" (Lincoln & Guba, 1985, p. 273). These observations were conducted within participants' classrooms and offices or what Lincoln and Guba (1985) refer to as naturalistic settings. In using the direct method of observation, I positioned myself in a location that afforded me a comfortable situation with which to write, but a place that did not distract members of the population or the participants. I observed the first day of the study from the beginning of the school day through the end. My one-hour lunch break did not coincide with the schools' lunch periods because this time of

socialization was quite informative. In addition, I deemed it necessary to observe events at the close of the day.

Throughout this process, I noted activities that occur as well as the behavior of those engaged in the activities. I recorded descriptions of technological objects in the landscape, particularly computers in the classrooms. This direct method of observation will be implemented for one day. However, this time frame is flexible enough to include unforeseeable occurrences in the daily schedules of the sites.

The participant observation method involved the second collection process. Within one setting, I am both an observer and a member of the faculty. Lincoln and Guba (1985) contend that this is a difficult position. However, when I began to consider the school's strong position within the autobiographical roots of my experiences, I saw the need to include at least one other participant from my site in this study. Therefore, as Lincoln and Guba (1985) suggest, I will also view myself as "an informant who has historically been a part of the local context" (p. 274). As a participant in this study, I became an active character as the plot unfolds.

The questionnaire is in the form of a story map (Appendix D), which substitutes for the Informed Consent Form. Lincoln and Guba (1985) suggest becoming familiar with the participant before confirming the day and time of the interview (p. 270). Therefore, prior to scheduling the interview, I revisited the story map in order to become as knowledgeable of the participant as possible. The story map provided a view of the past and present technological experiences, both personal and professional. This map also provided information about the participant's projections for the future.

Fontana and Frey (1998) contend that participant observation and interviewing go hand in hand. Some of the information that I obtained during the interview was the result of observation. In-depth audio-taped interviews were informal and each interview involved open-ended questions that were generated spontaneously, although I frequently referred to my pre-designed questions (Appendix E). "Unstructured interviewing provides a greater breadth than the other types" (Fontana & Frey, 1998, p. 56). In other words, these unstructured interviews did not restrain participants from asking me questions whenever they chose to do so. Allowing participants to ask questions eliminated any element of distance between us. This is a relational approach to in-depth interviewing that Chirban (1996) suggests will reveal "a complete and accurate picture of the participants' contributions, motives, involvements, strengths, and weaknesses" (p. xii).

For teachers, interviews took place during their planning periods and after school. All interviews occurred within the teachers' classrooms and the counselor's office. The counselor was interviewed according to her particular schedule. Seidman (1998) says, "People's behavior becomes more meaningful and understandable when placed in the context of their lives and the lives of those around them" (p. 11). Although two interviews lasting a minimum of fifty minutes were planned for participants, some participants that interviewed at the end of the school day chose to interview for longer periods of time.

Because of the responsibilities of public school teachers, counselors, and paraprofessionals, I recognized the need to be flexible in scheduling these interviews. Interview one was designed to reflect on information participants provided on their story

map and to gain insight into past experiences with technology prior to entering the school environment as educators. Interview two covered details of their present experiences with technology in their classrooms. Teachers were also asked to reflect on their best-case and worst-case scenarios of the use of technology, using the genre of science fiction.

Initially, I had planned an optional third interview, which was designed to encourage participants to draw metaphorical relationships between their experiences in the field and a science fiction film or short story. The first participant reminded me of the hectic schedule secondary teachers must follow, including the preparation of students for high-stakes tests. This participant suggested taking a film and viewing it on her own time and writing an analysis that she would e-mail me when completed. Therefore, prior to the first interview, I asked each participant to view and metaphorically analyze a sci-fi film or story as an optional activity. If they preferred not to participate in a third interview, they could write the analysis and e-mail it as one participate suggested. Each participant said that they understood the use of metaphors but only two participants agreed to this optional activity.

I explained that I would like for them to write their analyses to include sci-fi metaphors as the main focus in analyzing their personal and professional experiences and their perspectives on technology. In other words, there are direct relationships between what is similar to them and the dissimilar events of sci-fi. Participants were encouraged to choose from the following: “Blade Runner” (1982); *Johnny Mnemonic* (1981); “The Matrix” (1999); “X-Men: The Last Stand” (2006); “Equilibrium” (2002); “Spiderman” (2001); and *Harrison Bergeron* (1961). They were also given the option to substitute one

of their favorite sci-fi films. They felt that this was a timely but an interesting activity that they had never done before. However, the two were excited about the challenge.

The two interviews were scheduled from two days to one week apart depending upon the schedules and responsibilities of the participants. This provided "time for the participant to mull over the preceding interview but not enough time to lose the connection between the two" (Seidman, 1998, p. 15). Directions for the optional activity were given at the end of the second interview. Those agreeing to participate in this activity were given at least two weeks to complete it. Participants needed time to view and review a film or read a short story as an effort to find similarities between their experiences and those elements of a particular sci-fi film.

Although participants have been apprised of the purpose of the research through my initial letter, I began by recalling the purpose. "By clearly identifying one's goals and clarifying one's expectations for an interview, the interview itself is given a course and direction (Chirban, 1996, p. 36). In keeping with Lincoln and Guba's (1985) position, I started the interview by asking a "grand tour" question (such as "How did you happen to choose to become a teacher?"), which is designed to make the interviewee comfortable in talking with me.

Specific questions followed and I attempted to keep a rhythmic pace to the interview. However, the questions I structured were only used to guide the interview. "Main questions get the conversation going . . . and ensure that the overall subject is covered . . ." (Rubin & Rubin, 2005, p. 13). Unlike the questions on the story map, which were asked each participant, the interview questions varied. The participants provided answers that generated other questions. According to Rubin and Rubin (2005), "in

qualitative interviews each conversation is unique, as researchers match their questions to what each interviewer knows and is willing to share" (p. 4). In order to reach the richness, depth, and detail that Geertz (1973) called *thick description*, my main questions were accompanied by probes and follow-up questions. During my interviews, participants expressed ideas that thoroughly added to this research; therefore, I often asked participants to expand on these ideas.

When the each interview appeared to have exhausted itself, I played back portions of the interview for the interviewee's response and I asked the participants to verify their satisfaction with the content. I extended my gratitude to the interviewee for participating in this study. I also provided the participant with a copy of the context of their interviews within two weeks of the end of the first two interviews. I asked them to review the content and notify me of any concerns to be clarified or eliminated. "By responding to concerns of the interviewee, the interviewer expresses interest in the interviewee" (Chirban, 1996, p. 36). I also provided each participant a copy of the narrative part of the study in Chapter 4 that was derived from his or her particular interview. According to Lincoln and Guba (1985), this establishes credibility (p. 236).

Field notes were made from the taped interviews. In addition, I took notes during the interviews in order to capture the body language of the interviewees. These notes included my perceptions of the interviewees' attitudes about the topic from their expressions. I limited note taking during the interview so that I could concentrate on details in participants' conversations.

According to Clandinin and Connelly (2000), " . . . one of the most important points for us to make is to note how easily, in our experience, it is to forget or ignore the

existence and relevance of documents" (p 114). Therefore, prior to entering the site for observations and interviews, I visited school websites that contained online newsletters and overviews of the schools – goals, objectives, staffing, , student population, etc. According to Lincoln and Guba (1985), a researcher could assemble a good deal of information about a situation by studying its documents.

Several types of documents were reviewed. School newsletters, newspaper clippings, bulletin boards, and any printed documents that relate to technology were reviewed as narrative expressions. Hodder (1998) reminds me that even though these documents are not capable of speaking directly to us, "[the] interpreter learns from the experience of material remains – the data and the interpreter bring each other into existence in dialectical fashion" (p. 127).

Information gathered from participants were maintained on diskettes and on paper, all of which are secured in a locked desk drawer when not utilized for the purpose of analysis. Data was reported that included the identities of participants. Therefore, pseudonyms were assigned as a strategy for maintaining the privacy of participants as well as the locations of their worksite.

During my break and at the end of a day's observation, I set aside time to review data, and to make clarifications and additions to my field notes, while things were still fresh in my mind. I noted patterns and themes that emerge. Field notes were dated, and written in sequence. All notes were labeled according to type (e.g., direct observation, participant observation, interview, document, and end-of-day review). All notes were typed and saved on diskettes and CDs.

Interviews were taped and written notes from the interviews were documented in my journal. I did not rely solely on my micro-cassette because my written experience is valuable. Clandinin and Connelly (2000) pinpoint problems some researchers experience in placing too much trust in their use of tapes and videos. They are insecure in relying on their notes (p. 106). In contrast, my use of tapes is a method of managing and maximizing my time. Each tape will be boxed and labeled with the date, time, location, and a brief description (e.g., Dec. 1, 2004 - 9:30 a.m. – Capricorn 7 - Interview with Tim Jackson).

Seidman (1998) reminded me of the costly nature of hiring a transcriber. However, Seidman (1998) notes, "Interviewers who transcribe their own tapes come to know their interviews better, but the work is so demanding that they can easily tire and lose enthusiasm for interviewing as a research process" (p. 98). I weighed my options and I chose to hire someone because transcribing the interviews myself would be too time-consuming. Doing so was advantageous. As the transcriber completed a tape, he e-mailed the transcript and I studied it for details. I must note here that all tapes were copied before sending them to the transcriber in order to protect the content from loss in the mail.

Data Analysis

Data collection and analysis occur simultaneously and constantly. As I reviewed my notes from story maps, observations, documents, and interviews, I reflected and compared previous events, ideas, statements, and assumptions. Although I carefully constructed specific research questions to answer from this experience, my findings uncovered relevant information to support this study's potential to impact education reform's inclusion of science and technology as transforming and productive.

I was aware that a researcher accumulates massive amounts of information to be analyzed. Therefore, preparing field notes, transcripts of interviews, and documents obtained from the school sites into a format that facilitates analysis was crucial. Audio-taped interviews, handwritten notes, story maps, and field notes were typed and saved on disks. Transcribing could be a tedious act; therefore, I hired an experienced transcriber. Copies of taped interviews are much more detailed than my reflections.

Hard copies of data pages were made from the disks. Because data come from various sources, it was necessary to determine an easy way of identifying the sources. My personal notes were photocopied on white paper, while each set of interview transcripts were photocopied on six different colors that represent each participant. In the upper right hand corner of the first page of each transcript, I noted the pseudonym given the interviewee and the school, followed by initials of both. For example, V/A would identify the transcript as an interview with Vicki from Andromeda B.

My personal notes were coded according to setting. For example, in the upper right hand corner, I identified the setting from which the notes were gathered, such as Personal Notes/Capricorn. I was aware that coding could be tedious; therefore, I coded the hard and soft copies as I receive them from the transcriber but I also coded notes as they were generated in my journal.

Because of my familiarity with the computer, I chose to use it for the purpose of assisting me in sorting and categorizing data. In addition, I consider it an effective source in managing and pulling up data that consist of details that are more than I can keep in my mind at any one time. Even isolating various themes was facilitated.

It was necessary to review data before identifying units of meaning and categorizing information. I preferred to read the soft copies; therefore, I started with the soft copies of my field notes. I reflected on those notes and injected my reflections within those pages using the editing tools (red) of my word processing software. After reviewing all field notes, I followed the same process for story maps and interviews. Within the interviews, additional information related to the story maps may be obtained.

As I read each participant's story, I looked for the ways that they have made meaning of their lived educational experiences, with a focus on technology in education. As a language arts teacher, I have always taught the importance of creating a story map. In analyzing the story map (Appendix A), I gained insight about each participant's past and present lived experiences, and their ideas for the future. Pinar (2004) speaks to our need to revisit the past in order to understand our present circumstances (p. 2). This is my justification for using a story map with *past*, *present*, and *future* as labels. On this map, the world of the participants consisted of the following codes: *self*, *formal schooling*, *family*, *business/community*, and *work environment*. The story maps also contained categories of experience, influence, and expectation.

In order to determine meaning from the data collected, it was necessary to reread and break the data into parts. Lincoln and Guba (1985) refer to this process as *unitizing*. "These units [single sentences or paragraphs] are best understood as single pieces of information that stand by themselves, that is, that are interpretable in the absence of any additional information" (p. 203). Within the interviews, these units were responses to my questions and additional information participants provided.

These units were cut and paste into the second column of a new computerized document and the source information (i. e., participant's name, location, and notes/observation) were noted in red. When those units were derived from notes, I also identified the location from which I took the notes. The first column includes a one-word descriptive code of what the unit is about. I am aware that because of the open-ended nature of my designed interview questions, precoding these questions facilitated the preparation of data. These codes included: beneficiaries; involvement; access;; instructional change; inequities; extensions; sci-fi and exploration. Precoding did not determine all themes that emerged but my data collection process is designed to answer my research questions, within which are themes of this study. Again, however, I was aware that new themes would arise. Those included: high-stakes testing; job security; and training.

Once the units were all included in the tabled document, I used the software to sort the data by codes listed. Then, each set of related data was separated by pages and photocopied. I studied these pages to determine the patterns and themes, to note any inconsistencies, and to identify any surprising circumstances that appeared as I compared and contrasted data from each source.

There were similarities within the coded units, which lead me to define the following categories: (1) Information Technology (access, technical support, exploration, interaction); (2) Computers (access, beneficiaries, upgrades, interaction, instructional changes, acceptance/resistance, accountability); (3) Social Issues (job security, techno/human experiences, inequities, responsibilities); (4) Planning, Support, and Training (teacher involvement, school technology goals, financial and technical support);

and (5) Sci-fi (metaphorical and analytical, future reality, entertaining, broadens the imagination). *Categorizing* is the process of attributing descriptive labels to groups of units that share similarities (Lincoln & Guba, 1985, p. 203). These categories reflect the nature of my research. After studying the data, I began the process of writing the information in a narrative format, which is presented in Chapter 4.

Because I chose to include a chapter in which I will merge the experiences of the participants with those of a science fiction film, it was necessary for me to revisit the data from a different direction. I designed a literary graphic organizer that contains a character analysis, setting description, conflicts encountered, and resolutions for each participant, which will also include quotations. Then, I studied each organizer for the purpose of identifying similarities between these expositions and those of the science fiction film "Robots" (2005).

I included details from my analysis in Chapter 5, which presents my findings in a different, yet, metaphorical and analogous form in which participants' experiences are viewed through the parallel world of the robots. Chapter 6 discusses the themes that arose while linking these themes to theory as well as my interpretations. Finally, Chapter 7 addresses answers to the research questions and concludes with a discussion of recommendations.

Narrative Analysis

One teaching objective of using narratives is to gain insight into human behavior. This same objective is found in the use of narratives in critical research. I chose to use narrative analysis as a way to make sense of the challenges in technology integration in education through the experiences of educators. In fact, participants were provided a

space to reflect on their past and examine their present situations so that the readers would be motivated to critique their social and political relations regarding technology adoption efforts in education.

All of us engage in storytelling regardless of age, gender, or economic status. According to Geertz (2000), telling stories to one another and about one another is not only natural but also it is the earliest method of organizing and relating our thoughts (p. 193). As storytellers, these participants described their experiences with technology and they also interpreted reasons for acceptance and resistance to the integration of technology in education. It was my job to interpret the stories they told (Riessman, 1993). These stories and my interpretations are subject to be interpreted by the reader (Riessman, 1993).

My experiences and conversations with each participant formed the plot of the stories and I positioned myself as an active participant. Because each participant had unique experiences and ideas to share, each participant's story was presented individually in Chapter 4. "Polkinghorne (1988) reminds us that "whatever else the story is about, it is also a form of self-presentation in which the teller is claiming a particular kind of self-identity" (p. 164).

I began by describing the settings and providing background information on the characters. In addition, the content of the interviews contained the literary elements of flashback and foreshadowing as well as the rhetorical trope, the metaphor. As a narrative analyst, I have presented my interpretation of storied experiences that participants have shared. "The goal of analysis is to uncover the common themes or plots in the data" (Polkinghorne, 1988, p. 177). In addition, participants were encouraged to locate these

common themes within a dissimilar world of science fiction.

A Rationale for a Narrative Approach

As a language arts teacher, I encourage students to examine their own lives through literature, and to find value in writing and sharing their autobiographies. Their lived experiences are descriptive of inner-city youth who face the challenges typical of the oppressed. When I was introduced to narrative inquiry, through the works of Bruner, Clandinin, Connelly, Denzin, and Lincoln, I was amazed to find that the qualitative research community embraced the sharing of stories as a research method. This is exactly what I do as a classroom teacher. Students share their stories and I open up the pages of my own stories. We read and discuss narratives in the spotlight of our own experiences, while engaging in a reciprocal relationship that builds ethics of trust, respect, responsibility, and caring.

Unfortunately, teachers are seldom afforded opportunities to build such relationships amongst themselves, and to share experiences related to accountability within education's technology reform. In fact, teachers often perceive administrators as distanced from their concerns. In education reform, the voices of teachers, administrators, and support staff are not often heard beyond the walls of their classrooms and offices. In fact, some remain silent about their concerns because of the fear of what may accompany becoming confrontational. I have become more aware that site administrators share the same concerns regarding reform efforts. Actually, within all educators lie solutions to the problems they experience each day.

With those thoughts in mind, I began to consider the possibility of providing teachers and administrators with opportunities to share their experiences in a storied

fashion. In sharing these experiences, participants in the research are exposed to new perspectives from which they can draw more options, while readers are equally provided opportunities to connect their own life experiences to those of other educators. This is in accordance with Lincoln and Guba's (1985) contention that "the inquirer and the 'object' of inquiry interact to influence one another . . ." (p. 37).

Through narratives, humans have always made sense of their world. In their research of Africa, archaeologists have turned to griots to unlock mysteries of the continent. Griots, the storytellers and historians of African villages, are known to memorize stories, the history of their tribes, genealogy, and law that date back centuries. Alex Haley connected his African American family's narratives to the village of Juffure upon listening to the same centuries old stories told by Juffure's griot. Haley's experience and those of countless others support the narrative research argument that our own experiences and those of others become meaningful when they are expressed in terms of narratives or stories (Bruner, 1986; Clandinin and Connelly, 2000; Denzin & Lincoln, 2003).

Bruner (1986) identifies narrative as a method of making meaning of the world. Through narrative, we attempt to make connections between events that are best understood within their context. According to Bruner (1986), an interest in narrative began during the 1970s, a time when the social sciences "moved away from their traditional positivist stance [objectivity] towards a more interpretive posture [subjectivity]" (p. 8). This move towards a narrative discourse brought about a distinction between two landscapes. According to Bruner 1986),

> One is the landscape of action, where the constituents are the arguments of action: agent, intention or goal, situation, instrument, something corresponding to a

> ‘story grammar.’ The other landscape is the landscape of consciousness: what those involved in the action know, think, or feel, or do not know, think, or feel. (p. 14)

Bruner (1986) identifies the landscape of action as the plot of a narrative that is not devoid of the landscape of consciousness. The landscape of consciousness refers to our perceptions, goals, aims, and emotions. In teaching narratives, I have found that the most intriguing are those written from an omniscient viewpoint, in which the writer gives thoughts, emotions, and attitudes to characters rather than merely noting their actions. Readers are stimulated to interpret these stories. The conflicts or issues experienced by characters are interpreted in terms of the readers' life experiences. Bruner (1986) says, "Characters in story are said to be compelling by virtue of our capacity for 'identification' or because, in their ensemble, they represent the cast of characters that we, the readers, carry unconsciously within us" (p. 4).

Because our perceptions and experiences vary, our interpretations of a narrative, or a good story, also vary. Bruner (1986) contends that a good story has a subjective mood, which creates the element of possibility. This element invites the reader to become a part of the construction of meaning; and subjectivity is what draws the interest of readers to a good story.

Bruner (1986) recognizes that the power of narratives is found in their ability to arrive at verisimilitude. “[Narrative] creates verisimilitude, or what are for the reader believable experiences” (Denzin, 1989, p. 23). According to Denzin and Lincoln (2003), researchers who function from a critical theory, postmodern, poststructuralist, or constructivist school of thought "seek alternative methods for evaluating their work,

including verisimilitude, emotionality, personal responsibility, an ethic of caring, political praxis, multivoiced texts, and dialogues with subjects" (p. 15).

These ideas drew me towards a narrative approach. A person's explanation of their thoughts and actions are derived from their experiences; but the listeners and the readers' minds are opened to a new awareness. In other words, by speaking, listening, and reading we gain new experiences and we begin to define or redefine our realities. According to Bruner (1986), we achieve meaning by sharing (p. 122). This situation of sharing is an example of how connected we are to the lives of others in such a way that our personal responsibilities to one another ought to be apparent and engaging.

Literature teachers have never underestimated the power of storytelling. However, from my experiences as a teacher, literature takes a back seat to subjects considered more intense, especially science. But we cannot connect with science on the same level as we can narratives. "It seems reasonable to consider narrative as a thread that binds our memories, ourselves, our social partners, and our culture together, and to explore the ways in which it does so" (Nelson, 2003, p. 20).

Inclusive of educational experiences, our experiences as humans are bundles of events and emotions. Literature teachers engage students in critically reading narratives, not merely to recognize literary elements, but to gain insight into human behavior. As a result, we often begin to perceive situations and people differently. According to Guba (1990), “A critical reading suggests another way, another logic for the tale, for the character, for the plot, for the denouement” (p. 338).

"People are individuals and need to be understood as such, but they cannot be understood only as individuals. They are always in relation, always in a social context"

(Clandinin & Connelly, 2000, p. 2). I am aware that each individual has stories to tell of lived experiences. In fact, we often exchange roles, fluctuating between being the main character in our own to that of a supporting character in the stories of others. As the plot develops, images and perceptions unfold. In fact, we move through a series of spaces that introduce new people and that stimulate the recreation of new selves, with no destination being final.

Once or twice each week
a gathering of Earthseed
is a good and necessary thing
it vents emotion, then quiets the mind,
it focuses attention, strengthens purpose, and unifies people.
- Octavia Butler (1993)

CHAPTER 4

VISITING FAMILIAR WORLDS

Throughout history the search for faith has led men to look to the stars for answers. But only by looking into ourselves may we find it.
- The Control Voice ("The Outer Limits," 1995)

Rather than contracting corporations in the business of diagnosing our ills, the field of education only has to look within the schools for answers to the reasons for our challenges in the integration of technology. In addition, I am concerned that we are mis-educating our youth when we fail to teach social responsibility. I work within that world and my question has always remained: Why not listen to those who dependably work within those worlds in spite of the challenges they face?

I do not believe that anyone can give another a voice. But we can create an atmosphere where those voices that tend to remain silent or those that are heard within the limited spaces within their schools can be echoed throughout our worlds of education. It is the purpose of this study to provide that atmosphere for participants who inhabit these worlds of education.

The six participants in this study work within small non-traditional schools with a student population fluctuating between 60 and 100 students. The instructional staffs of many non-traditional schools that follow the small school concept are comprised of a maximum of seven teachers and two paraprofessionals. There is usually only one teacher per discipline. The support staff of each school consists of a principal/director, a secretary, counselor, and an administrative assistant. The identities of these schools are

described in Chapter 3. Schools have stories and they are reflected in the following stories told by their inhabitants and observed during my visits.

Klaatu: Pauline and Carolyn

I arrived at Klaatu at 9:00 a.m. Klaatu is a high-tech high school in a historic area of the city. As I entered the building, a student greeted me and directed me to the main office. Classes had begun and the social service worker explained the difficulty visitors have in finding Klaatu. This school is not the usual physical structure we imagine for a school. It is located in a renovated restaurant hidden between a massive church building and a retail store. The interior is similar to that of an office complex with few impressions of a school until one looks within the six classrooms filled with students.

It was not difficult to find Pauline's class because it is the only science class in the building and she was waiting outside her room. She led me to the dual-purpose room that is used for activities and lunch. As I found a comfortable space, the school director approached and offered any help he could give. In addition, he apologized for not having the time available to participate in the study and he hurriedly left to greet a parent seeking to enroll her son.

A buzzer sounds for the changing of classes. It was at that moment that Carolyn approaches and introduces herself. I spoke with Carolyn the night before and she was eager to start the interview on the phone. Carolyn appears to be the grandmother figure for students for they greet her with hugs as they move to their classes.

Carolyn begins to set up the room for a project-based science activity that would involve all students. She gathers some students to help with tables and chairs. I thought that this has to be a tremendous undertaking for one science teacher but Carolyn

explained that most of the teachers would assist. At that moment, four visitors approached me and introduced themselves as teachers from a local university, who were there to facilitate the rocket-building project. Carolyn ushers them to Pauline's room and then continues coordinating the setup for the project.

As the buzzer sounds, students enter the activity room and find seats at the tables. Many appear enthusiastic, while a few seem resistant and are ordered to find seats. However, as the project begins, the visiting professors took the lead in providing instruction and assistance. As soon as students are aware that they will be building rockets that will be launched in the vacant space in front of the building, students became more enthusiastic. Pauline asked me to participate as a facilitator, which I welcomed. The launching took place at the end of the session, which lasted four hours. I must say that these students not only built workable rockets but they were very creative in the decorating of their products. The lunch break was late that day due to the extended day for this project-based learning session.

Before returning to her class, Pauline allowed me to read the manual for this program. It opens with the purpose: "To enable students, whose academic success may be threatened, to become successful students who are prepared to move to the next level educationally, vocationally and as citizens of [the state]." The content of this manual also describes the importance of project-based learning, dual enrollment, and service learning. Because of non-instructional issues faced by these students, this program provides a coordinator to link students and their families to community resources. Although I was not allowed to remove the manual from the premises, Pauline suggested that I could continue to read it in her classroom.

I was amazed that the day was ending when the buzzer sounded. The students merged in the activity room for dismissal. The majority left at 3:15 but many stayed to work extra hours on course content on computers. Carolyn explains that their school day varies from one day to another because of the numerous community organizations that meet with small groups of students during the week. This is typical of a small school with a flexible schedule.

Prior to leaving Klaatu, I confirmed the time for the interviews with Carolyn and Pauline. Pauline was busy tutoring a group of students for a major science test mandated by the state. I reminded her of the optional activity (sci-fi analysis) for this study and she elected to participate. However, time would be a major factor. I suggested that I would make any adjustments to meet her schedule. Carolyn was still interested in interviewing but she did not want to participate in the optional activity.

Pauline – Science Teacher

As you enter Pauline's class, it is obvious that she is a science teacher. Her walls are adored with beautifully framed pictures of the animal kingdom, while each student's workstation holds some scientific artifact, such as replicas of human skulls and flasks. A small dry-erase board has replaced the traditional chalkboard. An overhead projector sits towards the middle of the room, signifying its relevance in her delivery of instruction. The sixteen computer stations that occupy the majority of space available in the classroom have replaced the traditional student desks and tables but various types of science textbooks are scattered among the stations.

Pauline is a veteran science teacher who teaches all high school science courses and several electives. In fact, she is the only science teacher in this program and she has an average class load of 16. She describes her responsibilities at her worksite.

> As science instructor my responsibilities involves covering a number of content areas in science, in those areas of Biology 1, Biology 2, anatomy, physiology, environmental science, chemistry, physical science; and I am also responsible for a number of electives such as health, PE, recreational games, personal fitness.

All of these areas are included in the electronic curriculum selected for her worksite. She also works in university-designed summer and weekend programs for high school students. Technology is an important part of these programs, according to Pauline. She states that she spends from 60 to 70 percent of her time on the computer.

Pauline did not always see technology as the fastest way to research information. In fact, on her story map she writes, "I did not view myself [in the past] as a fan of technology." Her high school experiences with technology were limited to typewriters and the old film projectors. As a college student, she recalls the emergence of computers but they were not a part of the classroom environment. These past experiences influenced her preparation for the teaching field. Pauline critiques herself as a new teacher entering the classroom for the first time. She reflects and writes, "I was a textbook, overhead, film projector teacher."

In contrast to Pauline's initial involvement with new technology, her son always took interest in computers. She believes that he had a natural curiosity for technology, which stimulated other members of her family to take notice of computers. Her granddaughter loves the computer. On the other hand, she says that her husband is still learning the basics.

Pauline began teaching at her present site during the late Seventies. Therefore, she was a part of the various changes that the school has experienced. However, her input was not sought when plans were made for this new technology oriented environment. She says, "We were not involved in those [pre-planning and planning] sessions. No. We were not involved in those." She states that the staff members were brought in after the plans were made. "We were brought in to basically be introduced to the program, to be introduced to [the electronic software], and how we would be using it with the students."

I mentioned to Pauline that many teachers may feel that their input is not valued in the pre-planning stages of any phase of their programs. She firmly responded that teacher input is valuable. Relating as both teacher and parent, she says,

> But it is. It's most important . . . I relate it to being a parent. Who knows my child better than me? Who knows better what I need from my kids or for my kids. Therefore, I should be involved in pre-planning. I know their needs, so I should be involved.

Her school's designers include service learning, project-based learning, and dual enrollment as components to the program. "[These components] were just introduced to us and we were told what the expectations were and our role as teachers as to how to implement it with the students. We were not involved in planning per se," states Pauline.

Pauline and her colleagues are beholding to two entities, the local school district and the non-profit dropout prevention initiative that serve as partners in this venture. Neither entity has clearly stated and presented its technology goals for this school. Expectations for the use of the electronic curriculum have been stated, according to Pauline. However, it is difficult to determine whether or not you are successful in meeting any goals when you are not clear about them. "You're just playing it by ear.

You're hoping that you are and possibly expecting that you're not," states Pauline with a tone of even more uncertainty.

She ponders over this situation and she openly questions whether technology is really a major focus of top administrative persons. This response stunned me because of the technological nature of this program. I questioned whether she really felt this way "even with this being a high tech situation." "Even so and I say that because everything is so test oriented now," says Pauline. She notes that it is her belief that administration looks at the computer as "a tool or a strategy" to merely improve test scores.

Pauline would like to see top administration support the program financially, so that software is updated. In fact she mentioned that even such basic needs as a cord are not met. She notes,

> We can't get support. We can't get the funds. Even if, you know, they would just come around sometimes and just see what we need. Funding, that's the biggie. Placing the money there for the things that we need from the technology perspective.

Pauline contends that school districts should have a goal of providing disadvantaged students with computers in their homes. "Students who have good attendance, good grades, I would maybe suggest that those students be given or assigned a computer to take home with them and they would have to sign a contract," she says. Upon graduating from high school, the students would verify that they maintained possession of that computer. Pauline contends that this is in keeping with system requirements regarding such items as band uniforms and books. She maintains, "There are so many [funding sources] out there who are more than willing to just give these kids a computer. It's a tax write off for them."

In discussing the reason why disadvantaged kids are not a priority when it comes to computer access, Pauline says, “Again, it goes back to the top. The administration has not seen the need or had the desire to want to go out and close that digital divide that we have, especially among the poor and economically disadvantaged kids.” “Technology is here to stay,” says Pauline. She believes that it would be advantageous for the business community to partner with education by funding programs that will provide computers in the homes and schools, so that all students will have access to technology.

She identifies some counties in the state that received media exposure when electing to provide all students and teachers with laptops. Teachers were given laptops in one county identified. In one of the many seminars Pauline attends, a colleague told the group that he had received his laptop but problems have surfaced regarding student issued laptops. Accountability would be the issue. Pauline states that there were not guidelines in place for what would happen if students sold the computers or would dropout of school. Therefore, the plan was nixed.

I asked Pauline to elaborate on her concerns regarding administrative responses to the needs of teachers. Pauline says,

> When you collaborate with other teachers . . . you hear teachers talking about the one or two computers they have in the classroom are always down or when the computer breaks down it’s hard to get someone in to fix it. And you don’t have enough for the students per class, so it creates a problem and many times rather than deal with the problem they just don’t use the computers at all.

Reflecting also on her experiences in more traditional educational settings, Pauline believes that one “cure all” would be to make enough computers available in all classrooms. She adds, “I am aware that there are computer labs in each school.” The problem there involves the issue of scheduling the students. “So its not like you can go in

possibly even once per week," she states. Metaphorically, this situation was comparable to a field trip, and Pauline agreed. "Exactly," she says. She notes that her colleagues in traditional high schools have discussed the bias associated with using those labs. "If you are not their favorite person [of the lab managers] they hassle your kids to death when you bring them to the lab." Pauline considers this a major deterrent to using the schools' computer labs.

In her present situation, the number of computers available to students and technical support are not major issues. "Technical support here is good. It could be better because we are on their list to rotate as a rotational school and sometimes we are the last on the list, which is usually the case." I was in her room during the period of the year when teachers are expected to enter grades on the computer for the local school district reports. However, she notes that the teaching staff is the last to receive training. I have also observed here that all teacher administrative computers do not have access to the software program needed to complete the reporting of their grades.

As a teacher in this environment, she uses computers everyday. Since she has had computers in the classroom, Pauline's instructional decisions have changed to include the planning of research activities that also involve the students in designing PowerPoint presentations. She borrows the laptops from the vocational department, which is the process for all teachers at her worksite.

Pauline says, "It has changed my past teaching style. Because I used to be teacher centered but now with the computer, with technology, it is student-centered and student focused." Pauline has up to seven different courses per class period. She challenges those

who view teachers in high tech classroom environments as having less work to do because of the electronic curriculum. She says,

> It is more challenging because I have many more science as well as elective areas to cover. You have students who have needs and questions to be addressed in seven content areas . . . It is much more challenging rather than teaching from a book [where] everybody is on the same page, everybody is moving at the same pace. Whereas on the computer, kids are moving at their own pace; therefore, they are covering different concepts.

Pauline contends that a technology-oriented classroom, with as electronic curriculum, is more challenging. She describes it as being "pulled in all these different directions." She is quick to relate the local school district and state mandates for testing. "Students who have passed the test, their needs still have to be addressed and met," she says. With a tone of frustration, Pauline notes that all students in her class have so many different needs, based upon course assignments and test requirements. This makes this environment much more challenging for a teacher.

Although she believes that children are natural users of technology, she does not believe that an electronic curriculum in education is for all students. She considers various learning styles and relegates the computer to a visual method of learning. She says, "Some students are not visual learners." Pauline says,

> I feel that basically when it comes to kids and the computers verses adults it's just something [kids] catch on to naturally…now its not a one size fits all solution because all kids, though very few in number, but all of them will not grasp or comprehend . . . certain concepts.

Pauline continues by critiquing her electronic science curriculum. "Many times they assume that kids in science have prior knowledge. They don't start from the basics, so many times I have to go back to the textbook, start with the basics, then place them back on the computer." This has presented a challenge for her in utilizing the science

courseware. I could visualize how this would tend to pull a teacher in different directions in classrooms where the scheduling fails to take this challenge into consideration. Pauline uses computers on a daily basis. She adds,

> And since we have laptops, and I do thank the administration for those, . . . the kids have been able to do more research; they've been able to do a lot more video streaming, especially students who have passed all major parts of the test . . . I can assign them additional things to do…been able to do more PowerPoint and research papers.

Another challenge for her involves access to the Internet. Pauline is limited to only two laptops with Internet access for student use. Therefore, only two students are able to use them at a time. As a result, she feels that one "terrible" drawback to this program is the difficulty in accessing the Internet. There are no Internet connections on the seventeen computers in her classroom. Pauline has two computers for her own use. Only one has Internet access, which is provided by the local school district for administrative purposes only. "If we had the Internet on their personal computers at their desks, that would be so helpful."

Pauline's worksite has a project-based learning component. During the week of this interview, the liaison between the school and the non-profit partner in this initiative expressed concern, at the staff meeting, for the implementation of senior projects and research papers of which Pauline is actively involved as a coordinator. Teachers' concerns centered on a lack of supplies and the stress associated with teacher accountability for test scores. The liaison had been working with the staff for two years but was surprised to find out that none of the students' desktop computers in the classrooms had ever been wired to access the Internet. This has made it very difficult for

all seniors to conduct research. Nevertheless, Pauline attempts to engage all students in project design and research, which is a heavy burden for one science teacher.

We talked about designing projects and their purpose. Too often, projects become debris for school trashcans. In order to make projects more relative to social issues that affect students, Pauline suggested using the Internet to allow students to explore the roles of family members throughout the world. Pauline believes that we should design projects based upon the gifts and interests of students "and tie in values with that."

Pauline uses her neighbor's son as an example of just early in years when a child becomes focused on technology.

> He loves computers. She says that all he wants to do is work on computers. He is very smart in school . . . He told [his mother] when he was three years old he wants to design software for the computer. So maybe I would say 'Design some software that would improve the lives of the doctors in the hospital.

She adds that this could be used to teach the value of caring for the body so that you can extend one's life.

Pauline considers projects for students as being an effective way of teaching students how technology can be a problem-solving and socially transforming experience. I mentioned the effects of hurricane Katrina and that most people are not aware that a misuse of technology is the root of such problems in the environment and such problems change our very lives. "The students could research . . . the effects of global warming on the ozone layer, outsourcing and its impact on Americans," Pauline states. She urges us to tie in such research to our value system and analyze how our value system is being affected by these choices. She adds, "People have always had that dream – you get your home, you get a good job, and you're set for life. But in our today's society, *it ain't necessarily so*." The choices we make affect every aspect of our lives.

I was interested in her viewpoint about the dependency of science on technology for its existence and I encouraged her to consider the meaning of technoscience. Her response was, “I think about when I first learned about the caveman using tools. That’s technology. I mean when you think about our forefathers and our ancestors studying the stars. Technology.” Without technology, Pauline says, “Life would be non-existent.” She adds that if we resorted to old technology alone, life would move at a much slower pace. She laughed at the thought of returning to manual typewriters but she added that technology advances so rapidly that new technology becomes out-dated in a matter of a couple of years.

Technology is such a socially transforming experience. There is a vast amount of knowledge that students can just “click” and pull up, which would otherwise take him many hours to obtain from a book, Pauline notes. Studying cultures and lifestyles of others throughout the world is her example of the socially transforming effects of technology.

Teleconferencing is an important technology that opens up the world to students, according to Pauline. Through teleconferencing, students can talk with other students from around the world and learn so much about the world. “And they would never have this opportunity [because] many of them would never travel outside their little melting pot community, so [technology] has its advantages,” says Pauline. “We use to tell them that a book opens up your world but now [with] the computer not only can they read it but they can see it,” she adds.

She maintains that the community will benefit as students become technologically literate. She believes that teaching students now will set the stage for businesses and

universities welcoming students who are skilled in using technology, rather than spending time, energy, and resources to train them later. Pauline believes that software vendors are the first to benefit from technology in education, especially in the promotion of the small school concept. “They’re the first ones to benefit because they’re making the money,” states Pauline in a tone of assurance. She also identifies the disadvantaged students, who do not have access to computers in their homes, as beneficiaries of technology in education. “Otherwise, they would not get the exposure to it,” she adds.

Pauline states that one view of technology integration is that it takes away from that personal touch but you will always have to have someone to serve as a facilitator. “Students still need to be guided. They still need to be directed. There are questions that still have to be addressed. There are concepts that you will always have to explain.”

Pauline also addresses the issue of isolation among students in high tech classrooms. She describes how she groups her students according to content and she suggests that a creative teacher would see the benefit of such grouping. Pauline supports the concept of peer teaching and she finds this environment welcoming of an each one, teach one approach. I have observed this approach in operation in her classroom. In contrast to her more traditional educational experiences, she says, “In fact there is more collaboration.”

Pauline views technology as a very important part of her total experiences. “Everything is technology drive,” she responds. “It is a part of our fiber.” She says that we will either beat technology or join it. “We won’t be able to beat it because it is here to stay,” says Pauline. However, she notes that technology has both a good and a bad side. She highlights some of the darker areas. “I think about those persons who surf the web

for porno, child pornographers. Many of them end up kidnapping these kids and doing dangerous things to them." In such cases, she believes that we must teach our students values so that they will avoid these situations.

I wanted her input by critiquing science fiction as a genre that stimulates the imagination. Therefore, I explained that she would be given the name of a science fiction character for this study. "You might be Princess Leia," I explained. She laughs and explains her view of science fiction. "Well its another avenue by which kids . . . can explore, expand their horizon. So it's another strategy that [can be] used to expand a child's creativity."

However, the misuse of technology is "a dreary picture," states Pauline. "I think about the amount of sex and the solicitation of drugs that they can pull up on the web," she adds. However, in describing the worst-case scenario of misused technology, Pauline contemplates a world in which everyone is killed as a result of atomic bombs and nuclear radiation. Everything is destroyed, even the food chain. " I think that would be my worst-case scenario because that is also something that could actually happen as well," she says with a voice of concern.

Pauline's best-case scenario of the effects of technology when created and used in the interest of human beings and the environment is "finding out that there are creatures on other planets but friendly ones." She relates the theory that "we got technology from creatures from other planets." Pauline says that it would be great to find out that this was true and that their gift of technology was "just the tip of the iceberg." They would return to Earth with "a cure for all diseases, especially all cancers." I asked, "How real could that be?" Pauline responds, "Anything is possible. Anything is possible." Recalling

episodes of "Lost in Space," with its many gadgets that are now useful technology, Pauline states that sci-fi is "very real."

Pauline agreed to draw similarities between her personal and professional experiences and the characters and events in a sci-fi film. She chose "Blade Runner," the 1982 film based on the novel *Do Androids Dream of Electric Sheep?* by Philip K. Dick (1968). Pauline is a devote Christian and, therefore, it is not surprising to find that she would first address the theme of religion "Blade Runner" and its allusion to biblical scripture. She says,

> Religion is presented in the film where we see Tyrell as Roy's god or creator. Tyrell tells Roy "you are a prodigal son," who returns to a father who does not welcome him as his flesh and blood but as something less than human. Roy kills his creator.

Although the struggle for control exists within and outside the walls of formal education, Pauline does not view herself as characteristic of the Tyrells of education. She notes,

> I try not to make my students feel inferior or lesser than a person. I stress that as an individual everyone is important and everyone has the God-given capacity to learn, some of us differently and at different times; but every student can. I viewed Tyrell and other humans like the children of Israel, who turned from the true and living God to do their own thing. They became god in their own eyes and as a result, the consequences were suffering and death.

Within "Blade Runner" (1982), there are moral implications regarding genetic engineering and its suggestion that a human being with superior intellect and power can possess god-like qualities. Pauline examines her views and she draws analogous relationships between the technology of genetic engineering and education:

> I would compare genetic engineering and the replicants to education - symbolizing teachers and students in education being used as political pawns by some administrators and other leaders in order to achieve their own personal

> agendas .The moral issues come into play when those who rule over you do not really have your best interest at heart.

She continues by expressing concern for the treatment and rights of children.

> Like the theme in Blade Runner, one has to question man's right to create humans without bestowing upon them the rights afforded to real humans. Leaders in education play a large degree over the future of a child. If that child is made to feel inferior and has no voice he can be made to feel less than human. Another moral issue, the replicants are viewed as the villains who must be destroyed. Society only viewed them as useful when the replicants were achieving their superiors' agendas. The moment they decided to take a stand with a voice, the superiors decided they had to be destroyed. As humans we treat one another likewise. Many times leaders or bosses view the workers as slaves, a commodity whose service is useful only for a few years. Then the workers are tossed to the curve, wounded mentally, financially, and many times spiritually.

> In "Blade Runner" (1982), control is manifested through repetition and the

probing lights. These are quite symbolic. According to Pauline,

> One symbol that stands out is the voice in the background of the movie repeating "a golden opportunity awaits you" and the probing lights are constantly flashing. These symbols can be compared in our schools to a form of brainwashing or control over students. Students hear voices everyday at school and nightly it is flashed across the news screen. It tells them with an education you can accomplish anything. When in reality, education as viewed by many is intended for a few to succeed and many to fail. Case in point: Jails are built based on the number of black males who fail the standardized tests.

She adds,

> The lights also depict subliminal messages. The stimulus from the images portrayed on TV, movies, DVD's, computers and other forms of technology can also send messages to be used as a means of control and dominance by those who are in control. A student can leave feeling inferior or good about himself or herself.

Pauline returns to her thoughts on technology and brainwashing in "Blade Runner"

(1982).

> Technology in "Blade Runner" developed to the degree that genetic engineers had the ability to create artificial beings. Outwardly, there was little difference in humans from replicants. but inwardly memory implants or as it relates to human beings brainwashed. Attempts are always being made to program our thinking in

> education daily. We are given mandates on how to teach and test children, who we should teach and test. We are even brainwashed into thinking that the playing field is level for all children educationally. When in reality, students and teachers are used as legal means to achieve illegal gains by the powers that be. We are programmed into thinking "It's all about the children." It is really all about making your superior look good.

"Blade Runner" (1982) also depicts the oppressive nature of corporate power to insist on the programming of others. Pauline notes,

> We see corporate power working in both Blade Runner and our schools in their treatment of replicants, teachers, and students as inferior workers, with no or very little rights [and] in need of a god or a creator. Like Nexus and Corporate America people are not always given a voice and in many cases so many leaders do not recognize the workers as human beings but something lesser than human to be tossed aside if you get on their bad side. We see our schools in the present era being run by corporate America. A worker's longevity in corporate America now is short-lived like the replicants, which were manufactured for only four years.
>
> Many in Blade Runner become so oppressed that they leave for off-world spaces

Pauline describes events in education that are similar to what these people are doing.

> Discipline and testing of students are two events in education causing teachers to become so depressed that they are leaving education in massive numbers. Teachers feel oppressed due to the lack of support by leaders at the top, administrators and parents. Most do not have a voice, a listening ear or the necessary resources. If a child is disruptive or can't learn the finger is always pointed at the teacher. Moral issues arising from society's treatment of humans in Blade Runner are the same issues arising in the educational arena. Roy Batty pleas to his superior for more life while teachers' plea for more support and resources but to no avail [and] they leave the system. I am amazed that more teachers do not react like Roy and turn on their superiors.

Pauline concludes with the same spiritual tone with which she began.

> I relate to Harrison Ford [Deckard] in the movie. Society created a replicant, Harrison Ford [Deckard], then uses him to destroy co-replicants. I feel that as teachers we are controlled by an educational system that rewards many teachers who are passive but destroys or gets rid of those who are aggressive, speak out or take a stand [against] the injustices and inequalities in education. I can relate to Rick Deckard that in the end of the story he did not follow orders and kill Rachael, a fellow replicant. I may not always agree with co-workers at all times but have learned that revenge, backbiting and reporting to the boss is not the answer.

Pauline advises us to consider providing love and patience to those with whom we differ.

Carolyn - Paraprofessional

Carolyn has worked as a paraprofessional since 1979. Her first position was at a traditional high school that is now home to a modernized middle school. Carolyn chose to accept a position at her present worksite twenty years ago when the school was selected to include Title One Reading and Math.

She also works at the neighborhood art center, which she states does not have technology-oriented programs for participants. This center is located in a low to middle class neighborhood. Carolyn states that attempts were made to incorporate a computer program at the center but nothing ever materialized. “I know one time they tried to get it set up but there is only two main computers, one in each of the two offices,” she notes.

Carolyn does not consider herself a novice or an expert in using computers. She has taken several staff development courses provided by the local school district. She is one of the few paraprofessionals that has exceeded the system’s technology requirements. Therefore, she is often called upon to troubleshoot for the director and other teachers at her site.

Because of her active involvement, students often consider Carolyn a facilitator rather than a paraprofessional. Carolyn’s classroom is a small space that maintains six computer stations for students and three computers for the facilitators’ use. However, she usually works with less than five students, leaving some computers idle for the entire day. This windowless but quaint space is neatly decorated with framed pictures surrounded by colorful butterflies.

Carolyn has seen the changes that the school and staff experienced as the school evolved into a non-traditional program with an electronic curriculum. Although she perceives the program as working "beautifully," she admits that no one ever involved her in the planning process. Carolyn states that she would have wanted to have some input in the choice of software, even though she is favorable to the choice they made.

Unfortunately, Carolyn has not been informed of the technology goals for this program. She is unsure of what goals to add. She says that she is "not up on goals right now." Because she has never seen the goals, Carolyn is not sure that she is helping to meet these goals. However, she says that she has seen progress with the students. They are able to finish a course and then move right on into another course. Carolyn's school affords students opportunities to recoup lost credits by providing them an individualized program of study without the boundaries of time. They work at their own pace and many of them utilize after school hours to complete their programs of study earlier than the normal semester schedule. "They are finishing courses one by one and then going on into another course," she notes.

During the early Eighties, Carolyn worked at Robert Green High School, a large traditional public high school. At Green, the Commodore system was used. That was the age of the floppy. There was a management system based on prescription. At Green (1979-1985) the Commodores were only in the Title One programs. Other classrooms did not have computers. According to Carolyn, Green students could only use the Commodores if they were identified as needing Title One services.

The Internet was not a part of Carolyn's past experiences. In fact, in the past it was not available for me to entertain in my widest imagination. However, the Internet is

available to students at her present worksite. Within the school there are only 18 laptops with Internet access and there are 80 students. The problem Carolyn finds is that students do not have opportunities to access the Internet in her classroom. “But here in the classrooms they don’t have an opportunity to go into the Internet because the computers are not opened up to the Internet line.” They can use the Internet on the laptops that are shared among the classes.

Carolyn voiced concerns about people accessing the Internet to learn how to make bombs, etc. She found this to be quite troublesome. Her voice tone became serious and wearisome, a tone which reflected itself in her facial expressions. “I’m sure there are certain websites that they are not allowed to access,” Carolyn says.

Carolyn also spoke of a general lack of access to the computer among poorer students’ families. Carolyn identifies her class status as upper lower class to lower middle class. She stated that it was difficult for her to purchase a computer but she thought it was important for her grandsons to have one. It was a sacrifice but Carolyn bought a computer for the family. She is raising her two grandsons and it is her goal to make sure that both have their own computer. “I learn from my kids.” She says, “I learn a lot from them . . . my grandbabies were raised on that computer.”

Carolyn is actively involved in her grandsons’ schools. In their middle school, there were three computers in the classroom that were used for various reasons. Some corporate benefactor was supposed to give all students a computer but that fell through. I would like to note that this middle school has a predominantly African American middle class population. This reminds me of Pauline’s story of failed attempts to provide computers in the homes of underserved students as well.

Carolyn speaks of the Internet as a great source for exploration. She notes that she has the Internet on her computer at home. Her grandson uses it to connect to students in China. He has a web cam. He was invited to go to China through a special program at his high school. From these experiences, he has become proficient in Chinese. He has downloaded different languages and has studied these languages through the Internet. Presently, Carolyn's grandson is beginning his first year of college in China. She explains how her grandson became interested in Chinese culture.

> See what happened was at East Lake, where he attended high school, they have this program where they bring children over for so many days. And this particular year they had Chinese students coming in and we housed the little boy. There was one boy and nine girls that came and those children had to be placed in homes of the students at East Lake. And we housed the young man and . . . we fell in love with him…he came in with gifts for everyone and when [my grandson] went to China they had to take gifts to children there…And when he went to China [through the same school exchange program] it was like a whole new aspect of his world opened up and he was able to live with the family . . . And he had an opportunity to be in the [school] newspaper the other day . . . The newsletter came to the house [he] opened it up and turned it to his page and said 'ooh that's an ugly picture' and it was a picture of him . . . when I saw it said one senior passes that Chinese proficiency test, a very difficult test to pass, and it said he has passed the written and the oral presentation of that test.

I complimented Carolyn on being willing to expose her grandchildren to various experiences. Many children of low-income families do not have this type of support because of a lack of resources or interest. She responds, "It was hard for me to obtain my computer and I've seen what a help it has been for the children and it has been my goal to get each one a computer for their personal use."

Carolyn has a positive outlook regarding technology in education. She believes that technology would enhance a student's education. Again, she recalls how students enter this program and are able to finish courses early, which is based upon the amount of time that they are willing to give. She believes that students could be inspired to open up

their world. However, right now she sees that students are being limited because of a lack of access to information technology. Carolyn says,

> I think it would be great for the student to be able to try the internet so they can, you know, expose them to thing, but right now they are limited 'cause they can't get on the Internet unless they use the laptops. Through the laptops they can access the SAT study guide and they can also take the SAT online.

We talked about the importance of technology in our lives. She does not believe that we can do without technology. Carolyn contends that the worst-case scenario would be not to have technology at all. When technology is used to benefit all people, the world would be beautiful through the eyes of Carolyn. She also notes that life would be like something out of space. Carolyn believes that we are headed in that direction – living on other planets

While discussing how technology is all around us, she notes, "You can do that online banking, pay bills online," Carolyn shared an interesting analogy. She mentioned that she could not drive but her husband compared her sewing and the use of the sewing machine pedal to driving an automobile. He guided her to see connections between the activity she enjoyed and the one she avoided. She mentioned that we control both technical processes.

Carolyn contends that using technology can be a problem solving experience. Carolyn's family has a history of Alzheimer. In fact, she has started to question her behavior, which may be signs of Alzheimer. She notes, "My mother had Alzheimer's…a lot of her siblings had Alzheimer's and I'm worried to death that I may get it or I'm getting traces of it, but I try to keep myself active in reading and writing, using the computer."

She gives the example of researching such issues as a method of exploring areas that affect families. Carolyn believes that using technology to explore these issues would help families resolve some problems associated with Alzheimer because family members would become more knowledgeable. In fact they could chat with other people who have those experiences, which would be a great support system.

Many educators are reluctant to embrace computers in the classroom. Carolyn says, "Young people are not afraid to use the computer." Carolyn notes that when she took computer classes through the school system, she noticed that the adults were nervous.

> A lot of adults are afraid of the computer, you know. I've had coworkers that have taken workshops with me and they are just trembling . . . you have an activity to do and go from one thing to another . . . They just like freeze up and you have to kind of like assist them with it, you know, but I understand now they are getting more into the computer because they have a computer at home now, too.

She helps them out. However, that is not necessary with kids. Carolyn sees that "kids have no fear."

Metropolis: Allison and Joyce

Allison and Joyce work with this non-traditional school. This is the site of an alternative program that offers students opportunities to recoup lost credit through an electronic curriculum. It is located in a beautiful and serene rural area on a tree-covered campus. Although the school is located in a rural area, it is a part of a metropolitan school district. Upon approaching the building, I found that the school was housed in an older physical structure whose interior has been remodeled.

Entering the building I found a sign-in desk at the end of a short hallway that opens into a huge meeting area. A parent volunteer greets me and I sign the visitors' log.

Joyce enters behind me and assumes I am there to see her. Apparently, visitors are few and far between.

I accompanied Joyce to her room, which is located adjacent to the principal's office. We discussed the schedule for the interviews and I asked her if she would be willing to participate in an optional activity. After explaining this activity to her, she informed me that her time is consumed by her responsibilities at Metropolis and her degree program. Nevertheless, she was still agreeable to serve as a participant in this study.

There was very little to observe that day because the support staff of a dropout prevention initiative had transported the student body of 60 students to a job fair. I did notice that most classrooms had at least five computers. Joyce's classroom was the only one that contained a cabinet for wireless laptops.

I returned to the main office to locate Allison, the school's counselor. Her office was adjacent to the main office and the secretary escorted me there. It was necessary for me to readjust the interview schedule because of a necessary meeting at another site. She asked if we could do both interviews on the same day. I agreed. Allison agreed to the optional activity involving the analyzing a sci-fi film or a short story. She made it clear to me that she was not a fan of sci-fi but that it would be interesting. We would discuss this activity at the end of the interviews.

Joyce – Vocational Education Teacher

Joyce has worked in the field of education, as a teacher, for thirteen years. Prior to teaching, she served as an administrative secretary in the state's university system. Joyce entered the non-traditional school as its first vocational teacher. Joyce completed the

rigorous Technology Leaders in Education Program, which was designed by the local school system to train at least one teacher to troubleshoot issues at their school. Although Joyce has numerous technology courses to her credit, she prefers to consider herself as slightly less than an expert but certainly more than middle of the road as it relates to technology skills.

As I observed her class, I noticed that Joyce has twelve desktop computers and she has access to eighteen laptops, which she allows other teachers to use when they are available.

Upon moving into a discussion of the formation of Metropolis as a high- tech school environment, I opened by asking her to describe her involvement in the pre-planning and planning stages. Her response was short and to the point: "No involvement." In fact, Joyce had a puzzled look on her face when I asked her to identify those who made the ultimate decision to move to a performance-based school. She pondered over this question and considered the local school district but she finally settled on the non-profit corporation that partners with the district. She feels that if she had been included in the process she would have suggested improvement in the training aspect. She also doesn't like the idea that there are no hard copies of material that is on the electronic software. Searching through tons of links is less than desirable.

Joyce has never seen the specific technology goals for this school that were designed by the non-profit corporation. Therefore, she is not sure whether or not she is fulfilling the specific technology goals for this school because they were not made available. However, Joyce states that the state's In-Tech program has identified what

teachers should know. Every teacher has been tested on general information associated with the use of the Microsoft Office package: Word, Excel, PowerPoint, and Access.

It is clear to me that she has definitely critiqued her classroom situation. She notes that the Microsoft Office package is not available on any of her computers. What is also interesting is that she says that other teachers do not have editing capabilities on Microsoft Word. They can simply bring up a document and print it. I must note here that I downloaded my own Microsoft Office package to my computer because I experienced similar problems. In reviewing her transcript, Joyce noted that she has made several attempts to persuade those individuals in technical support to remedy this problem. I am also familiar with this problem. What makes it so complex is that there are two entities that partner in this venture and it is never clear who is truly responsible for some issues.

Joyce continues to critique various hardware problems. Wireless laptops have no printer connections. When students work, they save on disks and then she has to print from her computer. In fact, the student desktop computers have no printer connections.

Joyce feels that this setting affords students opportunities to recoup course hours missed by working at a greater pace than others. She notes that students at her site enter the school at different times and the computer and electronic software make it easier for the students to be on task. Before the entrance of the computers, teaching simply involved pencil, paper, and books. We tried to get out of the books by assigning research. Now we give them offline assignments so that they can use the books. Joyce considers the computers to be the best method. She has always enjoyed them.

Joyce is interested in seeing education change nationally. She states that it has been said that students are leaving high school uneducated. She asks, “How can schools

teach the same way for 200 years." She is looking forward to a better way of teaching. She believes that technology in education is a good direction because education is not working. She believes that avoiding technology would not benefit students. In fact, she says, "We all benefit."

Some staff members have suggested that we discard computers and return to books. But this is not the way. Joyce recalls that, as a secretary, she used the typewriter and when computers entered the picture, "it felt like a miracle." However, she adds that we should not overlook the need for interaction among students and teachers.

There are no barriers to accessing the Internet in Joyce's classroom. The students access the Internet in her room on a daily basis. They research careers, work on projects and search for colleges and scholarships. An individual student will use the Internet at least 2-3 times each week.

Joyce feels that as long as information is on the Internet that may be negative, we have a difficult time in teaching students to be responsible. She hoped for someone to design a filtering program but added that teachers should engage an interdisciplinary approach to developing projects that encourage responsibility. Joyce is extremely concerned with the way women are projected in violent computer games. A major step in teaching responsibility rests with game designers. Joyce suggested that game designers should consider designing computer games that are peaceful in tone and action, such as those that are biblical in nature.

Futuristically, Joyce speaks of a completely paperless society and of being implanted with some type of coding device. "We cannot do without technology," she states. She speaks of an individual's lack of understanding the importance of technology

until something happens. She said that when her computer stopped functioning, it felt as if someone in the family had ceased to function. When you are a computer user, "when the computer is down you are sick with it." You are in a bind because of your dependency upon it. You are aware that you are missing something and "it feels as if the computer is another person in the family."

Science fiction has been critiqued as a genre that stimulates us to consider the effects of technology in our lives. Joyce used the film title, *The Day the Earth Stood Still*, to describe the effects of technology when it is misused. She described this setting as chaotic. However, when technology is used in the interest of everyone, this world would be one where every person had the same opportunities. With everyone given the same opportunities, there would be no class system – "No inequities."

From Joyce's experiences and conversations with other teachers, she believes that teacher reluctance to technology integration involves their orientation. Joyce feels that teaching is often an isolated situation and with that isolation comes the hesitancy to make a change. In bringing technology into the classroom, teachers become reluctant to change because they are so use to their traditional or old methods that include pencil, paper, and lecture. In contrast, kids have been exposed to tech games and when they access a computer, they are more interested in exploring than older people. The games stimulated them in this manner. According to Joyce, the bottom line is that "Kids are more willing to change than older people." Kids are more comfortable with change. When computers first entered classrooms, "there were kids who knew more than teachers."

Allison – Counselor

Allison came to her present worksite three years ago in order to fill the need for a counselor. As a counselor, she provides assistance throughout the school district whenever called upon. In fact, her interview was rescheduled because she was required to fill a need at another school. She has worked for this district for twelve years in various settings and capacities. Planning periods are virtually non-existent for Allison. Therefore, scheduling an interview was a difficult task. Nevertheless, it occurred during after school hours in her office.

As I entered Allison's office for the interview, I found myself in a small room with wall-to-wall technology. Four people in her office would constitute a crowd, due to its limited space. A massive multimedia system and a file cabinet dictate one wall, while a table containing a computer with management system and printer occupies the other. As I waited for her to free some time, I reviewed her story map/questionnaire that she returned two weeks earlier.

On her story map/questionnaire, Allison writes, "Technology was not as sophisticated when I was in high school or in college. It was really rare to see a computer used by students." That was the Seventies, an age when businesses and government agencies dominated access to computers. When she started working, she was still using typewriters.

Allison's introduction to computers came when she was hired for a large educational corporation that designed educational software.

> I was about 7-plus years with [that] learning corporation . . . During that seven years I actually trained teacher's how to work with technology in their classrooms. Prior to that I was at [a local university] and of course technology then was word processing, projectors and that kind of thing.

Her training lead to a position as an educational consultant whose responsibilities included the training of teachers to integrate technology in various classroom settings.

In her present position as counselor, Allison depends on technology for everything she does. In fact, her state education certification is dependent upon her technological proficiency. She writes, “I have taken several courses, workshops, and training sessions on technology.” She is also required to attend quarterly training for a student management system. Allison writes, “I am sure my job in education will continue to require current . . . knowledge and training on technological products that will support doing the job faster and more efficient.” Allison projects a future of new technological products that may make life more interesting and even more efficient.

Allison writes of her dependency on technology. “I depend on digital watches/clocks, computers, vehicle meters, etc.” She also notes that this dependency is characteristic of her family. This dependency cannot be avoided because technology is everywhere. In fact, Allison believes that technology will replace people in the job market as the business community becomes even more dependent upon technology. She writes, “The economy will become more technology dependent.” What is certain, according to Allison, is that “Technology is constantly changing and improving. It’s here to stay.”

From her story map, I could reasonably assume that Allison has a positive stance on technology and this interview proved that point. Allison sees technology as a vital entity in school reformation. “I can’t even do without it,” according to Allison. It is a part of her responsibilities to schedule students as they complete courses. “If I can’t do that it stifles the whole school. It stifles the student’s being able to move on. It stifles me being

able to keep accurate records. So technology is just pinnacle to what happens here," she notes.

I asked Allison to identify the beneficiaries of technology in education reform. "All the stakeholders are beneficiaries, starting with the child and their parents, the teachers that are working with these students." She adds, "You will see a difference, I believe, in their grades. You will see a difference in our homes in some cases and in our communities."

As it relates to the community, Allison notes, "A big thing right now is our business community is saying that our students are not prepared for the work world. I think that technologies will help prepare our students." Allison believes that knowledge of the use of technology will make a student more of an asset in the business sector than one without the knowledge and expertise. However, she adds,

> I don't want to say that technology is all there is. We have some fantastic teachers who along with technology really make or break . . . what a student can absorb and what a student may not walk away from classrooms absorbing. The teachers, tied with the technology, really make a difference.

I mentioned to Allison that we tend to appear to be in the same position in the world as depicted in *A Nation at Risk*. "Technology seems to be moving so fast and growing societal wise," she notes. "But when it comes to the actual school districts and being able to keep up with the upgrades in our software and the upgrades in our hardware, we are talking about a big budget."

I ask her to consider countries that are thought to be less wealthy than ours but that are ahead of us in a number of technological areas. She says, "Technology is so important to them that they make it [a priority]." Allison draws a metaphorical

relationship between a focus on financing educational technology and driving a car and owning her own home.

> Looking at my checkbook, those things that are important to me you're going to see that those are the things that I am going to give money to. I am going to try to stay in my house, so I am going to pay a whole lot for that. To drive, I'm paying a lot for gas because those things are important to me; and in our school district and in our state, if technology was something that was very important to us, then it would be reflected in our upgrades and our technology.

However, Allison was quick to note that some inequities do exist. Because of her active involvement throughout the school district, she moves comfortably to explain those inconsistencies. She says,

> Technology is not the same across the district. You will find that in some schools there is just so much more upgraded and updated technology and more technologies depending upon the school's emphasis. For instance, [in] the schools that are looking at video production or are looking at communications and have their own radio stations and those kinds of things, you will see that the money has gone into the technology. You'll see upgraded computers in the classrooms. You'll see technologies in the main office - just being able to use the intercom system and having an automated system that calls parents. You'll see more monies put into those technology schools. But schools where that is not necessarily the focus, you may not see the upgrading happening as often.

I asked Allison if she thought that this selective focus had anything to do with the address of the school. In her usual soft-spoken, yet firm tone, Allison states,

> I think that the district has a lot to do with being able to allocate monies to go to various schools; and I think that the board members have a say so in terms of the advocacy for their district and what they want to see happening in their district. And I also think that the PTAs, our parent organizations, have a lot to do with the technologies that we see in our schools and their awareness. If the parents are exposed to top-notch technologies, then those are the kinds of things that they want to see happening in their child's school. And so they get on that bandwagon and make it happen.

I am aware that there are parents, however, who are not exposed to the same types of technologies as others. Therefore, they may appear to be apathetic to technologies in

their child's school. Allison's response is alarmingly filled with accuracy. She says, "Then you will probably see a match with the school. If our technology is down and it doesn't seem to be a big concern with the parents, well, that is just the way it's going to be."

Some educators are advocates for computers in the homes of those who cannot afford to purchase them. Allison previously worked in a program, Computers for Home, which advocated computers in the homes of low-income families. This program allowed students to check out computers from their home schools. "Back at that time, that was before they had laptops, they took home the big monitors, the CPUs," she says laughingly. However, they did not have printers available for students to use at home. The security of technology is always an issue at my school. Therefore, I was interested to know if there were security measures followed by the Computers for Home program. "The only thing we had were their names," she said. "We had the name and address of the student that checked it out and, of course, all the equipment was insured."

I could visualize from her description how cumbersome and yet, rewarding this must have been for the students and their families. Students would return the computers at the end of their particular agreement. "Sometimes they would check it out for a month. Sometimes they would check it out for a semester, depending upon the circumstances," says Allison.

When Allison entered her present worksite it had already undergone its high tech change. However, she viewed it as similar to her previous school setting. At Butler, "there were at least three computers in every teacher's class plus there was a lab," states Allison. In contrast to Butler, her present school's primary course curriculum is in an

electronic format. “That’s a big change from what the students are doing at the traditional high schools. At the traditional high schools, the curriculum is mainly taught through lecture or . . . creative teaching techniques to the different learning styles that students have,” views Allison.

Allison states that technology goals at Butler were explicitly stated. Even though technology was in place when she arrived, Allison states, “A lot of the same information from the school district, in terms of what you could do or not do with those technologies, was already in place.” At this point, I was reminded of a memo sent from the technology division to all district staff, including her staff, regarding the misuse of technology by staff and students. The memo was noted as of high importance and it read as follows:

> Please refrain from the use of non-business related [Internet] based services such as [Internet] radio, music sites, and music downloads immediately. These services are an extreme drain on our network performance, and are negatively impacting instructional activity. Online testing activity is in progress in many of our schools, and the added network load from these non-essential services is causing problems for our teachers and students.

Allison explained that another challenge in this area centers on the various requirements of the two entities to which the staff is responsible. Each entity owns the rights to different technologies at her school. “You have to be careful to follow [their requirements],” she explains. In addition, Allison notes the need to be cognizant of what a person can do on various technologies because “contractual agreements” must be upheld.

Regarding the technology goals of the State Department of Education, Allison says that teachers are aware of what is required of them because their certification is based upon satisfying those technology requirements. Allison states, “It is my understanding that everybody in here who still has their certification has taken that

course." In fact, she says, "That course was tremendous. It really introduced me to how to do a lot of the technologies, not that I wasn't aware but how to do them if I wanted to."

Allison recognizes the capabilities of students to use technology effectively. She notes that students "are very familiar with the technologies." However, she would like to include more technical training for students in the use of software. "I would like to see every child knowing how to use PowerPoint for future purposes," she asserts. "I think PowerPoint is just a piece that you shouldn't leave high school without knowing how to use, especially those who are planning to go to two-year and four-year institutions," Gwen explains. At this school, there are courses in place to provide students training in the use of the Office packages. These in-house courses are Computer Applications Parts I & II and the Introduction to Technology.

Allison perceives her school's lack of Internet access as a barrier to accessing information. "Our students' use of the Internet is limited because of the number of computers that we have that have access to the Internet," observes Allison. Seniors are required to do research projects before graduating. Limited Internet access, along with no printer hookups for student computers, is a deterrent to effective research by students. She adds that teachers complain of having one computer in the classroom that can access the Internet and then the laptops. "And we have to really hope that the person that's over the laptops is here for us to be able to use at least eleven." Nevertheless, with a student population of seventy-five, it is "a vital concern" that Internet access is not affordable for all student use.

Some adults are concerned that if the Internet were accessible to students through their desktops, students would be likely to travel to websites that are troublesome in

nature rather than work on lessons. Allison believes that this situation can best be remedied through monitoring. She maintains that students can become preoccupied "without having access to the Internet. Instead of doing their assignments, they could be reading a magazine. It's just a matter of monitoring."

Allison goes on to say that monitoring may or may not be "as consistent as it should be." She says that even within our public libraries, people are visiting sites that should be restricted because of the nature of the setting. "There's no fine for visiting a site you are not supposed to visit. But now on the school level, if a student is caught . . . , there are disciplines attached to it," she notes. Those disciplines vary from suspension to expulsion. In order to best handle this situation, Allison maintains that we conference with parents about the severity of the improper use of the Internet. Allison believes that students will visit these sites regardless of the blocks we set. It is their inquisitive minds that set them apart from many adults.

Allison has worked with teachers in both traditional and non-traditional settings. She has spent part of her time training and observing teachers in the use of technology. Speaking from her experiences, Allison says,

> I worked with teachers who had twenty plus years in terms of teaching, providing classroom instruction without integrated technology, in terms of using computers in coursework to help supplement what was going on in the classes. Some teachers were just excellent. They just jump on in. They saw the kids learning faster, learning more and you saw the results you wanted. But then in some cases there were teachers who felt like they had been teaching this for twenty years and why did we need something new to change what they were already familiar with. As long as they were getting results, why did we need to use technology? So, in those cases it was pretty hard to get them to do anything different from what they were accustomed to.

We are often fixed in our traditions but I asked Allison to consider other possibilities for teacher reluctance in integrating technology. In a contemplative mood, Allison says,

> Sometimes it is fear of the unknown. I had some teachers to say that they were afraid that they would break the equipment and they didn't want to be responsible for breaking the equipment. They felt like if they got stuck and didn't know what to do they wouldn't have somebody who would be there to kind of hold their hand and make sure they knew how to log out or get out, so they wouldn't touch it at all.

In considering the *back to the textbook* attitude of some teachers even within high tech situations, Allison states, "The textbook is wonderful but I think we have to change with the times" She adds, "And if you use technology properly it can make your teaching a whole lot easier. It can make keeping up with your roll and your grades a whole lot easier." She pointed to different software possibilities that teachers could use to make such efforts a lot less tedious. "You don't have to manually do that anymore unless you just want to. It's so much faster," she notes. However, she points out that some people are not willing to make the effort to learn to apply those technologies. With a light chuckle, Allison says that those people "will be behind the times. They will create a lot of work for themselves."

I wondered how Allison perceived her school's methods of addressing the issue of teaching social responsibility in the creation and use of technology in our daily lives. Her school's project-based and service learning components are designed to teach students to explore societal and world issues while stimulating an ethic of caring, according to Allison. "[They are designed to help students] see a need in the community and to do that need while expecting nothing in return."

She ponders over specific projects and she says, “I still want to think that the sky’s the limit.” Allison recalls a school-wide project implemented in her previous school. That project involved all disciplines and all grade levels. Students began the project in the ninth grade and presented it during their senior year. “We had them to research their family - their own roots. In the ninth grade they did a family tree,” she says. This was an interdisciplinary project that involved all content areas and members of the students’ families. “Every subject area had something to do with the history of that child. It really showed the child how that subject matter dealt with real life issues,” she adds.

Her description of this project really stimulated me to think about projects associated with the male species, throughout the animal kingdom, in the role of nurturer. This conversation certainly engaged me to consider this issue because the majority of the male students, with whom I work, are from homes headed by single mothers and absentee fathers. Too often, they repeat the cycle.

Technology is a socially transforming experience. Allison says, “The whole thing is social.” She describes her use of e-mail as transforming. She suggests that we could study technology from various directions that suggest its transforming nature. “Even learning about various behaviors. If I see something that I didn’t recognize, I want to go and put in this characteristic and see what in the world is going on here.”

Reluctantly, Allison adds that studying the impact that various drugs have on one’s body is another direction to study. “What could make a child fall asleep in class constantly? What are the possibilities?” We talked about prescription and over-the-counter drugs that are advertised in such a way that, even though the negative side effects

are stated, they are still appealing. I asked Allison why did she think they maintained their appealing nature. “If it can cure whatever that ailment is, some people might be willing to take the risk of those side effects,” she says. “You fix one thing and, in my opinion, you break something else.”

Allison also recognizes the socially transforming effects of the Internet and cell phones. “I see more kids communicating with each other through e-mail than through the telephone,” she says, speaking from her personal home experience. Her children have cell phones but she notes that everyone in her home gets in line to get on the Internet. “Shamefully, my husband, too. Everything. You have to really stand in line. You almost have to have several computers in your home and DLS to run them all, so that you can have all of these things going at the same time,” she says. There are five computers in my home. My husband uses three for composing. We talked about how technology has transformed the music industry. “That’s right,” Allison says. “Everything is digital.”

Allison recognizes that outside the classroom, technology is crucial. “Its everywhere,” she says. “Our cars. Everything is digitalized. Our watches, our microwaves, our stoves.” With a bit of humor about leaving her watch at home, she adds, “I can’t even look at the sun to tell what time it is.”

I spoke with her about the cyborgs of science fiction and how I perceive that everything we attach to ourselves to improve our lives, in some way, is extending our lives into technology and vice versa. Because of her job-related responsibilities, it is easy for her to acknowledge her computer keyboard as an extension of herself. “It is. It has become. I have become dependent on it, “ she says.

When it comes to sci-fi, however, Allison perceives it as entertaining. “I am a non-fiction person,” she maintains. “I like reality.” She considers some cases of sci-fi as real but she does regard it as having the ability to stretch the imagination and “it helps you to get outside of the box or to think outside of the box.” With a soft smile and laughter, Allison adds, “I don’t totally block it out. It helps you being rational and to look at what is realistic and what isn’t realistic – what’s fantasy and what’s not fantasy.”

I asked Allison to consider the old sci-fi movies such as “Lost in Space,” and to recall the gadgets used in the film that are our technologies being used today. She began to recall others. “You remember Dick Tracy was science fiction,” she says. “He use to talk on his little wristband and that’s the same thing we’re doing now. We have cell phones that are like walkie-talkies where you don’t have to actually dial the number.” Allison also notices that calculators on wristbands are a part of today’s technologies. “It wasn’t true then,” she maintains.

The questions of truth and reality often arise in my discussions with students. I asked Allison to consider whether reality occurred prior to our catching up with that reality. She began to question the gadgets in 007 movies and the Jetsons. “Whose to say that that’s not happening?” In fact, she believes that the government may have always been privy to such technologies.

Wartime efforts may include such sci-fi nova found in the old “007.” This thought led into Allison’s description of technology gone awry. The worst-case scenario of technology misused is the total destruction of humankind. “Using it as a weapon,” rather than for education is Allison’s perception of technology tainted. “Sometimes we are destructive,” she notes in a very soft and concerned tone.

When used for the betterment of human beings and the environment, technology is positively effective. Allison notes, "When you said that, I know of the technologies where we are reproducing or making genetically engineered foods so that we would be able to feed hungry people across the nation. I'm not sure," she states. Laughingly, she continues. "That's one of those science fiction realities."

Her concern with manufactured foods deals with nutritional benefits. "You can manufacture what the fruit looks like. But does it still have the nutritional value," she questions. "If there was a way to naturally produce foods and crops, and to naturally encourage procreation among animals," then this would be a best-case scenario because we would be able to feed starving people around the world. Allison concludes, "That would be technology being used at its best, I think. It would extend life."

Allison agreed to view the sci-fi film "X-Men: The Last Stand" (2006). Although the term "utopia" is associated, most often, with a perfect society, I consider the ideas of the X-Men as utopian because of their efforts to create a better world by embracing difference. I asked Allison to view this film for the purpose of drawing analogous relationships between the story's events and characters with those in education. She begins by finding similarities between herself and Storm. She says,

> The character that I identify myself with is Storm. I see Storm as a strong leader, one who takes charge and looks out for the best interest of all entrusted in her care. There are a large number of students to advocate for and to ensure that they meet graduation requirements. I care for the students and have their best interest at heart. I have to take the initiative and insist that they make 'good choices' that will impact their future. Good choices like coming to school regularly, encouraging them to do all in their power to pay attention to curriculum taught in class and on [our electronic software], and to follow [the school's] rules and guidelines to be successful.

Allison adds, “Storm is characterized by her ability to control the weather and the temperature.” I asked her to consider the fact that Storm often brought about “a storm” in order to settle uncomfortable situations. In addition,” storm” is often used as an antonym for “peace.” Allison continues by describing the storms in her environment and her participation through them.

> Some “storms” witnessed in our technological school environment are times when the technology does not work because the software network is down either locally or in that whole part of the United States. Sometimes, there are power outages due to overloading of circuits, weather, damage to cables, etc… I help keep the calm, by reassuring students that, the situation is temporary and normal usage of technology will soon resume. I may call for assistance from the power company, or the software network technical support personnel, or even central office personnel if the situation warrants. On the other hand, I may stir-up (produce a storm) to encourage students to do what is necessary to graduate. Storms like giving deadlines to turn in community service hours, warning letters when student attendance is poor (threatening withdrawal from the [school]). Another storm is calling parent conferences, and/or writing letters to inform them that their child will not be able to graduate by May and giving them alternates.

Allison sees an interesting relationship between circumstances within her school environment and Jean Grey, the Phoenix that had all powers and had to be destroyed for her own sake as well as others. Allison says,

> In X-Men III, Jean used her powers for destructive means. Technology can be our best friend when it comes to managing large files of student information. But, if something happens such as a “bug” in the Student Management Program (SASI) causing student transcripts or information to be faulty. Oftentimes the technology is only as good as the personnel inputting the information. If information is put in the system incorrectly then this can affect a student’s very ability to graduate on time. When technology is not used affectively it can have adverse affects on those involved. One example would be if a student became ill at the school, and the parent emergency information in the computer is not correct, this could lead to a bad situation. An example of using other types of technologies at the West End would be the uses of space-heaters in our small school by several persons at the same time, will cause the circuit breaker to turn the power off. This will abruptly stop students working on their individualized programs/courses, anyone using a clock, computer, refrigerator, lights, or any other kind of technology will be cut off. Storm would fight against the climate not being conducive to learning, she would intercede on behalf of the students and

> teachers asking that the thermostat and/or temperature be adjusted whereby persons with space-heaters would not need to turn on their individual units which could cause havoc with the technological balance and climate of the school.

Allison goes on to connect education reform's focus on technology to the Phoenix, Jean Grey. She continues.

> Before education reform, our educational system did not seem to be so technology driven. But not with the integration of technology it is becoming a lot like Jean Grey (the Phoenix that had all powers and had to be destroyed for her own sake). Before reform the educational system was still operating under the old Horace Mann model where the three R's was the focus; make sure students can read, do arithmetic, and write. This system was basic at best and promoted quit a bit of memorizing information. In today's information age, student's must not only memorize information, but with education reform one of the focus' is on usage of Blooms Taxonomy (knowledge, comprehension, application, analysis, synthesis, and evaluation) to help students pass (some of the new reforms for Georgia, which includes Atlanta Public Schools, students must pass the End-of-Course-Test (eight tests) plus five parts of the [the state's] High School Graduation Test (English/Language Arts, mathematics, science, social studies, and writing) along with 22 units of course work and community service, in order to graduate. To add to the many tests our students must pass to graduate, the schools are adjusting to the No Child Left Behind requirements to meet there Annual Yearly Progress reports. With this reform, schools are graded on student attendance, test scores, student behaviors, graduation rates, etc. Technologies are used to gather the data, disaggregate the data, learn from the data, make improvements based on the data, and on and on it goes. It seems that our federal government, and state governments are using technology to help students learn more, learn faster. But if our students are not measuring up to all of the tests, they come out on the short end of our society – dropouts.

Allison asks us to consider her question: "Could it be that this new educational reform is spinning out of control and becoming the *Jean Grey* of our time?" She is also aware that in these situations there are mutants in X-Men and education that are not integration friendly. She says,

> Our dropouts become mutants that are not integration friendly. Ultimately, it seems that the dropouts seem to fill the prison and jail systems, or end up in general as the low wage earners in our society. Technologies are in place to track these persons and make it hard for them to receive financial aid to attend post-secondary opportunities or even get certain types of jobs. Storm has a job to do--encourage students who are in school to take their opportunity seriously. To work

> with the educators who are trying to assist them in achieving their goal – to graduate from high school.

Allison discusses the importance of a support system in education, even for those who are both sensitive to the needs of others and bold in working in their interests. She notes,

> Storm was also sensitive, she could sense or discern what was good and what was evil. She knew how to mobilize the team quickly to rescue or go after the bad guys. There were times she received encouragement from others to stay strong. She used the gifts that she was given to make the world a better place for herself and others.

She concludes by discussing the importance of the theme of teamwork.

> Storm was a team player. Although she had awesome powers, she chose to work along with Charles (when he was alive), Wolverine, Katie (who could walk through walls), Jean (when she was well), Scott (whose eyes were like lasers), Iceman, etc…and others who where on the side of *good* verses *evil*. Just as *Storm* did when "Charles the Professor" was destroyed, she encouraged the team to stay together so they could carry on the "good" work that they had started – supporting and encouraging one another. When things were too cold, *Storm* found a way to warm up the environment to make it comfortable for all. As a counselor, educator, and role model, I help to set the climate in our school. It can be a climate that's pleasant, a good place to learn, where students feel supported and cared for. Or it can be a place that students dislike coming to each day. As various conditions arise at school, too hot – temperatures flaring (students, faculty, or staff), I can intercede to promote unity and good outcomes so that all parties experience a win-win solution.

Earthseed: Robert

The class day at Earthseed, a rural non-traditional middle school, is from 9:00 a.m. to 3:00 p.m. I arrived at Earthseed at 8:30 a.m. and reported to the office. The secretary directed me to the commons area in the front of the building where I found a comfortable table in the rear. It is this area that the staff and students use for all meetings and convocations. The staff members are expected at 8:30 but it appears that all eleven members have reported. The secretary explains that the teaching staff often uses at least

forty-five minutes before students' regular reporting time for tutoring. The principal greets me and Earthseed's participant, Robert, also acknowledges my presence. I remind him that my first day is observation. He appears very enthusiastic about the interview the following day.

In the commons area, there is seating for the school population of 58 directly in front of a raised podium containing five upholstered chairs. As students enter, they take a seat in front of the podium until seats are nearly filled. Their conversations are typical of middle school students. Their playful attitudes and jokes become louder and the staff is quick to attempt to tone down the noise.

At 8:45, five middle school students move to the podium while the majority leaves the commons area. The secretary explains to me that this gathering of twenty-three is for a fifteen-minute morning motivation, and that it is voluntary because these students will sometimes read motivational material with religious tones. Parents assist in coordinating this activity with their children, according to the secretary. She resigns to her office. The only adults present are two parent volunteers and two members of a grassroots organization that mentors youth at this site.

I reviewed Rod Paige's "Secretary's Letter on Constitutionally Protected Prayer in Public Elementary and Secondary Schools" (February 7, 2003). This letter referenced students' rights to engage in religious activities during non-instructional periods, such as recess and the lunch hour. However, any public employee could neither participate with students nor encourage or discourage them from participating, which I assume accounts for the lack of presence of school employees.

At 9:00, the school bell rings announcing the beginning of the first period. Students quickly gather their bags and proceed to five classrooms that are located in the rear of the building. Each of these classrooms contains from six to sixteen computers that align the walls of each room. The offices are also well equipped but the fax machines are definitely similar to the small ones used in our home offices. The copying room, however, is inviting. Robert enters with student assignments and a ream of paper. He explains that there are no copy restrictions placed on teachers as long as they use their own paper. This is certainly a change from traditional settings where the guidelines are strict. I agreed to copy Robert's assignments and he returned to the commons area to plan with the science teacher.

All classes are dismissed for lunch at 12:30. The lunchroom is filled to capacity and staff assist in distributing lunches that were prepared in the high school cafeteria adjacent to this building. Once the students are served, staff members sit with their classes in order to maintain a semblance of order. At 1:10, the bell rings signaling the return to class. As I watched them leave, I thought about the lack of time teachers have to bond with one another because they follow this routine daily.

At 3:00 p. m., the bell signals the end of the day, only to find teachers in the solitude of their classrooms. As I moved towards Robert's class, I noticed two students in one classroom. They appeared to be working on a project with their teacher. A laptop was among the clutter of poster boards and construction paper. In Robert's class, there was one student waiting for a parent/teacher/student conference. I confirmed the time for the interviews and asked Robert if he had any questions. I reminded him of the optional

activity (sci-fi analysis) for this study but he elected not to participate beyond the interviews to be held on the next two consecutive days during his planning periods.

Robert – Mathematics Teacher

As I entered his room, I noted that Robert's classroom has sixteen computer workstations. His desk is situated to the side of the room rather than front and center. A separate table is adjacent to this desk. Each one holds a computer for teacher use. A storage cabinet rests on the front wall and it is at arms length to both table and desk. One single picture adorns the walls, while textbooks, many of which are still boxed, are located in the front of the room; although, some books at found on the student workstations. Stacks of papers suggest that Robert also engages students in numerous off-line assignments.

There is no Internet access on seventeen computers in his classroom. One administrative computer with Internet access is limited to teacher use. However, Robert allows students to use that computer when they ask, even though "there are stipulations" on how it is used. He notes, "I really monitor them" when they are using it.

Robert has worked in two educational worlds for more than thirty-three years in a non-traditional middle school and a traditional high school. There was no technology in his traditional classroom environment. On his story map, Robert writes, "[In the past,] I was slow to venture out in technology," although family members kept abreast of technology. He notes that even in the business community his technological experiences were limited in the past. Actually, he describes his own technological experiences as a student as limited to old technology – calculators, overhead projectors, and filmstrip projectors. Such was true of the Sixties.

While in college, he did not use the computer. Computers were not a focus; calculators were primary resources. He reflects and states, “That’s really a travesty.” Robert contends that computers would have made things so much easier when he was in school. Today, the basic calculator has taken on a new technological character in the form of the graphing calculator, according to Robert. Robert says that he would never hold a student back by requiring him to do math the old way or the way he was required to do math. He says, “I would never want him to slave” by making graphs the way old way.

Today, Robert critiques himself as slowly adjusting to technology. He is a frequent cell phone user. He uses the computer to balance his checkbook but he identifies the calculator as important in this process. In fact, his classroom is totally computerized. Nevertheless, he continues to view himself as slightly illiterate in comparison to family members who use technology as a way of life. He contends that all family members use technology to perform their jobs.

Robert admits that instructional technology has changed the way he teaches. Speaking about the computer and the electronic software, Robert says,

> I really haven’t been outgoing in really taking advantage of it like I should. That’s my weakness. I am just going to tell you flat out because it’s beautiful. There is no way I can teach that many different subjects without the computer.

Robert notes how students attempt to beat the system by using the textbook while doing the pre-test on the computer. He tells them that they are really wasting time because pre-tests are not counted in their grades. They are only used as a diagnostic. He also adds that it would be impossible for him to administer diagnostic tests to all students and then design activities for each one of them according to their weak areas, unless he had use of the computer software.

I noticed that Robert is very animated. He walks the room constantly. During my observation of his class, I noticed that he never sat down unless it was beside a student to give assistance. He recognized that a student was struggling before the student had a chance to ask for help. He stopped and coached the student through the process and he cheered the student on. In fact, a student came to him for help during this interview. He stopped and provided assistance. I maintain that students come first when they have an issue and need our help.

When we returned to the interview, I stated that many critics have suggested a *back to the textbook* approach. Robert admits that some educators may not have adjusted to technology, and that he is one of those but he is conscientiously working to adjust. Moreover, Robert does admit to the effectiveness of technology in education. Referring to the idea that we discard the computer, Robert states humorously, "We could go back to slingshots or whatever. That is what you are asking us to do. The world is going on real fast . . . The textbook will always be a help but a textbook was really more of a crutch." He adds, "It's ludicrous." He believes that an avoidance of technology is a way to keep our students behind in a world that is rapidly moving forward with technology. I picked up a book from his desk and stated that the limits of that book rest between its covers. "That's exactly the point I am trying to make," utters Robert, enthusiastically.

Robert was a member of the staff of Earthseed when the school changed to a high tech middle school. Robert draws an analogous relationship between his initial response to the school transition and being homeless with children. He says, "You either sink or swim." He adds, "I had some kids in college then, depending on me. So I had to learn

how to swim. Too many mouths were depending on me." Therefore, Robert found the need to protect his job by following the script as presented.

He was not involved in the pre-planning or planning stages of this program. He states, "[The designer of the program] introduced [the electronic curriculum] and told us this is the system that we would have. And so that is when we went with that system." He notes that what followed was training sessions for the entire staff. Robert says that if he had been involved in the process, he "would have taken more time and just really made the teachers more at ease." He believes that this would have dispelled some of the teachers' concerns.

Robert feels that he would have been more familiar with the content if he had been involved in the initial planning stages. Robert says, "The first year, personally, I feel I cheated myself . . . I did things for the students because I wasn't aware of what the computer was doing. Me and the computer were fighting a little bit." In the beginning of the program, Robert was not aware that the software was designed to restart students on materials that they found difficult to master. "That's what you want to do. So, I really found it good." But Robert acknowledges that he was not aware, initially, and that if he had known it would have made it easier for him to explain the process to the children rather than allowing the students to escape the full process.

Again, implementing lessons was initially a problem for Robert because of a lack of time in providing teacher training in the use of the computer and the software. This led me to question whether or not the technology goals for the school were adequately stated. I asked him if he was aware of the school's technology goals. "To be honest, I don't know . . . I guess it may be in some of the literature but I will admit that I haven't read a

lot of the literature that they have," says Robert. Robert also states that there are two entities involved in managing this school and that each entity is always providing material to read. Earthseed is the alternative setting for two middle schools that are located in two different cities in his county. "[One] might want something done one way and the other another [way]. That is what usually happens," states Robert. Where is he in the process? "Caught up in the middle," he notes.

Nevertheless, Robert has an optimistic view of technology in education. "Technology? You can't do without it." In view of our country's technological position in the world, Robert contends that we make adjustments or get out. Quoting James Brown, Robert says, "It's no such thing as standing still." He adds, "If you stand still, you are going to fall behind."

Robert perceives the technology-oriented program as an opportunity to advance and to teach without excess paperwork required in other educational situations. In this environment, students work at their own paces. He lectured in more traditional environments but now lecturing is more "one-on-one," says Robert. This lecturing is more of a conversation or a dialogue with students rather than what we consider traditional lecture methods. I observed him engaging in dialogue with students and the conversations were so different because each student was working in different areas.

Many teachers are reluctant to integrate technology in education. "Most of them are lazy," according to Robert. He admits that he once fell into that category. He adds, "You have got to change. You have just really got to change." He believes that technology will allow you to exercise the mind, which will reduce the onset of

Alzheimer. There is so much information to be read on the Internet that the mind could remain active and challenged.

Robert says, “I am just going to be real. I love technology.” Nevertheless, he admits, “I don’t know why I am so scared of it. It’s just fear.” Citing biblical scripture, Robert challenges himself on being fearful and, through this study he chooses to challenge teachers wanting to remain in a comfort zone without computers in the classroom. “Go back to the story of the talents,” challenges Robert. “Some teachers are going to bury their talents,” adds Robert.

I told Robert that he reminded me of the work of Octavia Butler, an African American science fiction writer. Lauren, the protagonist in Butler’s (1993) *Parable of the Sower*, creates a fictional religion called Earthseed. Earthseed is founded on the principle that God is change and we are responsible for taking control of our lives and our circumstances rather than waiting for a divine being to do it for us. Although Robert’s Christian beliefs do not mirror those of Earthseed, as Lauren, Robert recognizes the need to embrace change as he challenges his fears.

I supported Robert’s perception and I added that there are talents gone unused and seeds of information that never take root in the minds of some people. Holding on to our fears and traditions nurtures contentment with the present system of education rather than engaging a radical displeasure with changeless educators and a system that works for a select few. I was quite elated to find that Robert used this time for self-evaluation as a teacher overcoming the fear of technology integration in education.

In contrast, students are more adept in using technology than many adults. According to Robert, “Students aren’t scared of nothing. They don’t care if they tear up

something . . . They just do it. They've got the sign of Nike." He used himself as an example of adults who need to read instructions on how to use a cell phone. Kids bypass the instructions and continue to try. "If one thing don't work, they will try another," states Robert. In support of the laws of reciprocity, Robert says, "Age doesn't matter." You can learn from kids and even a homeless person on the street, according to Robert.

Students are the real beneficiaries of technology in education reform, according to Robert. "It prepares him for the real world. If you don't get him computer literate he will not be able to do a bunch of things," he states. The entire community is using technology including "churches." It was interesting that he mentioned churches. I told him that my church is growing so fast that we cannot accommodate the membership. Therefore, some services are aired on the Internet.

Robert believes that a teacher's best source of inspiring students to be socially responsible is in constructing a self that cares about others. Leading by example is important to Robert. He admits to not reading many books. The Bible is his main source of reading material. Although he does not participate in the students' motivation sessions, he is silently supportive of their efforts. "I read the Bible but that can get you one-sided," he warns. "Religious stuff can get you one-sided." He adds that reading books on technology would give us a more balanced view of life in a technological world – the good and the bad.

Robert adheres to the importance of reflecting on our history and how we arrived at this point. He says, "If you never know where you came from, you are bound to repeat it." He considers opening up the world of students by allowing them to explore outside the confines of the building. He refers to a recent trip to a bottling company in a nearby

metropolitan city to see how their technology has changed over the years. He wanted to have students to consider other technologies that influence the way we all live and how they have changed.

Because everything is almost computerized, Robert contends that his future will reveal that he will become indoctrinated or he will be at least keeping in step with his family members. Robert views the future as a technology-oriented space where it will be necessary to be literate in the use of technology. Robert writes that he believes that "technology will be so advanced that a student would not need to leave home or the dormitory." He also envisions classrooms where notebooks will be totally replaced by laptops. This is probably a realistic vision because our laptops are now referred to as *notebooks*.

Robert considers the need to have confidence in what you are doing and then you can be open when interviewed. He definitely exemplified that confidence. Even in engaging in this research he notes that some people are reluctant to give information regarding this subject because they are not sure how it will be used. Robert states that he understood and respected the fact that I was pursuing this activity and compared it to choices he made during his graduate studies. Robert noted that he admired what I am doing with this research and with my studies at Georgia Southern. He says, "This is gonna make Robert get up off his duff and say 'He needs to do what he needs to do'"

Dagobah: Karen

Locating Dagobah was an easy task because it is located on a well-traveled boulevard in an urban school district. The school day begins at 8:45 a.m. and ends at 3:00

p.m. The designers of this school are planning to expand the facility to accommodate at least 400 students.

I arrived at the school at 8:30 a.m. in order to meet Karen. After reporting to the main office, I found Karen waiting outside and she escorts me to her classroom. I reminded her that I wanted to observe the school day. She provides optional spaces for me to write comfortably but she says that space is very limited at Dagobah. Most of the space is used as learning areas for students but I managed to find a table in an open area.

Traveling through Dagobah was truly an experience. Every student can have access to a computer, although there are many offline classroom assignments during the day. Karen suggests that all teachers are engaged in tutoring students for the state's exit exams and tutoring is using done using lecture methods and other technologies besides computers.

Students move from class to class without the usual conversations one may hear in traditional settings. But, after all, there is only one hallway and teachers stand outside their rooms awaiting their students. I found Karen's room bustling with conversations about senior projects and the difficult time they were experiencing in order to get them done in time for the end of the Fall term. This was interesting because of the amount of resources available. Maybe Dagobah, which appears to be as close to a perfect school setting as one could get, was not as perfect as it seems.

My day at Dagobah was a long one it seems. Karen did not need any assistance because students became engrossed on computer courseware. As I spoke with her, I found that Dagobah's school days follow the same routine with little deviation. However, she explained that her day continues pass the final bell because she makes her room

available for students that want to work late into the afternoon. Although it appears to be well financed, Dagobah does not include a budget to compensate such teachers as Karen for working additional hours. She says that it is not unusual for her day to end two to three hours after the regular staff leaves.

I reminded Karen of the optional activity of drawing analogous relationships between a sci-fi film or a short story with her own story as an educator. Although she is a fan of sci-fi, Karen believed that time would present a problem for her. Her workday continues pass the regular days at Dagobah. I left Karen's room after finalizing our interview schedule and realizing that she waived the optional activity.

Karen – Social Studies Teacher

I scheduled an interview with Karen at the time she returned the story map/questionnaire. We decided that her planning periods would be best because she volunteers her time to work with students after school. She was quick to identify these after-school sessions as opportunities for students who want to catch up on missed work or to advance.

On the next day, I entered her room during her planning period anticipating the first interview with Karen. I noticed that her desk was surrounded by students who were waiting for explanations of why they were continually having difficulties with different concepts. She patiently responded to each one, while another student sat directly next to her. This young lady was waiting to review an online test that she had just completed. It became obvious to me that this interview would need to be rescheduled; therefore, I decided to wait until the last student left. Karen asked me to reschedule for tomorrow because she needed to take care of some paper work that she had promised a student.

While waiting, I noticed the framed pictures of famous African Americans. A huge gold-framed painting of Sojourner Truth dominates the classroom walls. Several copies of different types of textbooks are neatly arranged in black milk crates that are stacked against the back wall where there is a picture window overlooking a busy thoroughfare. Artificial greenery adorns the tops of the crates. A slightly opened storage cabinet revealed a large number of textbooks and even more test preparation materials than those stacked on a table next to her desk. The desk is not the typical metal or old wooden desk that I used when working in the traditional high school. To the contrary, the teachers' desks in this program are large polished cherry or mahogany desks that one may expect to see in a professional office suite. Two computers occupy the space on each end of her desk, which faces sixteen computer workstations.

Karen is the social studies teacher who has been at her present worksite for ten years. This veteran teacher with thirty-three years of experience has spent the majority of those years in traditional high school environments. The majority of those years have been with the same school district.

Her past experiences with technology were limited. On her story map, Karen writes that there was no technology when she was a student, except typewriters and the copying machines that required a sponge and "purple jelly." Karen's first experience with technology occurred when a national telecommunications corporation hired her. She notes, "In my job I had to use several machines from keypunch [to] data processing.

Reflecting on her family's past experiences, Karen writes, "In the past my grandparents thought the radio and television were unbelievable. When my mother took

some typing classes at night school, that was phenomenal to them for her to type instead of writing."

Today, Karen characterizes her family members, both immediate and extended, as expert users of technology. All but two adult members of her family are employed in the technological industry. She writes, "The experts are my children, my nieces and nephews. They can do anything from spreadsheets to international marketing in cyberspace."

Recalling her early years as a teacher, Karen notes that there was very little technology in the classroom and there definitely were no computers. "If you wanted to use any type of equipment it had to be checked out of the library," she writes. "Before we got computers to use in the classroom, the only thing I did on the computer was to answer my e-mail and to look for and print out recipes."

Before accepting her present job assignment, Karen came from a traditional high school of fourteen hundred students. Her class load would often exceed thirty-five. There were no computers or typewriters in her social studies class. Books, paper, pencils, and pens were the tools of her trade. The same was the case when she first came to this school. Then, the school made a transition to a high tech situation. "Everything is totally different. Everything is conducive for, what I like about it, each individual child. Each child is given his or her own program. Each child works at his or own speed." She says that in her class of fifteen students, every student is working on different things at a different pace. Some students finish courses earlier than others depending upon the extra time they spend. In contrast to her previous work sites, this small school provides her the opportunity to individualize instruction.

Today, she sees a complete turnaround in her present educational situation. There are eighteen computers in her classroom and she writes, “I do see myself better than I was three years ago. Hopefully, I’m middle of the road” as a user of technology. She uses technology to pay bills, shop, and bank. She writes that she loves “surfing the Internet.” However, the majority of her day is used monitoring students on computers that are programmed with an electronic curriculum. She assigns activities based upon student needs and course requirements.

Karen had no input in planning the transition of this school. She says, “When we knew about the program, they came in redoing our school and then they sent us for a summer workshop. That was my first time hearing about [it].” She acknowledged the partners in this initiative as responsible for the designing and planning of this program.

Karen states that the administration has covered various goals for the students but she is not aware of the specific technology goals for the school. Success with the electronic curriculum appears to be the major goal and Karen adds, [The decision makers] have not taken it pass that.”

Karen would like to see an official extended day. She believes that the decision makers should make this one of their objectives. Karen has voiced this concern numerous times but to no avail. Presently, school begins at 8:45 and ends at 3:00. Because so many students elect to work additional hours after school, Karen contends that the administration should accommodate these students.

On the day before this interview, Karen says that students were in the middle of finishing an assignment when the site administrator came to her room and said, “You have got to get out of here now.” She explains that students are told that they can work

as long as they choose and they are able to devote as much time as needed to finish courses. With a firm yet aggravated tone, she adds," Then, if this is truly true, then don't tell me that when you get ready to go home that I've got to go." Because students are told that extra time is available after the regular school day ends, Karen suggest that the day is extended to 6:00 p.m. This could be possibly an in-house problem. On the website of the designers and managers of this school, I read that the benefits offered by the program include: advanced study; catch-up; research; and after-hours access to the school's resources.

Students are sent to this small school because they did not function according to the rules and regulations of traditional schools. Karen considers her students to be more motivated to recoup lost credits or move at an accelerated space; although, she has found some exceptions among students. Nevertheless, she is willing to spend extra hours after school, without compensation, to assist these students. On the day of this interview, Karen stayed until 5:45, which she says is her usual daily behavior.

Technology has completely changed the way she teaches. "It has changed in that this program is more student oriented." Karen acknowledges resorting to a lecture method only when several students share the same issues and difficulties. Instructional technology used at West End allows for more course assignments per period. In social studies, there are three or four courses on her schedule per period. However, Karen has all social science courses on her course load.

Karen finds the lack of access to the Internet as being a major problem. There is no Internet access in her classroom. "We have a set of computers that have the Internet but they are so completely out-dated and they are so limited to the number of children

who can use them, when they can use them, and how they can use until I have not even tried giving students assignments . . . It is too much of a hassle and no means to really use it effectively."

Karen believes that everyone benefits from technology in education but she sees resistance among associates that are teachers. "Some people still don't realize that everything you do is technology," Karen contends. Karen's sister is on the school board in a city in the Midwest. During their discussions on technology integration, Karen was given a different perspective on why teachers resist it. "They feel threatened," says Karen. "And rightfully so," she adds. "Their jobs are not going to be what they once were and they probably never will be because times have changed, things have changed."

Karen believes that when technology is truly integrated into education, a teacher will not be identified as the one who dictates a student's grade. Students will analyze their own performance and teachers will be needed to assist them. She maintains that unless teachers change their attitudes about technology, they will be out of a job.

Even in accepting technology, job security could be threatened. With a tone of concern, she notes, "My daughter just lost her job to people in Singapore. Those people were not even here in the United States but they were managing the company and the jobs and the people here." Karen also talked about meeting with a group of African women who came from various parts of the continent. These women conversed everyday, through the use of technology, to discuss the grounds they were covering in their various technological interests.

Even within this high tech environment, Karen argues that there are staff members who do not realize "how far technology has come and how far technology is

going." With an attitude of bewilderment and frustration, Karen says that there are staff members at her school who still believe that the book is the best learning source. "I look at them and feel sorry. And I say, 'Where have they been? What rock are they coming from under? Have they not been keeping up?'"

Karen argues that some persons limit their own access to information because they are keeping themselves behind in the print age, especially those with whom she is presently working in this high tech school environment. Unlike these persons, children are moving forward using iPods and playing games, according to Karen.

Karen says that kids are much more receptive to technology than adults. She declares, "They know it and they enjoy it. They love it. They started with it with games and then transferred it on to education and everything else. They love it." Karen adds that anything that kids love they can do. In fact, she mentions that students who have after school jobs use technology, even if it is the fast food chains or airport vendors.

"We learn from children," says Karen. There are times when she has asked students for assistance on her computer system. They are engaged in using technology all day, so that technology problems are not an issue that they cannot handle or that they are afraid to try to resolve.

Karen believes students who prefer books rather than computers are those who do not have computers at home. She urges the policymakers and the financial backers to eliminate these inequities by designing a program that would provide students with computers in the home. "We're a small school. We don't have 100 kids here," says Karen. She maintains the need to assist kids and their families by providing computers for home use.

Karen identifies the pressure of high stakes testing as one of the weak points of education. Little room is left to engage all students in research. The majority of these students enter with the need to satisfy test mandates. The other issue is that in this high tech environment Internet access is a problem. With an air of dissatisfaction, Karen says, "We are suppose to be doing projects." However, she lists the lack of supplies, facilities, and the Internet as barriers to the effective implementation of projects. Karen would suggest that resolving these issues would open up the way to encouraging students to do comparative analyses of other cultures. Within this present situation, she feels that teachers are left to try to find a way to get around these issues so that students "can be exposed to more."

"They still aren't able to hop across the map in social studies. They still don't know how to go over the Niagara Falls. On the Internet, they could do that," urges Karen with a forceful yet sincere tone. She argues that most of us have the privilege of traveling but "the only way some of these kids will ever go is by the Internet." She argues that this program has been in its high tech character for four years and the shame of it all is that only one classroom manages laptops with Internet access, although these laptops are out-dated. "Ridiculous," utters Karen.

Again, Karen speaks of the importance of technology in our lives. We wake up to it and we go to bed with it. She stops at this point to relate a conversation with a recent high school graduate who is now in a fast food management training position. Karen told her that she was headed to one of her food sites to get breakfast. "I know that is a real egg," Karen says. However, she is completely shocked to find out that what she thought was a real egg was not the case. She states,

> That is the way it is with everything in the world and with technology. Anything that you think it is, you had better think again because it is not. It is what they have made you think is an *egg*.

Contributing more to this illusionary capacity of technology, Karen suggests that we consider how technology is used to turn on your home lights at a particular time, suggesting that someone is home. Because of technology, "nothing is what you think it is," says Karen. She encourages educators to teach theses facts to children. "My grandchildren know," says Karen.

Karen believes that technology will make one's environment as large as the world. She writes,

> Technology has and will continue to make us a global world. There are now video connections for interactions with associates, peers, employer, employees, etc. all over the world, just as if they were just next door. Technology puts them in the room with you. No matter what part of the world you are in or what language [you speak].

She adds that it really doesn't matter to which multinational corporation you belong. For example: "My oldest daughter has just taken a job in Africa where she will be teaching adults . . . but she will be in Atlanta with video connections."

Regardless of the explosive nature of technological advancements, Karen maintains an optimistic and relaxed view of her life in the future. On her story map/questionnaire, she writes, "I see myself using technology from the time I smell my coffee and hear my television in the morning, until it puts me to bed at night." In addition, Karen hopes that technology will be used to improve the lives of the elderly and handicapped. In imagining the future of technology, Karen writes, "We will have no boundaries." She imagines a universe where we will live on one planet and work on

another. She writes, “Things that you once thought were science fiction are now being lived, enjoyed, and [we’re] looking for more.”

I reminded Karen that my study would involve science fiction. She quickly interrupted by saying,

> Well you see, some people don’t believe in science fiction. But some of that stuff that was once science fiction is now [fact]. So they had better look at science fiction and say ‘You know what? This may not be just science fiction.’ Stop and think about it.

I talked about John Weaver’s contention that science fiction is more real than what we consider reality. In rapid agreement she suggests, “Go right to Epcot . . . Everything that was once considered science fiction is now reality.”

During the time of this interview, Karen’s brother was very ill. She talked about how the medical staff was monitoring his condition while he remained home. He was given a computer that monitors him closer than he would be in a hospital “while you are waiting for a nurse who is maybe on her coffee break or who is talking on a telephone,” according to Karen. “So we are already there. We are already in science fiction. We are living in science fiction. It’s unbelievable, Vicki. We are just not aware of it,” concludes Karen. I could hardly believe it. They were my own words. Our past, present, and future are worlds of science fiction.

For history and science fiction are inseparable . . . For all that human beings have ever thought about is the future. Hiding in caves, discovering fire, building cities – all of these were science-fictional endeavors . . . Everything we do has to be imagined first . . . [The] invention of gunpowder and the cannon was a fiction made real . . . In the further fictions that became dreams in American History, the invention of the repeating rifle and the Gatling gun did away with the Indian tribes as we moved across the country. All, all of it fictions that became sciences and technology.

- Ray Bradbury (2005)

CHAPTER 5

PARALLEL LANDSCAPES OF ROBOTS AND EDUCATORS

Look around for a need and start coming up with ideas to fill that need. One idea will lead to another. Before you know it, you've done it. See a need. Fill it.
- Bigweld ("Robots," 2005)

"Robots" (2005) is a sci-fi animation that has a heart-warming plot and an optimistic dénouement. The setting is a world inhabited by mechanical characters, with Rodney Copperbottom as the main character. As the story begins, we are introduced to River Town, the working class neighborhood that is home to Rodney and countless supporting characters that are literally falling to pieces. In fact, the inhabitants of River Town are dependent upon used robotic parts to produce their children.

As I consider the notion that there is a parallel world to our own, it is easy for me to imagine my own world of education existing alongside River Town and Robot City. Rodney's marginalized position is not unlike my own where I am constantly attempting to find solutions to inequities that plague students and fellow educators. Too often, I have felt the pressure of those who would resign me to a mechanical, an emotionless, and an unthinking educator that is purposed to serve the desires of those who rule. Like Rodney Copperbottom, I have been encouraged by my own colleagues to become less verbal and more passive; and like Rodney, I have actively resisted those notions.

River Town and Robot City are comparable to any environment. Several social levels are constructed in "Robot City" (2005). At the top of the spectrum are the upper class robot executives of the corporation. Parallel to this spectrum are the state public school systems and the corporate entities that influence their decisions. Within the

vicinity of the corporation, is the working middle class. This level is parallel to the local school districts that are under the authority of the state.

The next level is the world of the Rusties, the street robots that are on a daily quest to merely survive. This level is equivalent to many of our schools where teachers and students' opportunities for success are tarnished by the lack of moral and financial support as well as by a lack of up-to-date resources. This is the world of the marginalized. As a teacher, I once found myself in the world of the Rusties. I have taught without textbooks and I have used my finances to purchase school supplies and decorations for my classroom. Otherwise, there would have been none.

There are too many educators that are or have been in the world of the Rusties. In fact, I am still in that world, although, my space may be somewhat more comfortable than others. However, many educators may have become so disenchanted with the struggle that they opted to leave education. On the other hand, many more of us have stayed, waiting for the time when survival would give place to a thriving educational system for all students and educators.

The lowest level is the dark and dismal Chop Shop that is parallel to those non-traditional schools with the atmosphere of our penal system. I hope that advocates for alternatives to traditional schools will continue to recognize the need to reconceptionalize all educational options. I work with an organization that attempts to dispel the penal tone of non-traditional education. However, there are still for-profit corporations in the business of convincing school districts to contract for the development and management of Chop Shops for those students they label as *at risk youth*.

My ventures through other school sites are comparable to Rodney's quest for answers to River Town's problems. River Town is my work site, which is always in need of revitalization for one reason or another and it could mirror your school environment as well. As a parallel world to River Town, my school is a technological environment where information technology is desired but limited. It is a place where up-to-date resources are rapidly becoming out-dated. Newer but used hardware versions are replacing the old, which is similar to Rodney's birth.

Rodney's birth occurs as a result of his successful construction from the pre-packaged and discarded remains of a robot whose life has moved to another stage. As he aged, he received big boy parts that were hand-me-downs. Upon graduation from high school, Rodney was composed of female parts that were handed down from his cousin, Veronica. Later, Rodney's father found used adult male robotic parts to replace the last.

As I watched Rodney enter various stages in life, I was reminded of my first experiences with computers in the classroom. They were hand-me-downs from corporations and districts that found it necessary to upgrade their systems. Their lives were as short lived and out-dated as Rodney's used parts. As the computers became debris to be removed, other outmodes took their place.

Rodney's stages of growth also remind me of how dependent we have become on technology. It has extended itself into our lives. Rodney's changing parts are our prostheses. They are the glasses that we find essential but must change often or the computer mouse that fails to be detected. I am sure that the reader can imagine those extensions of ourselves that we must upgrade.

Metaphorically, Rodney is also technology with a social focus. In fact, Rodney is every person who dreams of being influential in making the world a better place for everyone. He is every person who chooses to design technology based on our need to be socially responsible. In his weekly, televised program, the socially responsive head of the corporation, Bigweld, says, “Look around for a need and start coming up with ideas to fill that need. One idea will lead to another. Before you know it, you've done it. See a need. Fill it.”

My visits with educators in various schools uncovered parallels to the characters, attitudes, actions, and circumstances in “Robots” (2005). I was reminded of Bigweld’s advice in a conversation with Allison. She believes that we ought to design projects by seeing “a need in the community and to do that need while expecting nothing in return.” Rodney designed technology to make life easier for his dishwashing father. Rodney took the advice from Bigweld's broadcast. He considered the tiring task of washing dishes and he filled a need by designing a dishwasher.

Rodney’s creation malfunctioned when an unexpected interruption occurred. Technology sometimes goes awry when we least expect it. I recall many instances in which a report was due or student evaluations required, only to have the printer malfunction. Printer cartridges are costly; therefore, down time is unpredictable. Monitors have gone out on me in the middle of reviewing a test with a student. What was even more unnerving was hard drive failure while recording the findings of research in the field. Momentarily, I became discombobulated.

When I regrouped, I found myself in a computer repair store listening to a person tell me that a new computer was the answer. Such circumstances are not unique. When I

visited Joyce in her classroom, she was facing the challenge of having no printer connection to student systems. She even characterized many technology problems as having the capacity to affect her emotionally. Her connection to technology is such that she feels pain when it ceases to function in her behalf.

I spoke with Pauline who sees the need for us to engage in technological research that would improve life. Certainly, we can observe Rodney's determination to not only improve life but to guarantee that death will not be premature. My conversations with Karen uncovered her hopes that technology will be used to improve the lives of the elderly and handicapped. As Karen talked passionately about the needs of the elderly and the handicapped, I could hear Rodney formulate in his mind the need to search for new parts for the out-dated robots around him. Rodney is a genius at taking dilapidated parts and repairing outmodes. Rodney recognizes that his purpose is to improve the lives of others. As a fellow educator, Robert urges us to teach our students to be caring by living an exemplary life, a life that demonstrates such a caring attitude in action.

After graduation, Rodney realizes that in order to make a positive impact in the world he must leave home. This attitude is strengthened when Rodney observes his hard-working father, who appears to be degenerating because of a lack of new parts. In order to remedy the problem, Rodney must leave home in search of new parts for his neighbors as well as for his father. Rodney's destination is Robot City, which is totally maintained by Bigweld Industries. Mr. Bigweld is known for his concern for the well being of every person. Whenever a robot is in need of repair, Mr. Bigweld provides new spare parts. Therefore, Mr. Bigweld is an icon, especially among robots in need.

Bigweld's attitude is typical of non-profit organizations designed to aid the underserved. I have worked for such an organization that seeks to serve students that were not successful in large school environments. This organization partners with local school districts to provide small, personal school communities designed to meet the needs of the students and their families.

Mr. Bigweld sets the tone for a system that cherishes the thoughts and presence of others. The gate to Bigweld Industries is always opened. According to Bigweld,

> We never shut the gate. Shutting the gate means shutting out fresh ideas. Everyday robots come here from hither and yon bringing us new ideas. I listen to every single one of them. So remember whether a bot is made of new parts, old parts or spare parts, you can shine no matter what you are made of.

The participants in this study, however, were not so fortunate to have a receptive audience for their ideas. After evaluating their high-tech schools, they found the need for an improved infrastructure and their expressed concerns have fallen on deaf ears. In fact, they have an understanding of the need to expose our students to more than pre-packaged programs. Researching societal issues will stimulate their imaginations to unlock solutions to the problems in their River Towns. However, this is hampered by a lack of access to the information highway.

Unfortunately, in the pre-planning and planning stages of educational programs, too many ideas are gone unheard because the gate is shut. Even when entire staffs remain intact through various changes, the gate remains shut to those who are expected to implement the plans and follow the guidelines. These educators are the experts who have toiled in the field, attempting to separate the wheat from the tares in order to best educate students with little support but with accountability measures in full view.

I have approached an opened gate, only to have it closed because my approach is not in keeping with the views of others. I have always been concerned that we are graduating students without teaching the importance of demonstrating an ethic of caring. My inner-city school district requires students to complete seventy-five hours of community service and my school site has the opportunity to structure a course in service learning. Inner-city students are often the recipients of community service rather than the contributors. They often fail to realize that all of us can be of service to others regardless of our circumstances.

As I presented this idea to staff and administrators, the staff became closed-minded even though the administrators welcomed the idea because they operate a non-profit organization that relies on volunteers. The staff decided that the school refrain from structuring community service workshops or classes and continue the traditional process of merely informing students of the district's requirement.

No excuses were given for following this tradition. We merely moved on to the next item on the agenda. However, it was eye opening to witness the possibility of planning a program only to recognize that educators, teachers, and support staff were willing to ignore the positive impact of service learning on inner-city youth by turning a deaf ear or remaining silent. Some of us relate to the optimistic Rodney and others are similar to Bigweld and the Rusties, who need to be re-inspired and motivated.

Many educators have been in situations where they are expected to fit a square peg into a round hole regardless of the fact that it does not fit the design. I am one who knows such struggles to implement what I, too, would have done otherwise. Throughout my research experiences in the field, I found that such is the case with the participants.

They were never involved in the pre-planning and planning stages of their programs. In fact, teachers are working within school sites where designers continue to elude their expertise as it relates to alterations to activities, components, and methods of delivery. Carolyn, a grandmother that works as a paraprofessional and who has struggled to provide a computer for her grandchildren, does have insight into software choices and the needs of low-income families, especially as it relates to computers in the homes. As I traveled through the classrooms of educators, I found that many of them have productive ideas for helping the underserved children in their school. Bigweld's attitude is seldom found within those walls and those who shine are carefully selected from amongst those who are apt to echo the thoughts of those in charge. However, I contend that Bigweld does exist and we must look internally for the fortitude to allow Bigweld to shine through us all.

Bigweld began to see himself as nothing more than an outmode. He began to think that his attitude was equally outdated. Bigweld lost his drive and determination to uphold his dream of making the world a better place. He succumbed to Ratchet's profit-driven strategies by allowing himself to be overthrown by corporate greed.

As I watched Bigweld's energy level diminish, I thought about my own circumstances. I entered a graduate program late in life only to find the challenge of listening to the voices of those who find age a deterrent. Youthdom is heralded as the place to be. After considering those voices, I came to realize that my thoughts are not always my thoughts and my attitude is anything but outdated. Caring about the direction in which we are headed in the creation and use of technology can never grow old; but if it does, we are already doomed for destruction.

Veteran teachers that are nearing retirement are often thought of as being withdrawn from the focus on technology integration in the classroom. It would be interesting if a reader decides to research the actual reasons why veterans opt to leave the profession at an early age. Are they comparable to Bigweld who lost his drive?

With Mr. Bigweld's lost of drive to make life comfortable for all robots emerged corporate greed in the image and leadership of Ratchet. There may be many of us in school districts that work desperately to seek sources to meet the needs of students labeled "at risk." Unfortunately, in desperation they outsource a portion of their non-traditional settings to for-profit corporations while not fully realizing that their district has the capacity to meet the needs of all students by involving the resources of the community and non-profit organizations.

One such for-profit corporation identifies its primary purpose as the removal of disruptive and low-performing students so that schools will be safer and more productive environments. Their position is in keeping with the Chop Shop of Robot City. In River Town, Mr. Copperbottom's boss called Rodney "a hand me down son of a dishwasher." And his voice bellowed with the suggestion that Rodney would never amount to anything. Rodney finds the same attitude in Ratchet.

Ratchet considers outmodes as ready for the trash heap. For that reason, Ratchet designs a plan to maintain cleanliness in Robot City by capturing the Rusties and sending them to the city's underground Chop Shop, a place that no robot wants to go. Sometimes students from the profit-driven corporate school manage to enter my school site. They describe the setting as not so safe and definitely not a place students want to go.

The Chop Shop is managed by Gasket, Ratchet's evil mother. Gasket is no different than the rusty robots in the Chop Shop and Mr. Copperbottom's boss is no different from the persons he manages. This is typical of situational irony: We can always perceive others in a different light, even when the same spotlight shines on us all – the oppressed and the oppressor.

Ratchet's motto became "Why be you when you can become New." This motto was etched within the arch to the gate of Bigweld Industries. This idea has also been etched in the minds of people who elect a nip/tuck because our society has been so preoccupied with the need to remain physically youthful. We cannot deny how technology is used to capitalize from the sagging esteem levels of people who have been presented a physical image of desired perfection. Too often, surgeries go awry, leaving people with emotional and physical scars. These lessons can best be taught in our classrooms rather than during the twisted aftermath of regretful choices.

Bigweld's motivation for maintaining Bigweld Industries was in sharp contrast to that of Ratchet. Bigweld says, "To me, having the company was all about making life better. With Ratchet it was about making money. That came first." Ratchet says, "What a remarkable legacy - concern for the common robot. You don't come across old-fashion values like that anymore, friends, and for good reason. There's no money in it."

Ratchet's criticism of Bigweld's social interest provides a glimpse of one reason for corporate involvement in the development of new technology as a major focus in education. Ratchet typifies those corporations that have emerged from the imaginations of those who find education as a vulnerable arena for their profit-driven motives. During my visit with Pauline, she listed the hardware and software vendors as the first

beneficiaries of technology in education. She noted, “They’re the first ones to benefit because they’re making the money.”

We cannot reasonably argue with the idea that education has become a profit-driven market. There are entities that support underserved students but there are many more that enter the business of curriculum for Ratchet’s purpose: To make money. Ratchet says, “Let's get down to the business of sucking every loose penny out of Mr. and Mrs. Average Knucklehead.” Ratchet wanted robots to buy new upgrades and any robot that could not afford it was ready for the scrap heap.

Financial gain is paramount. It leaves me to question: For whom does technology in education make life better? As I watched the film, the main idea was always apparent: Robots were in need of parts in order to survive. Those that could afford it would simply upgrade. However, those who couldn’t were led to find whatever parts were available. Ratchet responds, “We're not a charity.”

After interviewing teachers, I used time to observe and collect documents. During that time, I overheard teachers in a discussion of computers in the homes of students of low-income families. One respondent initiated the discussion with another who was adamant about supporting such a program. The other respondent was even more adamant that this would be the wrong move. Discussions of security and loss of financial resources were pursued.

Earlier that day, I had a conversation with Carolyn, a paraprofessional who had the awesome responsibility of raising two teenage grandsons. Carolyn identified her position among low-income families. It was difficult for her to provide a computer for her grandsons. Nevertheless, she wanted them to have the same opportunities to access

the Internet and to expand their world that economically advantaged students can afford. Carolyn made a tremendous sacrifice to purchase a computer. Otherwise, her grandsons would be among too many students who only have limited access at school. Unfortunately, programs designed to place computers in the homes of underserved students meet with attempts to end them before they can even begin.

Pauline spoke to me of one district's discarded plans for computers in the homes of students. Again, the lack of an accountability measure was said to be the reason for discarding those plans. I checked news articles about this district's plans and I found that public outcry, followed by legal maneuvers, caused them to nix their plans. In February 2006, the school district made a failed appeal to a higher court to reverse a lower court's decision that halted their plans to place laptops in all homes of middle and high school students.

The district school board proposed to use the one-cent sales tax money allocated for technology upgrades. The cost of the laptops for students and teachers would amount to $59 million and the district court viewed this proposal as a violation of the referendum for technology and school improvement. Parents and teachers argued that the laptop proposal was a waste of taxpayer dollars. It was later uncovered, through a court ordered audit, that the district school superintendent had misled the public and school board officials. Although he maintains his innocence, the superintendent was accused of manipulating the laptop contract to favor Apple computers. In August 2006, the superintendent resigned.

During the time of this district's controversy, another state school district proposed to place laptops in the homes of middle school students. Participating parents

would agree to a two-year or four-year lease agreement at a cost of $39.48 or $78.96. At the end of the lease the computers would be purchased for $1.00. This district would not be involved in the contracting process but only serve to direct families to the vending sources. Families that cannot afford to participate but meet federal free and reduced lunch requirements could apply for financial assistance.

Allison worked with a program that provided home computers for low-income families. Her conversation prompted me to examine the program, particularly the source for their computers. The program's purpose is to provide training as well as computers. However, they rely on computer donations from businesses and individuals that are upgrading their technology. Those computers needing repair are refurbished and made available to families identified by the program's human resources. Similar organizations exist throughout the country. However, their methods of acquiring computers are similar to the methods used by the Rusties.

The Rusties scavenged the city's garbage for usable parts because Ratchet had discontinued manufacturing them. New computers for the homes of low-income students may be considered a luxury that capitalists may not desire for the oppressed to possess. We read of humanitarian efforts. But, how human are we to simply find pleasure in passing on our discards to those less fortunate. Even such humanitarian efforts can be comparable to the Rusties' search through the garbage for anything that would sustain them.

Because the Rusties could not afford upgrades, they were considered outmodes and they became those living on the margins. It is my desire that we may all awaken to find that we are no stronger than the weakest of us all, and then, we would begin to

challenge attitudes that nurture oppression. Rusty Fender viewed challenging a profit-driven attitude as an experience in getting a "butt whipping." However, my attitude is comparable to Crank. Rusty Crank states, "I'm tired of just complaining and never doing anything." Rodney adds, “This is our moment to shine, to show them what we're made of.” Freire would also agree with Crank and Rodney that our conversations must be backed with action and reaction. There is no time for complacency.

Karen was convinced that financial supporters for new computers for low-income families could be found. Pauline was less optimistic in our conversation. She contends that disadvantaged kids are not on the priority lists of policymakers and district administration. Nevertheless, we must allow our dissatisfaction with inequities to be the impetus for our reaction to these circumstances.

We ought to react to our world of the Rusties – marginalized, neighborhood schools that are not the focal point for technology and upgrades. We ought to question our school districts’ choices in who receives more than others. In talking with Allison, I found that certain monies for technologies in her school district are earmarked for schools with a technology emphasis. Those without this emphasis are not likely to have an abundance of up-to-date technologies. Yet, it is the district that determines schools’ emphasis areas.

Allison notes, “I think that the board members have a say so in terms of the advocacy for their district, and what they want to see happening in their district.” As she was speaking, I thought about the lack of presence of the district board member for my school. During the last fifteen years, my elected board member has never been inside my

school. If board members have influence in the direction taken for financially supporting their district schools, then they ought to get everyone involved.

The greedy Ratchet rarely visited the Chop Shop, although, his mother and father lived there. The Chop Shop is managed by Gasket, Ratchet's evil mother. Gasket is no different than the rusty robots in the Chop Shop and Mr. Copperbottom's boss is no different from the persons he manages. This is typical of situational irony: We can always perceive others in a different light, even when the same spotlight shines on us.

Bigweld Industries' workers are typical of those who ought to collectively challenge decisions that are not made in the interest of all; yet, they do not react for fear of losing their jobs. In our conversation, Robert openly discussed his own insecurities in applying technology in the classroom. Even though he labeled "fear of technology" as the reason for this reluctance, he was even more fearful of losing job security. He had tuition to pay for two children in college at the same time. Therefore, Robert found the need to protect his job by following the script as presented. Robert's story is not uncommon.

Challenging questionable decisions is not the only thing educators fear. Allison and Carolyn spoke of how fearful some teachers become of technology. Unlike Rodney Copperbottom and the students with whom these educators work, some teachers are afraid that they may break the equipment and they don't want to be held responsible. This attitude was prevalent among veteran teachers.

I maintain that fear is typical of those teachers who misunderstand the creative potential of the proper use of technology in the classroom because of a lack of training and proper orientation to technology. Karen notes that fear of change itself is typical of veteran teachers. For that reason, veteran teachers could be more resistant to technology

integration. These teachers may be more like the humorous and elder Rusty Fender, who says, “In my case it's a rare metal called afraidium. It's yellow, tastes like chicken.” Afraidium is the fictional chemical substance in “Robots” (2005) that is analogous to fear.

Students are not filled with “afraidium.” They have similar attitudes to robot Rodney and the younger Rusties. Carolyn and Robert contend that students can tear up anything and, without hesitating, students can repair it if they choose to do so. According to participant Karen, technology problems are not issues that kids are afraid to tackle but adults have a different approach.

In examining our past, we are apt to find reasons for a somewhat naïve approach to technology. Many of us are as naïve as Rodney when he first saw the fast paced life in Robot City. My conversations with educators in the field have provided them an opportunity to unlock that past in order to best critique themselves as teachers in a technological reformation in education. Robert describes himself in his high-tech environment as, initially, quite inexperienced. Roberts was as overwhelmed as robot Rodney’s when he first entered Robot City. This may be the case with many of us.

Before new technology became a focal point in education, particularly the computer and information technology, many teachers’ views of themselves were characteristic of Pauline’s analysis. “I was a textbook, overhead, film projector teacher,” she says. Unlike Pauline, however, many teachers remain fixed in their traditions or they incorporate their traditions with the use of technology as Pauline has done.

When I met with Pauline, who has also experienced complete changes in the structure of her school, she was convinced that some teachers struggle with change. She

says, “I feel that the program was not readily accepted because it involved change and change is not always accepted when persons are unfamiliar with the change or desire to hold on to the past way of doing things.” Joyce agrees and she finds that many teachers have a difficult time breaking the stronghold of traditions. Karen continues to find value in traditional teaching methods as well as the use of the computer.

In contrast to Karen’s methods, robot Ratchet believes in totally discarding the old robots, while embracing the new. On the other hand, Mr. Bigweld values the old and the new. This film and this study suggest, however, that we value the old and refrain from placing ourselves in a debate over what has value and what doesn’t. Embrace all methods and use them according to the needs and interests of the students. Isn’t this the message in technology integration? We are encouraged to integrate technology into our existing classroom methods of instruction in order to enrich student learning.

Freire would give the Rusties many accolades for recognizing the importance of working collectively to abolish oppression. “Let's make clear that people mobilizing, people organizing, people knowing in critical terms, people deepening and solidifying democracy against any authoritarian adventure are also people forging the necessary discipline, a discipline without which democracy does not function” (Freire, 1998, p. 89). In a quest to successfully overthrow Ratchet and reinstate Mr. Bigweld, Rodney and a group of outdated robots, the Rusties, design a plan together. Many of us are frequently subjected to oppressive situations in education and, yet, we fail to unite as one voice. As a result, injustices continue and our silent voices become contributing factors.

Robot Rodney recognizes Ratchet’s method of distracting Bigweld from the needs of others. Ratchet continuously supplied Bigweld with dominoes and Bigweld had

become preoccupied with setting up an elaborate domino design. When Rodney triggered the fall of the dominoes, it signaled the reawakening of Bigweld. Falling dominoes represent the triggering of nerve cells and how information travels from one end to the other.

Each one of us may identify our dominoes or our distractions in various ways. Too often, we find that our children are used as distractions. I have been accustomed to hearing that problems don't matter. "Do it for the kids" is definitely clichéd. However, when all children fail to be presented enriching experiences throughout education, including technological experiences, our dominoes ought to fall.

The speed of my falling dominoes escalated during my studies in the field with other teachers sharing their experiences. Just as Mr. Bigweld was reawakened to the needs of all robots, I have been reawakened by a new concern that Ferneding (2003) expressed in her study. Although I support technology integration, I am concerned that we are loosing site of the need to support our human resources. While studying in the field, I was brought face-to-face with the possibility that one of the participants would be terminated – the result of staff cutbacks. Mr. Bigweld was concerned about everyone, even those who he had never met. It should not be necessary for us to have direct communication with others in order to demonstrate an ethic of caring about their circumstances.

This study also awakened me to the fact that many of us are working towards the integration of technology without being fully aware of our schools' specific technology goals. Although participants could not explain these goals, I hope that my question was the trigger to awaken them to the need to question technology efforts in education.

Robot Rodney thought Mr. Bigweld would fight their battles; but he came to realize that it was up to the Rusties and him. Rodney's determination to effect change and his perception of Bigweld rejuvenated Mr. Bigweld's concern for all. Bigweld says, "Thanks [Rodney] for believing in me." The greatest gift one could give others - students or colleagues - is to believe in them.

Robot Gasket was concerned that outmodes would begin to think: "We can fix ourselves. We don't need upgrades." We need to recognize that we do not need to succumb to the corporate use of pre-packaging our ideas and selling them back to us. Those in the field can fix the problems. They have the answers. Pauline says that no one knows her situation and her children better than she. We only have the need to listen to them all – educators new to the field and veterans. We need to listen to each other with an open mind.

Robot Piper, Fender's young sister, could be metaphorically anyone who feels that they are not taken seriously, especially new teachers. Ultimately, her determination to prove her worth becomes apparent as the Rusties seek to reinstate Mr. Bigweld. As members of my system's teacher advisory counsel, veteran teachers are expected to mentor new teachers. There was an occasion when I felt role reversal was in order. One teacher recalled conflicts with veteran teachers regarding such issues as discipline, delivery, and technology. Although she voiced her opinion, she was left feeling unheard and she conceived her efforts as useless. Members of the counsel were not as sympathetic as they could have been. In fact, the new teacher's concerns were lightly addressed, but I suggested that she never resort to a silent voice. This is in keeping with the manner in

which Piper's opinions were initially received. The Rusties considered Piper to be too young to get involved and they sought to protect her.

New teachers are closer in age and attitude to the generation of teens with whom I work. My *new teacher years* were nothing in comparison with today. I witnessed no such technological reform efforts that are now apparent. Therefore, I nurture the laws of reciprocity because new teachers have as much knowledge to impart as I and I become their student. Therefore, we ought to develop bonds among teachers where youth is not downplayed. As I watched a bond develop between the Rusty Fender and Rodney, I observed a much older Fender demonstrate an attitude of respect and support for the youthful Rodney. In fact, Rodney's genius is used to repair Fender's dilapidating parts and the underrated robot Piper helps lead a successful reform effort.

Just as Reynolds (2003) values the dedication of new scholars within the "university in ruins" (p. 96), I recognize the importance of new teachers as valuable human resources in education because they bring fresh ideas. Reynolds' (2003) "university in ruins" and our struggling public schools are River Town and Robot City. In fact, robot Rodney is compassionate new scholars and new public school educators. Their fresh ideas may exclude reluctance to the integration of technology in their classrooms and they may include no reluctance to voice concern for inequities in education.

Just as the AND generation scholars work "within the calls to sacrifice scholarship on the altar of enrollment numbers, and within the urge to sell student abilities short" (Reynolds, 2003, p. 96), new teachers are entering a field that places creativity on the altar of standardization. In comparison, a restructured Robot City was

founded on standardization, conformity, and the desire for profit. If our new teachers are willing to work collectively and aggressively, then there is hope for a system of education that is based on compassion for all. In fact, veteran teachers that maintain a fresh awareness of the needs and interests of digital generations, and the willingness to avoid silence, will be as productive, now and in the future, as the Rodneys and Pipers in education.

Sometimes, however, you may find that the very people you are attempting to free from oppression are the ones who join the fight against you. For example: As Rodney and the Rusties fought against Ratchet and Madame Gasket, numerous Chop Shop outmodes sought to destroy the Rusties as well. I can certainly relate because I often find myself isolated from those teachers whose interests and needs I actively support. I am sure that many of you have been in situations where you have been the only voice challenging oppressive, superfluous, and non-productive agendas only to find that those you support have become your opposition. Silent voices are indicative of passive opposition.

Most of the motivation teachers receive comes from their students. But it was one of the most rewarding experiences as a teacher and researcher to have a peer compliment my efforts. In a conversation with Robert, he stopped to explain how he admired the direction that I chose for this research. As a fellow veteran teacher, Robert analyzed himself as a lifelong learner and he further complimented me on not allowing age and the number of years in education to deter me from continuing to study. In fact, Robert adds, "This is gonna make Robert get up off his duff and say 'He needs to do what he needs to do'" As educators working through many challenges, we ought to embrace Bigweld's philosophy that anything is possible if one remains persistent in spite of opposition.

How can we identify with robot Rodney? Tim, the gatekeeper of Bigweld Industries, considered Rodney a dreamer that is committed to a lost cause. Many of us have frequently viewed our situations in schools with the same attitude as Tim. Many find a lack of support and resources as the generators of a lost cause attitude. However, those of us that are committed to improving education ought to embrace the label of "dreamer." Without the dreamers that are radically aggressive in the field, the creation and use of technology with a focus on responsibility for the quality of all life would be a lost cause.

Bigweld's advice is timely when so many power struggles, including technology integration challenges, are emerging in education that threaten the supply of creative and committed educators that enrich the lives of students. I recall the back of the pocket watch in this film. It was visual for only a brief moment and I wondered what was its purpose in the film. There was no back on it, exposing its mechanical workings. Metaphorically, it shows us that the inner workings of our school and society, with its history, power struggles, and ethical considerations are not hidden from sight. We only have the need to remove our blinders.

Many people are either leaving the profession or they are excluding teaching as an occupational choice because of our struggles. Mr. Bigweld says, "Quitting is not so productive, either." Robot Rodney has heard such advice before. His father encouraged him when things seemed dismal and we ought to find strength, collectively, as Rodney and the Rusties.

If I could do it over again, I would follow my dreams. You've got greatness in you Rodney. Never doubt it. You go to Robot City. You go meet Bigweld and you show him your big ideas. And Rodney, never, never give up . . . I know it's not easy; but a dream that you don't fight for can haunt you for the rest of your life. It's up to you . . .

-Mr. Copperbottom ("Robots," 2005)

CHAPTER 6

UNLOCKING THE MYSTERIES

The world our children will face and be responsible for will be in so many ways different than what we have known.
William M. Reynolds (2003)

Reflecting on my childhood experiences, I perceive those years in the classroom as many worlds apart from those of my children and the students that I have yet to meet. Today, technology is viewed as the mythical savior of an educational system plagued by challenges in preparing our students for this and future worlds.

This study examined the orientation and attitudes of public school educators towards technology and techno-reform. I realize that educators' perceptions of technology will ultimately determine whether our students are taught social responsibility in the creation and use of technology. This study provided a discourse that uncovered how participants developed these perceptions by revisiting their past as well as by discussing their present experiences with technology.

Satellites are often prominent fixtures in SF. This study is comparable to a communications satellite that is positioned in space in order to receive and convert data into usable information through its data communication handler. It receives information from one source and transmits it to another. A satellite is powered by solar energy.

As I engaged in this research study, I was guided by two major components of my satellite: critical theory and the in depth interview. As participants and settings revealed their stories, critical theory was the energy source that guided my attitude. The in depth interview, my data communication handler, afforded me an opportunity to understand how and why people think and act as they do within the actual fields of their experiences.

Benjamin (1940/1968) argues that the act of translating always changes the translator. The act of interpreting the findings of this study has changed me. As an active participant in this study, interviews provided varied perceptions to consider as I expand my own lived experiences in new fields and in new ways.

Cuban's (2001) research encouraged me to evaluate technology integration in settings where access is not the primary issue. The settings for this study were public school environments with a technology focus. All participants selected have also had experiences in traditional environments without a high-tech emphasis and each one has had at least ten years of experience in education. For this study, I refer to Carolyn, Karen, Pauline, and Robert as veterans because their twenty plus years in the field. Allison and Joyce are considered new to the field. Each participant provides multiple perspectives of technology integration in instruction.

In spite of the rapid advancements in technology, the integration of technology in education is a challenge in America. This study was conducted to determine those factors that impede the successful integration of technology in instruction that is presented by education reform proponents as a means of enriching students' lives. I also sought to determine the steps taken to teach and promote social responsibility for humankind and the environment, while viewing educators' technological experiences through the lens of science fiction.

This chapter presents the findings, which indicate that educators' orientation to technology, self-efficacy, perceptions of technology, technology resources, and training and support are predictors of technology integration. In addition, educators' involvement in the planning stages of technology programs and high-stakes testing are significant

factors. A discussion of these themes will include a linkage to theory, science fiction analogies, and other studies based upon my theoretical interpretations.

Orientation to Technology

I chose to include a story map as a method of determining past and present experiences with technology as well as future projections. I was inspired to take this approach by William Reynolds who deems it important to revisit the past in order to gain an understanding of our present situations (Personal communication, 2004). Sam Beckett, the scientist in "Quantum Leap" (1989-1993), traveled back in time in order to make right those situations that ultimately went wrong. Reflection is our quantum leap into a past that provides the reasons for our challenges in education. Through reflection, we gain perspectives on how to best change a future that will ultimately become our history.

It is my contention that reflection opens the pages of our stories that have often escaped our analysis. As participants reflected on past experiences with technology, it became apparent that veteran teachers with as many as twenty years of experience had fewer opportunities to engage in the use of new technology, particularly computers and the Internet. Their introduction to technology in the classroom developed as a result of the restructuring of many small schools to high technology environments.

Although she was not aware of the impact of technology used in warfare during her childhood, Carolyn was just entering public school when a mushroom cloud rose over Nagasaki in 1945. In fact, the majority of veteran participants were elementary and high school students during an age when computers occupied huge spaces and the Internet was primarily for research and governmental use. Their college and university experiences

provided limited access to computers in libraries and none were available in the classrooms.

In reflecting on one's orientation to technology, many readers may find that their initial contact with computers could be traced to a workplace outside the educational arena. Karen was introduced to technology through corporate America. Karen was hired by a telecommunications company, and trained as a keypunch operator and data processor. In comparison to Karen, I did not enter the field of education immediately upon acquiring a college degree. Consequently, my introduction to new technology was initially provided during my two years of banking experience.

Participants' early high school teaching experiences excluded the use of computers in the classroom. Reflecting on their years as new teachers, veteran participants described their experiences as limited to what we now consider old technology: books, manual typewriters, and film projectors. I share their memories of film projectors and the cumbersome task of threading film through slots that were not designed for human fingers. This was an era in which the presence of a television in the classroom was a novelty, while the almighty textbook occupied the focal point of education's resources.

In studying the past experiences of Joyce, a teacher newer to the field than the other participants, I determined that technology occupied an active position in her pre-teaching experiences, although she does not critique herself as an expert. Many new teachers are members of the first generation of digital kids. They have few inhibitions, if any, to new technology because it is as comfortable to them as the television and radio were to the veterans. In other words, new teachers entering the field of education have

had a different orientation to technology. They have had the experience of utilizing computers and information technology for the purpose of research. They have enjoyed scholarly conversations through WebCT from their personal laptops or home desktops during their first years in college. In fact, readers that are new to the profession may find commonalities between themselves and our students regarding interests in virtual reality and online games. I observed Joyce enjoying computer games during her lunch break.

Because of teacher shortages throughout the country, many districts hold job fairs in hopes of remedying the problem by appealing to members of the corporate workplace. Allison entered the field after working as a consultant and trainer for a software vendor. Many new teachers from the corporate world, such as Allison, may have testimonies of proficiency in using technology and readers may also relate. Their orientation to technology is in sharp contrast to veteran teachers.

Participants agree that kids are more receptive to technology than adults. As a result of observing her students, children, and grandchildren, Pauline is convinced that children have a natural curiosity for technology. The findings of this study would suggest that our students have a drastically different orientation to technology than veteran educators, in particular. Participants' children and grandchildren that are just entering elementary school are actively engaged in using computers and visiting Internet sites for kids their age. In fact, their technology-savvy father introduced my pre-school age grandchildren to the computer.

The digital generation is engaged in using technology each day. Their comfort in programming and using technology is oftentimes in sharp contrast to adults that struggle with directions to activate technology. Unlike the novice X-Men, who had Professor

Xavier to teach them to use and control their technological gifts, students become our teachers that guide us through resolving problems we encounter with hardware and software issues. From Karen and Pauline's stories, we are provided a glimpse of the influence of their children towards their own orientation to technology. Participants state that kids have no fear of technology and they welcome change. Their orientation is what makes the difference.

Self- Efficacy

I am reminded of Bandura's (1993) contention that a person's efficacy beliefs have an impact on performance. Educators are always prompted to be aware of students' sense of self-efficacy as an indicator of their ability to accomplish complex tasks. As life-long learners, educators ought to consider how our self-efficacy development is a factor in any learning environment

Educators' sense of self-efficacy or their ability to see themselves as effective users of technology is an indication of their attitude to technology integration in instruction. This factor was determined when I asked participants to describe themselves as users of technology and I shared my own critique of self. I have a highly developed sense of self-efficacy in the use of technology and I tend to become aggressive in applying practices to bypass or eliminate the barriers to successful integration of technology. It is not uncommon for me to venture outside my school for assistance in acquiring resources for the students. In fact, those with high self-efficacy are aggressive in their critique of barriers to technology integration.

Allison's position as itinerant counselor requires a proficient use of technology and her approach is positive. The development of her high self-efficacy is apparent in her

experiences. She was introduced to computers when she accepted a position with a software vendor, which assisted her in building personal efficacy beliefs that continue today. Allison's position as a trainer for technology integration in instruction has also afforded her opportunities to critique the sense of efficacy among other teachers.

> Carolyn: I am not an expert in using computers. But I have taken several staff development classes.
> Joyce: I am slightly less than an expert but certainly more than middle of the road as it relates to technology skills.
> Karen: Before we got computers to use in the classroom, the only thing I did on the computer was to answer my e-mail and to look for and print out recipes. I do see myself better than I was three years ago. Hopefully, I'm middle of the road as a user of technology.
> Pauline: I did not view myself [in the past] as a fan of technology.

Among those who do not express high self-efficacy, I find that staff development training may account for their positive approach to technology. These are the participants that identify their expertise as "middle of the road." Carolyn and Joyce have elected to participate in numerous technology training experiences since being a part of a high tech school staff. Too often, I have listened to teachers and administrators complain about their lack of expertise in using computers. On-going training or short-term staff development is not one of their options.

I am among those educators, including Carolyn and Joyce, who chose training sessions. Although I critique myself as having high self-efficacy, I can reflect on an increased sense of self-efficacy in utilizing technology throughout my training experiences. I would contend that those who select technology courses are more prone to build self-efficacy than those who are forced to take staff development courses because of state mandates. As a result, each enters training sessions with varied attitudes that may

dictate their outcomes regarding efficacy building as well as the use of technology in the classroom.

I find that participants may be driven by the thought of what technology can do, which also contributes to building self-efficacy. When we view complex tasks as beneficial to the personal improvement of our quality of life, we are often led to challenge the complex in order to gain its benefits. I gathered this impression through conversations with participants. For example, Carolyn and Karen's families have a history of Alzheimer and other problems associated with aging. Carolyn believes that using the Internet to research aging would help families learn to cope. Therefore, I contend that issues related to health could motivate people to learn to use technology. In other words, when educators are motivated by personal interests and needs, the process of developing high self-efficacy in the use of technology will become more apparent. We can also see this attitude in the types of projects and activities teachers design for students.

Robert has a different critique of himself as a user of technology He says, "I was slow to venture out in technology . . . I really haven't been outgoing in really taking advantage of it like I should . . . I don't know why I am so scared of it." Robert's attitude is typical of educators with lower levels of self-efficacy in the use of technology. He cannot avoid technology altogether because he teaches in a high tech environment. Nevertheless, he admits that he has been slow in engaging in technical tasks. Robert's behavior is in sharp contrast to those educators with higher self-efficacy in using technology, whose actions and thoughts suggest that barriers to effective technology

integration can be either eliminated or by-passed. They are more actively engaged in projecting themselves in leadership roles than the inefficacious.

Everyone has experienced low self-efficacy at some point, especially when presented tasks that are completely unfamiliar and complex. The crucial point is that we conduct a self-appraisal and work towards increasing our levels of efficacy. This is exactly what Robert has done. He paints a self-portrait of an educator that is fearful of technology. In spite of this fear, he works diligently to overcome this fear so that his students will benefit from computers in the classroom.

Robert is also typical of teachers that have "student-centered educational beliefs but were reluctant to use technologies because of personal fears or inhibitions . . ." (OTA, 1995, p. 132). In Robert's case, job security is the motivation for moving forward. "[Teachers] feel threatened," says Karen. "And rightfully so," she adds. "Their jobs are not going to be what they once were and they probably never will be because times have changed, things have changed."

There are factors other than concern for job security that contribute to the development of higher self-efficacy among educators. As I studied the stories of the participants, I found that commonalities existed among them. Those who consider themselves proficient users of technology had a variety of learning experiences with technology prior to teaching. These participants are confident in their ability to integrate technology in spite of the barriers.

In contrast, those who label themselves "middle of the road" had fewer experiences with computers and the Internet prior to teaching. In fact, none of them could articulate the technology goals for their school or the district. These participants

questioned their ability to adequately integrate technology because of the existence of barriers. Finally, the participant with a lower level of self-efficacy had even fewer experiences than the others. In addition, he could not identify the technology goals for the school.

Regardless of their self-efficacy, all participants were able to provide an appraisal of the attitudes and behavior of colleagues towards educational technology. Fear of change and fear of technology are two factors attributed to teachers who resist technology integration. However, articulating reasons for the fear may be difficult for the inefficacious.

Robert is uncertain of the roots of his fear. Nevertheless, fear that is often aligned with worry, anxiety, and stress is a very real factor affecting educators' behavior and their subsequent confidence in using technology in instruction. In "Teachers and Technology: Making the Connection," the Office of Technology Assessment (OTA) contend, "All teachers, however, should be confident in applying technology when and where appropriate. Like their students, they should be 'fearless' when it comes to using technology" (1995, p. 50), as fearless as Storm and Wolverine, the X-Men.

When technical problems occur in the classroom, students are the first to come to a teacher's aid. In fact, participants mention that students usually know more about technology than many teachers. In contrast to many educators, students are not reluctant to use technology for fear of breaking it. Karen, Carolyn, and Robert agree that technology problems are not an issue that students cannot handle or that they are afraid to try to resolve. From the participants' description of our fearless students we can draw an analogous relationship to Niven's *Ringworld's Children* (2004). In order to safeguard

Ringworld's system, a vast and complex piece of technology itself, Louis Wu must seek the aid of children to maintain its stability.

Robert contends that we educators ought to adopt this attitude. We can learn from kids. Robert says, "Age doesn't matter." As Robert spoke, I began to reflect on suggestions for building self-efficacy. I encourage my students to surround themselves with a positive support system that will help them. For students, concerned teachers are a part of that support system. However, we ought to consider our students as the support we need in building high self-efficacy as it relates to technology.

Our students are digital kids born in a new technology era. As a result, they do not approach learning, entertainment, communication, thinking, and work in the same fashion as those of us born outside of their generation. However, as educators, we cannot continue to lag behind them in developing self-efficacy because our students and children cannot be left to define what is appropriate and responsible through the voices and behavior of Internet predators – a major concern for participants in this study.

Perceptions of Technology

Techno/Human Experience

In contemplating our experiences with technology throughout this study, I began to recall, understand, and accept Hayles (1999) contention that we are the first prostheses. Hayles (1999) says, ". . . the posthuman view thinks of the body as the original prosthesis we all learn to manipulate, so that extending or replacing the body with other prostheses becomes a continuation of a process that began before we were born" (p. 3). We are born into this world as products and extensions of our parents. Any subsequent extensions of our bodies are merely continuations and I maintain that with each new extension is a

rebirth. I use this position to also examine just how connected we are to everything in the universe.

Participants voiced opinions that we cannot survive without technology. Our bodies are both natural and artificial and both cultural and human. We ought to seriously consider the notion that we are the cyborgs of science fiction. I am reminded of the Borg, a group of cyborgs in the Star Trek series. The Borg are engaged in perfecting self. However, they are implanted with a mental device that connects their minds to one mind, that of the Queen.

The line between what is technology and human is so thin that we have become unaware of its existence. We continue to attempt to treat both as separate and unique and we fail to realize that our dependency is based upon their interconnectedness. This view is not designed to be pessimistic but it draws our attention to the need to reconceptualize our perception of humankind in relation to technology. We are not merely subjects but we are subjects/objects functioning between rationality and irrationality. For this reason, I refer to our experiences as "techno/human." As noted in their responses, all participants view technology as an important part of the human experience. For example:

> Carolyn: It is everywhere.
> Pauline: Everything is technology driven. It is a part of our fiber.
> Joyce: We cannot do without technology.
> Karen: I see myself using technology from the time I smell my coffee and hear my television in the morning, until it puts me to bed at night.
> Allison: Our cars. Everything is digitalized. Our watches, our microwaves, our stoves.

Technology is so much of an extension of our lives that participants argue that they cannot do without it.

In reading Joyce's story of her dependency on technology, I recall numerous instances when my computer was not functioning. On one occasion, when I was scheduled to attend a class online, my computer shut down. I was so frantic that I began to call students to have them report why I was absent from the chat room. Even at that, I developed the worst headache. Many students can relate to this experience. When my computer had a virus I felt the symptoms. Joyce insists that you are aware that you are missing something. She adds, "It feels as if the computer is another person in the family." In other words, technology becomes an extended member of your family as well as an extension of your very being. McLuhan (2001) urges us to recognize that any extension affects the psyche and it becomes a part of our personal lives.

Technology has and will continue to make us a global world. "We use to tell them that a book opens up your world but now [with] the computer not only can they read it but they can see it," confirms Pauline. McLuhan (2001) argues that our technologies have transformed us into a global village and our cities will never be the same. McLuhan (2001) adds,

> With instant electric technology, the globe itself can never again be more than a village, and the very nature of city as a form of major dimensions must inevitably dissolve like a fading shot in a movie. The first circumnavigation of the globe in the Renaissance gave men a sense of embracing and possessing the earth that was quite new, even as the recent astronauts have again altered man's relation to the planet, reducing its scope to the extent of an evening's stroll (p. 375).

Participants consider technologies as inexpensive and effective ways to communicate, globally. They list video-conferencing, chat rooms, and advertising as "great tools." Allison recognizes the socially transforming effects of the Internet and cell phones. "The whole thing is social," she says. Look at what email has done for us. In fact, I am reminded of my experiences in my universities chat rooms that brought students

together from across the state. This experience became so important to me that once it was over, I would frequently visit an empty chat room. Addictive? Maybe so. But the chat room experience became a part of the social/cultural dynamics of my being.

In the future, “We will have no boundaries.” Karen imagines a universe where we will live on one planet and work on another. Pauline views technology as heading towards becoming a powerful tool to perform repetitious or dangerous tasks. On the other hand, Joyce draws our attention to the future possibility of being implanted with some type of coding device that would be used to monitor us. This projection reminds me of “Harrison Bergeron,” Vonnegut’s (1961) dystopian science fiction short story in which members of society have been technologically reduced to average intelligence and physical ability while controlled by implanted devices.

This study finds that participants perceive technology as a curse as well as an asset. Participants understand the need to recognize the dark side of technology. Yet, I maintain the position that we cannot overlook the human connection (techno/human). First, concern is expressed for the sordid nature of sites available to people, especially children that are the objects of Internet predators. A major challenge is protecting students against the seedy side of the world made available through the Internet. The OTA (1995) reports,

> Bringing the world into the classroom is a laudable concept, but it can also have a downside . . . The same information superhighway that makes it possible for students to talk to the Archbishop of Canterbury or the state governor online could also link them to criminals, pedophiles, or psychopaths . . . Some educators fear that, without proper safeguards, concerns like this could block the educational potential of telecommunications in schools. (p. 27)

During a 1953 visit to Los Angeles, Adorno (1953/1994) was inspired to write "The Stars Down to Earth." Adorno observed that mankind treated science and

technology with both dependency and hostility (p. 2). McLuhan (2001) warns us that what we embrace now could bring us dissatisfaction later. He says, “Our electric extensions of ourselves simply by-pass space and time, and create problems of human involvement and organization for which there is no precedent. We may yet yearn for the simple days of the automobile and the superhighway” (p. 114).

Medical technology is used to design drugs to cure illnesses but it can too often cause other infirmities as a result of side effects. Freud (1930) warns us of possible problems caused by our extensions.

> Man has, as it were, become a kind of prosthetic God. When he puts on all his auxiliary organs he is truly magnificent; but those organs have not grown on to him and they still give him much trouble at times. Nevertheless, he is entitled to console himself with the thought that this development will not come to an end precisely with the year 1930 A.D. Future ages will bring with them new and probably unimaginably great advances in this field of civilization and will increase man's likeness to God still more. But in the interests of our investigations, we will not forget that present-day man does not feel happy in his Godlike character. (p. 3)

Allison suggests that people are sometimes willing to take the risks in order to survive. We listen to pharmaceutical commercials identifying the benefits of drugs only to be followed by an even longer list of side effects. Yet, we are prone to take them in order to gain some semblance of relief. Adorno (1994) discusses how we face and accept such absurd situations. We sometimes question our own rationale in making choices, “the most blatant of which is the threat brought to mankind by the very same technology which was furthered in order to make life easier” (p. 57).

Technology in Education

All participants viewed technology, especially the Internet, as a means to travel where they’ve never gone before. Participants report using the Internet, Web cams, and

teleconferencing, important connections to the world. These provide all students and teachers opportunities to communicate with diverse groups from around the world, learning facts about other communities while recognizing details about their own. Carolyn describes her grandson's global experiences. "[My grandson] has downloaded different languages and has studied these languages through the Internet."

According to Kanpol (1999),

> More cooperative learning (which implies far less lecturing and student regurgitation of facts on exams, forever to be forgotten), less stress on the value of success as the major reason for coming to schools in the first place, and more individual student participation in written, verbal, or math projects will allow for the possibility of student voices to be heard. (p.50)

I contend that technology works well in a project-based environment where students have a lot of responsibility about the information being used rather than their research becoming debris. Pauline's program incorporates project-based learning and it requires that seniors select projects based upon their interests. Students conduct research through the use of the Internet and interviews. Their products include a research paper and the presentations reflect their imaginations and interests.

This study finds that the Internet access in schools opens up the world to poor students. It was noted that the Internet is the only means some students have to travel the world. Some of us take opportunities to travel for granted. For many inner city and poor people, traveling fifty miles from home is a major production. Referencing the Internet as a transporter for poor students, Pauline says, "And they would never have this opportunity [because] many of them would never travel outside their little melting pot community, so [technology] has its advantages."

While engaging in conversations with other educators in professional meetings, I became aware of the fact that many of them are concerned about the possibility that technology in the classroom will bring about isolation. However, Joyce reminds us that the teaching profession is already one of isolation. By visualizing the huge technological structures – school buildings – in which we work, we are able to consider how seldom teachers interact. In the small schools of this study, interaction among teachers is rare when interaction's purpose is to share constructive methods of enhancing teaching and learning.

Participants suggest that we keep in mind that interaction among students and teachers is essential, especially as we integrate technology in the classroom and as we struggle for a democratic decision-making process. Freire (1998) asserts, "The project of democracy must never be transformed into or understood as a singular and individual struggle . . ." (p. 6). Freire (1998) notes that teachers are often persecuted for purely personal reasons and, in order to affect change, they must stick together.

I have listened to teachers in traditional settings discuss the probability that students in high tech schools have little or no time to interact. I observed Robert's students interacting when he was working with another student. These students went to the aid of another who was having difficulty with a math concept. Karen's classroom is quite similar, especially after regular school hours. Pauline believes that more interaction exists in her environment in contrast to her previous traditional school setting. She groups students according to content in order to facilitate her *each one, teach one* approach. Participants believe that creative teachers will use technology in collaborative and cooperative efforts.

Pauline's views are in keeping with information age advocates who maintain that socialization can take place when using interactive, multimedia. Carolyn describes social relations that developed between her grandson and students in Japan. These participants incorporate projects and service learning activities as more traditional methods of socialization. "But the new balance of social relations, including different modes of interaction and increased contact with people of different ages and locales, will be more reflective of the real world that today's children will live and work in tomorrow" (Snider, 1996, p. 28).

Job security is another fear of teachers. Many believe that technology reform efforts in education will see the emergence of the replacement of teachers with computers. However, Allison and Pauline provide a different perspective. Allison conceives of a partnership between technology and the creative teacher as being effective. Pauline maintains that the teaching profession is not in jeopardy of extinction as we integrate technology. She contends that teachers will always be needed to serve as guides, introducing new concepts and clarifying old ones.

Karen believes that teachers' jobs are in jeopardy if they continue to resist the technology integration. Because of technology, Karen believes that teachers' jobs will never be what they once were. She believes that student-directed instruction, which accompanies the use of computers, threatens traditional authoritarian educators. Snider (1996) says, "Technology can be a direct threat to the teacher's authority in a classroom" (p. 26). However, Snider finds one non-threatening situation for educators is the use of technology for productivity, e.g., "to mark grades and take attendance, to communicate with peers, and to access impersonal reference works" (p. 26).

We ought to consider the repercussions of our failure to implement technology plans in education. However, we must be collectively persistent in becoming a part of the decision-making process that determines those plans. If we persist in nurturing our traditions, which includes remaining silent and naïve, our technological position in the world may continue to reflect *A Nation at Risk*.

Karen's daughter holds a degree in engineering; and she worked for a major hardware corporation – a multinational corporation. "My daughter just lost her job to people in Singapore. Those people were not even here in the United States but they were managing the company and the jobs and the people here." This story not only validates McLuhan's (2001) analysis of a global village but it speaks to the notion that corporations are "impersonal empire[s] over many lives" (p. 25).

Karen's story of her daughter's job experiences is a reminder that we may have numerous unknown galaxies to discover and visit before we take the forefront in technological advancements. Utilizing computers in the classroom should not be our only concern. We are preparing students for the business sector whether they enter the workplace from high school or college. We ought to be cognizant of what they may experience in the future and engage students in a discourse regarding technological and corporate concerns.

From my own experience, I am aware of the need for accountability. However, I am aware that accountability measures have, too often, stifled my creativity. In fact, I concur with Ferneding (2003): "Certain reforms are designed to control teachers and their work through systems of accountability and standards" (p. 50). Although some educators are comfortable with accountability measures, I am aware that blanket measures could

possibly contain bias. For example, many educators in non-traditional environments are held to the same measure as those in traditional schools. This is the case even though many non-traditional settings are temporary situations for students and these schools are often revolving doors used by various school administrators. Students are sometimes on roll for less than a year. This has been my experience in the past and I am sure that some readers can identify other biases associated with accountability in education.

There are those of us that would rather function in an educational environment described by Reynolds (2003) as a space of freedom in which teachers' lessons emerge from a blend of their imaginations and student interests and needs. Within such an environment, teacher evaluation is essential and it should never be a matter of administering punish. Freire (1998) considers evaluation as a tool to gain insight into the needs of a program, especially those designed to meet the needs of our youth, which "almost always implies readjusting and reprogramming" (p. 7). Freire (1998) adds,

> In this sense, the evaluation of practice represents an important and indispensable factor in the preparation of educators. Unfortunately, we almost always evaluate the teacher personally instead of his or her practice. We evaluate to punish and almost never to improve teachers' practice. In other words, we evaluate to punish and not to educate. (p. 7)

In view of our country's technological position in the world, Robert contends that we ought to make adjustments within education. Otherwise, he suggests that we get out of the race. Quoting from James Brown's "Can't Stand Still, Move On," Robert says, "It's no such thing as standing still." He adds, "If you stand still, you are going to fall behind." His position reminds me of the context from Freire's (1998) *Letters to Those Who Dare Teach*: "No society can assert itself without developing its culture, science, research, technology, and teaching. And all this begins in elementary school" (p. 38).

According to Joyce, in bringing technology into the classroom, “teachers become reluctant to change because they are so accustomed to their traditional or old methods that include pencil, paper, and lecture.” Other participants concur, including Karen who adds *books* to Joyce’s list of traditional resources. Throughout the classrooms of these participants, books are present but they are used as supplements and reference sources. Participants believe latching onto traditions, while avoiding technology, has trapped many educators into the past and stifled change.

Participants in this study explain that using computers has changed the way they teach. Some teachers report that individualization of instruction is facilitated through the use of computers. “Each child is given his or her own program. Each child works at his or her own speed,” argues Karen. Advocates for technology integration suggest that individualization of instruction is difficult to attain when using traditional methods. In fact, Snider (1996) says, “Schools have had to put 20 or more students in a single classroom, often forcing teachers to *teach to the middle*” (p. 28).

What is unique and challenging about settings utilizing an electronic curriculum is that as many as six courses are scheduled within one class period. These courses range from simple to complex content, which requires teachers to tailor instruction based on individual needs and course requirements. “There is no way I can teach that many different subjects without the computer,” acknowledges Robert. This is in sharp contrast to traditional high school schedules that limit a teacher to teaching one course. Participants in this study are expected to have knowledge of and expertise in all courses within their discipline in order to provide immediate guidance and assistance when

needed. In addition, they also have project-based, problem-based, or service learning components as an integral part of their programs.

Addressing traditionalists who contend that teachers using computer-mediated instruction have it easier than they, Pauline says "It is much more challenging . . . than teaching from a book [where] everybody is on the same page, everybody is moving at the same pace." She feels as if the students are pulling her in different directions, while maintaining a focus on state-mandated high stakes test requirements.

These participants' opinions, situations, personal expectations, and administrative requirements would challenge Apple's (1988) contention that technology leads to deskilled teachers. My experiences suggest that some administrators *are* willing to allow teachers to work outside of their disciplines to facilitate computer-mediated instruction, relying more on the computer than teacher capabilities. In alliance with participants' concerns with tests, I would also concur with Apple (1988) that high-stakes standardized tests "should be replaced with more flexible and permissible guidelines that encourage more creativity and responsibility by teachers, local districts, and individual schools . . ." (p. 190).

Some teachers use technology to supplement traditional teacher activities. Some participants report that they were once teacher-centered in traditional settings. Reflecting on her previous experience, Allison says, "At the traditional high schools, the curriculum is mainly taught through lecture." In contrast to more traditional methods, some teachers take a more student-centered approach to the integration of technology. Their students are provided opportunities to conduct research and design service-learning projects. In fact, these educators find value in connecting students to the world outside their communities

by stimulating student interest in developing bonds with other students, internationally. Others are motivated to address environmental issues. In other words, students are developing problem-solving skills and having serious fun while learning.

Students may not always have direct experience with social issues. Field trips have become limited and it is a luxury many students and settings cannot afford. In addition, students need connections between the past and the present that direct experiences cannot provide. "When students cannot gain direct experiences, they may benefit from vicarious experiences portrayed in biographies, novels, storytelling, films, guided imagery, or the Internet" (Rea, 1999, p. M4). Rea (1999) contends that these vicarious experiences make learning more relevant and visual.

Some teachers report that technology integration has changed their roles. They spend less time lecturing and more time engaging in dialogue with students. I am now a learning facilitator. Facilitator is a title given many teachers in high tech school environments. It suggests that teachers have been transformed into the roles of coaches and guides; and students are expected to accept responsibility for learning. "While not all teachers want to make this transition from 'sage on the stage to guide on the side,' many find it exhilarating" (OTA, 1995, p. 13). Karen is one example. She spends extra hours after school, without compensation, to assist her students because of their initiative in recouping lost credits and in completing courses. Participants, such as Karen, attempt to move beyond the boundaries of a regular class day and they are driven in that direction because of their passion. These educators work with "an openness of mind and heart" (hooks, 1994, p. 207).

Beneficiaries

Participants identify parents, students, teachers, the community, and corporations as beneficiaries in technology integration. Parents benefit from the satisfaction of observing the progress of their children. Participants maintain that the community will benefit as students become technologically literate. They contend that technology integration will prepare students as assets in the business sector. According to Allison, "A big thing right now is our business community is saying that our students are not prepared for the work world. I think that technologies will help prepare our students."

One participant calls our attention to corporate vendors as beneficiaries of technology reform. "They're the first ones to benefit because they're making the money," says Pauline. Her analysis draws our attention to the fact that corporations are provided trade-offs when they elect to participate in technology reform efforts. Ferneding (2004) cautions us to be cognizant of "a repositioning of education to more directly serve corporate interests" (p. 49). In *Parable of the Sower* (1995), Lauren observes, "Politician and big corporations get the bread, and we get the circuses" (p. 18).

Participants consider students as the real beneficiaries of technology in education reform, and especially disadvantaged students, who do not have access to computers in their homes. The school community may be the main arena for their interaction with computers and for opportunities to access the Internet. What is interesting to consider is whether students will truly benefit until they are lead by new teachers because older teachers are more apt to resist technology adoption.

Reynolds (2003) perceives new educators, those graduating in the Nineties and in the new millennium, as more apt to move our field forward. These are the educators who

desire change and who enter the schools with innovative ideas. It is my position that new teachers and veteran teachers reciprocate the role of mentor, which will provide each group the support and knowledge needed to create a classroom environment that radically changes each of them and which guarantees that our students are the true beneficiaries of all reform efforts.

In "Education Wars: The Battle Over Information-Age Technology," Snider (1996) identifies the potential beneficiaries as

> . . . star administrators and teachers who will have the potential to develop national followings, textbook and software publishers, computer and telecommunications companies, and rural and inner-city homeowners whose property values have been depressed by the comparatively inferior quality of local schools. (p. 28)

I use the descriptive term "potential" because we must consider inequities in education that is reflective of the social injustices in society. Apple (1989) deems it necessary to consider whether or not all of us will benefit from the requirements of new technology and corporations on education. Otherwise, only those in power will continue to reap the rewards, while the schools continue to be in need of technological resources.

Social Responsibility/Ethical Issues

Allison also reports that researching societal and world issues ought to be designed to assist students in developing an ethic of caring about the needs of others and the environment. However, when asked to describe the steps that their school is taking to address the issue of teaching social responsibility in the creation and use of technology in our daily lives, all participants responded, "None." Their response prompted me to consider the fact that what we teach best ought to be what we need to learn most. I concur with Robert who believes that a teacher's best source of inspiring students to become socially responsible is by constructing and demonstrating a self that cares about others.

Critical theorists urge us to redirect our focus from using technology to dominate humankind and the environment. Marcuse (1938/1992) argues for the use of technology to promote life. “But this particular interest cannot be pursued without bettering and making more humane the conditions of life of the whole and liberating the entire society” (p. 171).

Many of us are concerned with the blight of the elderly as we frequently read of the possible demise of the social security system and the uncertainties of Medicare/Medicaid. We shouldn’t use technology just because it exists. We ought to consider technology’s potential to improve the quality of all lives. Other participants concur. Karen provides a heartfelt story of technology used to improve the life of her ailing brother.

Unfortunately, too many of the world’s people live in inhumane situations with little hope of experiencing technology as a liberating influence. Everyday people are dying from starvation throughout the world, including America. Allison imagines an experience with technology used to eradicate this problem. Marcuse (1964/1992) urges us to consider a focus for technology that is a qualitative change to improve all of humankind’s existence. We ought to teach this focus to students because they are the potential designers of new technologies.

As we discussed the need to teach social responsibility in the creation and use of technology, participants began to contemplate ways to do so. Joyce voiced her concern with the way women are projected in the violent video games that are so appealing to young people. As a senior research project, one of my students presented the history of gaming because of his interest in designing video and gaming software. During his

presentation, I noticed how violence became more graphic, the characters became more human-like, and the women were scantily clad. In comparison to Joyce's stance, the evaluators suggested that he use his skills to design computer games that are peaceful and that motivate students to solve community and world problems. Although he was hesitant in responding to this suggestion, he was more than receptive of the possibility of revolutionizing education by designing multimedia software for students.

Several participants' concerns center on environmental issues, e.g., global warming, conservation of energy, and environmental policies. Adorno and Horkheimer (1947/1992) examines these dangers as well as the costs. In spite of the dangers and the costs, "The fully enlightened world radiates disaster triumphant" (p. 49). In considering these issues, we are likely to find that we are experiencing the same degradation as the environment of which we are connected. If the environment's value is found only in its usefulness, then it is reasonable to conclude that human beings' value is also found in how they can best serve those in power. In teaching social responsibility, we ought to tie these issues into student research of technology.

There are no binding moral laws, according to Horkheimer (1933/1992). He insists, "The needs and wishes, the interests and passions of human beings change in relation to the historical process" (p. 189). As a result, when their primary focus is on the technical, human beings are apt to be submerged in greed. The interests of a few consumes any notion of the interests of all, which is a situation similar to a black hole that has so much pull that not even light can escape it.

Joyce perceives the end of our class system when technology is used in the interest of everyone. There would be "No inequities," according to Joyce. "The abolition

of economic inequality . . . signifies for the first time today not an abandonment of cultural values, but on the contrary their redemption" (Horkheimer, 1933/1992). Some readers may conceive of this trek as virtually impossible. Those who benefit from inequalities relish the thought that our behavior is demonstrated by this conception, and that we would abandon the quest for change. Pauline suggests that we engage students in analyzing how our value system is being affected by the choices we make in the creation and use of technology.

As Pauline spoke and as I recalled Rodney's quest in "Robots" (2005), I began to consider Plato's metaphor of the cave. Plato asks us to imagine a cave in which men have been chained in such a way that they can only observe shadows on the cave walls in front of them. Because they have not been exposed to anything else, they believe that the shadows are reality. As they speak, they assume that they are taking to the shadows. When one of them leaves the cave, he is first perplexed by what he finds and it takes time to adjust his vision. However, as things become clearer to him he experiences joy; yet, he pities those he left in darkness.

If we imagine that he returns to share his findings with those in the cave, we may find that he is criticized, humiliated, and attacked. We are imagining a person who returns to bring others into the light. This is the same case for Rodney ("Robots," 2005). Those he attempted to free from oppression were the ones that attacked him. In Lauren's "Earthseed" is written this maxim: "Drowning people sometimes die fighting their rescuers" (Butler, 1995, p. 54). Critical conscious educators may find themselves in similar situations as they attempt to reveal to our students and colleagues the illusions and

myths of technology prevalent in education. Nevertheless, this trek is essential and it is our responsibility.

Karen contends that educators have a responsibility to teach the illusionary quality of technology. Because of technology, "nothing is what you think it is," says Karen. As an example, Karen discussed the byproducts used in the fast food industry. That perfectly shaped egg is not natural. "It is what they have made you think is an egg," adds Karen.

In keeping with Karen's concerns, Allison provides her best-case scenario of technology designed to improve life: "If there was a way to *naturally* produce foods and crops, and *naturally* to encourage procreation among animals," then we would be able to safely feed starving people around the world. Stimulating such discourse ought to encourage students and teachers to question health and safety issues as it relates to the use of technology.

In order to teach social responsibility, we cannot afford to overlook the dreary images. "I think about the amount of sex and the solicitation of drugs that they can pull up on the Web," Pauline adds. Participants voiced concern for children stalked by predators on the Internet as well as for their access to directions for making weapons and purchasing them so easily. Therefore, exploration can move in a negative direction. Ferneding (2004) speaks to this issue in "The Discourse of Inevitability:"

> Although it is obvious that the expansion of resources can benefit both teachers and students, the growing commercialization of the Internet and the proliferation of infotainment-based resources shift the learners' experience from exploration and study to that of voyeurism and shopping. (p. 53)

Allison believes that teachers are uneasy with Internet access through students' desktops because of the possibility that they would visit troublesome websites rather than

work on lessons. Many of us have had these occasions. Hip-Hop web sites are definitely a favorite among my students. Because of easy access to information on the Internet, Joyce believes that we have a difficult time in teaching them to be responsible in using the Internet. There are students who can access seedy sites outside the educational environment.

Within the school community, however, participants believe that this situation can best be remedied through monitoring and filtering, although, filtering also blocks students from beneficial resources. School districts engage monitoring and filtering devices as a protective measure, which is mandated by the federal government's Children's Internet Protection Act (CIPA) of 2000. In reviewing the CIPA, I found that any educational organization receiving Universal Service Discounts (E-Rate) is required to utilize technology to filter or block obscenity, child pornography, and any other material that is considered harmful. However, local officials are given the authority to lift these blocks for the purpose of legitimate research and the lawful use of technology.

This study has prompted me to consider analog and digital. Analog and digital are patterns of thinking and many may consider analog thinking as a pattern that is as outdated as a rotary phone. I contend that an analog pattern is necessary as we become bombarded with new technologies, which generate concern for the need to be socially responsible in their design and use. Therefore, it is crucial that we continue to focus on the development of critical thinking students.

Consider the attitudes of our students - the digital kids. Too often, they search for simple answers to complex problems in an "either/or" manner. Assisting them in developing critical thinking skills is often a challenge and that challenge may be rooted in

their technical orientation. Everything is reduced to “good or bad,” and “right or wrong” with digital thinking.

Staff development workshops and university courses in instructional improvement are designed to assist teachers in creating and implementing critical thinking strategies. I maintain the importance of recognizing that digital kids are more prone to follow a digital thinking pattern. In *Human Resource Management in Electronic Media*, Scott (1998) addresses this pattern of thinking. “Children engage in digital thinking: there is no gray area. Adults soon realize that the polar opposites involved in digital thinking cannot solve all problems. ‘Maybe’ or ‘sometimes’ is often the appropriate ethical and moral choice” (p. 58). My studies at Georgia Southern University highlighted the importance of those gray areas.

I recognize the value in reflecting on the past in order to explain our present circumstances in education. In fact, "One could sense the future by looking behind. One could make predictions based on the solid ground of history. That was the era of analog thinking" (Shaw & Hamm, 1997, p. 228). Speculating the future through SF is an act of analog thinking. The creation of our analogies and metaphors is an act of analog thinking.

As a veteran musician, my husband is firm in his views on the use of analog and digital. Although he now uses digital equipment, he contends that analog brought out one’s creativity and patience. Today, the ability to play a keyboard provides one the opportunity to play any instrument that can be programmed into a synthesizer. While using analog, he was always mindful of the fact that his analog brain was in complete control of the processes from start to finish as he found the frequent need to restart in order to make corrections or changes. This was a time consuming but a critical thinking

and hearing process. Nevertheless, his analog thinking brain is in control of his digital world of music where corrections and changes are digitally edited, the result of his choices.

There is no middle ground with digital thinking as exists with analog thinking. By embracing the concept that technology is not neutral, we ought to recognize that digital thinking is not neutral. A digital system of thinking contributes to injustices and inequities that plague society because it is guided by self-interests or interest in a select few.

As we engage in cultural studies and a radical approach to exposing and eliminating oppression, we are applying an analog system of thinking, critically. Certainly, technology has improved life for many. However, in order to guarantee that our technological creations work in the interest of all people, we must educate students to be analog thinkers that control and influence the direction of our technologies in this digital world. Teaching social responsibility is the result of critical conscious educators who dare to make that choice.

I engage students in the research of complex issues affecting society, using narratives in visual and print media. It is important that our "digital kids" experience problem solving by recognizing that "sometimes" is often an answer when we consider issues within a context. Although we are functioning in a technological world, it is important to understand that digital thinking has the potential to be limiting.

I asked participants to consider the worst-case scenario of technology misused. Their responses were similar to the following:

> Allison: Using it as a weapon rather than for education . . . Sometimes we are destructive.

> Pauline: Everyone is killed as a result of atomic bombs and nuclear radiation. Everything is destroyed, even the food chain. I think that would be my worst-case scenario because that is also something that could actually happen.

In a very real sense, participants' fears have materialized. Bombs are dropped on people in the name of the preservation of peace. Forests are depleted; humans and animals are made homeless; children are made orphans; and the food chain is in trouble.

Allison characterizes us as a destructive people and this reminds me of Horkheimer's (1933/1992) depiction of us as functioning in hypocrisy. Although we live in a wealthy society, our hypocrisy can be seen in our brutal use of technology. After more than seventy years, Horkheimer's (1933/1992) analysis reflects this age. Our hypocrisy permeates every area of our lives - spiritually, emotionally, physically, socially, and mentally. Horkheimer (1933/1992) says,

> At no time has the poverty of humanity stood in such crying contradiction to its potential wealth, at no time have all powers been so horribly fettered as in this generation, where children go hungry and the hands of the fathers are busy turning out bombs. It appears as if the world is being driven into a catastrophe--rather, as if it already finds itself in one--which can only be compared, within known history, to the fall of antiquity. The futility of the fate of the individual, already caused by the irrationality and barren naturalness of the production process, has risen to the most striking characteristic of contemporary existence. Whoever is fortunate could, as regards their inner worth, just as easily take the place of the most unfortunate, and vice-versa. Everyone is given up to blind chance. (p. 191)

Technology and Science Fiction (SF)

In "Philosophy and Critical Theory," Marcuse (1937/1992) says that imagination has the ability to consider a different future because it can transcend the present. However, society has stifled and abused imagination to the point that imagination has "retained the commitment to the prevailing unfreedom in which it was born and from

which it abstracted" (p. 105). I contend that sci-fi provides a space to unleash one's imagination to critique our past, present, and future circumstances.

Participants offered varied critiques of this genre. For example,

> Allison: I am a non-fiction person. I like reality.
> Pauline: [It is] another avenue by which kids can explore and to expand their minds and creativity.
> Karen: Go right to Epcot . . . Everything that was once considered science fiction is now reality.

Of the six African American participants, only two were devote fans of sci-fi. Hopkinson identifies a stigma associated with Western sci-fi. According to Hopkinson, sci-fi has been perceived as a genre that merely depicts white people overpowering aliens and alien cultures. This is not a pretty picture for African Americans. Hopkinson says, "we've been on the receiving end of colonization, and for us it's not an entertaining adventure story" (Rutledge, 1999, para. 8).

Nevertheless, Hopkinson says, "It's been used to critique social systems well before the marketing label of sf got stuck on it. And that's when I find sf compelling" (Rutledge, 1999, para. 11). Although Allison is not a fan of science fiction, she stated, ". . . it helps you . . . to think outside of the box." Other participants acknowledged the fact that some people do not believe in the reality nature of sci-fi. However, Pauline and Karen state that sci-fi is "very real."

Allison and Pauline agreed to view a sci-fi film for the purpose of identifying analogous relationships with their experiences in education. Allison, school counselor, viewed "X-Men: The Last Stand" (2006). She drew the following analogies: (1) Allison relates to the strong leader, Storm; (2) Students are those in need of Storm's help when they are in trouble; (3) Storms that arise in education are power outages; malfunctioning

technology; warning letters to parents regarding their children's behavior; (4) Jean Grey is new educational reform that is spinning out of control; and (5) The Brotherhood of mutants are school dropouts that fill our prison systems.

In viewing "X-Men: The Last Stand" (2006), I recognized Katie, who could walk through walls, as those in education who are rebellious enough to openly work to revolutionize our system. In addition, Scott, whose eyes were lasers, are those educators who are not easily fooled into adopting reform efforts. They are capable of seeing through the glitz and glamour of education reform. Finally, Jean Grey was destroyed because she could not control her powers for the good of all. She represented both good and evil. Jean Grey is analogous to high-stake testing.

Pauline, a science teacher, viewed "Blade Runner" (1982). She drew from the film the following analogous relationships: (1) Tyrell, with his god-like attitude, is analogous to those educators functioning without an ethic of caring; (2) Genetic engineering is the process used by leaders to control educators for the purpose of their own agendas; (3) Students and teachers are the replicants that serve the political agendas of their leaders; (4) Replicants are designed with a four-year life span, which is analogous to new educators that remain in the field for a brief moment; (5) Free thinking replicants are the educators that voice their opinions, placing themselves in uncomfortable and unsafe situations; (6) Memory implants are brainwashing devices that are analogous to procedures used in education. "We are given mandates on how to teach and test children, who we should teach and test. We are even brainwashed into thinking that the playing field is level for all children educationally;" (7) Corporations are the god-like entities that view teachers and students as inferior workers in need of improvement or replacement;

and (8) Replicant Roy's pleas for an extended life are analogous to educators' pleas for more resources and support.

Students labeled "at-risk" are comparable to Roy, who is called the prodigal son that attempts to return to a father that does not embrace him. The father is the traditional-minded administrator that believes that the absence of these labeled students means that "good" students are more apt to learn because teachers can teach without hindrances.

Pauline described Tyrell and other humans in "Blade Runner" as the biblical children of Israel. For those of us working in the field, wandering in the wilderness is a very realistic picture of those who make the rules. They are doing their own thing and they are accomplishing very little in education in comparison to their efforts. However, we cannot overlook the fact that we, too, are in the wilderness. Recognizing our situation and working to relocate the system makes us different.

In analyzing participants' technological attitudes through their sci-fi scenarios, I find that they consider technology as a "tool" that humans use to promote or destroy life, even though they describe their experiences as substantive and/or critical. Their description is in keeping with Feenberg's critical theory that technology is both instrumental and substantive. Karen presents an optimistic view of technology in our lives; however, she maintains her position that we cannot detach ourselves from technology. Therefore, we must deal with this reality as educators. William Gibson's *Johnny Mnemonic* (1995) is an example of sci-fi with this message embodied. Of all participants, Karen's analysis presents the cyberpunk viewpoint explained by Weiner (1992):

Cyberpunk is a term that combines cybernetics--or the human-machine interface with punk, that nihilistic, defeatist, and street-culture-oriented view of life and the future. In a cyberpunk society, the haves will increasingly seek to remove and protect their persons and property from the have-nots . . . The cyberpunk vision of the future also foresees the rise of all-powerful global corporations, superseding the relevance of nation-states (p. 13).

While talking with Karen, it became apparent that she is very much in tune to the street culture of her students. She presents her perceptions in a "keeping it real" tone. Not only does she address the needs of poor and underserved students but she challenges decision-makers to eliminate the inequities within her own school environment. However, she perceives the future as a space for more of the same situations that we are experiencing today.

Karen also discusses the power of multinational corporations that manage an American workforce from outside this country. Today, her vicarious experiences contribute to the validity of Weiner's (1992) projection: "And, paradoxically, as sociopolitical agendas and infrastructure needs desperately call for more and more taxation of business, business will be courted everywhere around the world based on tax relief and favorable regulatory conditions" (p. 13).

Losing site of the need to control technology for the benefit of all humankind may find man in the role of servant, if we have not already arrived at that point. This is the theme in "2001: A Space Odyssey" (1968) and "The Matrix' (1998). Karen suggests that we rethink our notion of science fiction as merely fictional entertainment. "So we are

already there. We are already in science fiction. We are living in science fiction. It's unbelievable, Vicki. We are just not aware of it," concludes Karen.

A paperless society emerged as a theme in this study. The worlds of sci-fi are spaces in which characters function without paper, as seen in "Star Wars." We ought to question the image of a paperless society. It is reasonable to assume that the beneficiaries would be corporations. Profits would soar as a result of a tremendous decrease in operating costs, which include the elimination of jobs.

We ought to consider the position of poor people and poor countries if a paperless society materializes. At the present, we have underdeveloped countries and underserved poor people in America. Technological inequities are apparent, suggesting that in a paperless society the rich will get richer while the poor will witness more of the same atrocities they experience each day. Society as a whole, though, cannot find progress in the midst of oppression. Progress is merely an illusion.

We recall gadgets in science fiction movies and stories, such as "Lost in Space" and *Twenty Thousand Leagues Under the Sea*. These gadgets are no longer props for film but they are now the iPods, Web cams, teleconferencing devices, cell phones, etc. that are a part of our reality. Also, robots are no longer fabrications of sci-fi. They are visible in research, manufacturing, health services, and in the home.

Few of us would not welcome the idea that technology would be used to handle dangerous situations. This is apparent as we watch robots used by security agents to diffuse bombs. Pauline envisioned technology to make doctors' jobs easier. We have robotic arms used by surgeons and researchers in science labs. The same computer chips used in these robotic devices are used in Karen's programmed coffee makers and in the

device that turns on her lights at night, long before she arrives home. These robotic devices serve human beings' needs in much the same way as Robby the Robot in "The Forbidden Planet" (1956).

Although his appearance is somewhat threatening to other characters, Gort ("The Day the Earth Stood Still," 1951) is not only a peacekeeper but he has the ability to give life to dead situations. However, the "Star Wars" films remind us that there are both friendly and hostile robots. Some are slaves that can be bought and sold, while others are companions to the protagonists and their adversaries. Then, there is Rodney ("Robots," 2005) who believes that it is everyone's responsibility to fulfill the needs of all in society. Rodney works in the interest of the oppressed. However, Rodney is not only challenged by those with profit-driven motives, but Rodney is also challenged by the very ones he seeks to free.

Space travel is another theme that emerged during personal communications with participants in this study. Leaving Earth in a spaceship was a theme during the silent film era. "A Trip to the Moon" (1902) was released in France. Nineteen years before Apollo 11, "Destination Moon" (1950) was released in America portraying the first landing on the moon. This film was followed by such titles as "Forbidden Planet" (1956); "2001: A Space Odyssey" (1968); and "Star Wars" (1977). What I find interesting about the "Star Wars" episodes is the fact that technology isn't always up-to-date and reliable. It is often found to be troublesome and in need of repair, which is typical of the experiences I share with other participants.

The possibility of intergalactic travel for the purpose of working and establishing communities was a projection by participants. One participant suggested intergalactic

travel as a means of expanding ones experiences rather than as a method of escape. The "Red Planet" (2000) takes a different course. Space travel in this film is the result of a polluted Earth that is no longer safe to inhabit. In the introduction, Bowman, the narrator and main character, says that they have been brought to the point of traveling to Mars because mankind had totally ignored the environmental problems. As a result, Earth is rapidly becoming uninhabitable.

I am also reminded of Octavia Butler's *Parable of the Sower* (1993). Lauren, the teen protagonist in the story, considers the possibility that space may be the last option for humans on this decaying Earth. She says, "As far as I'm concerned, space exploration and colonization are among the few things left over from the last century that can help us more than they hurt us" (p. 18). However, as she contemplates the Mars mission and the space program as a whole, she becomes concerned that Mars is too close to those "who've made such a hell of life here on Earth" (p. 19). One character in "Red Planet" (2000) suggests that they take over Mars, regardless of what or who was there. An attitude of control still exists amid catastrophe.

Apocaplytic themes surfaced throughout this study. Participants identified their worst-case scenario as the near annihilation of the world as a result of atomic bombs, nuclear radiation, and environmental destruction. Apocalyptic science fiction engages the reader or viewer in the vicarious experience of living during or after disaster. The plots of these stories often include the restoration of hope as seen in "The Postman" (1997); "The Fifth Element" (1997); "Silent Running" (1971); and *Parable of the Sower* (1993). The drifter in "The Postman" motivates others to overthrow their oppressors. Korben Dallas attempts to protect the fifth element - the last hope for life - from Evil and Zorg who

profits from the destruction that Evil generates. In “Silent Running,” Lowell attempts to protect Earth’s last nature reserve.

However, in apocalyptic literature and film, sometimes the characters do not struggle to make changes where they are but they determine the need to find a more fruitful situation. In describing Butler’s dystopian/utopian work, Moylan (2000) says,

> It does not challenge, alone or with a larger collective voice, the new liberal government to redirect its own economic and political policies. Rather, it articulates a view of history that is cyclical, not dialectical, and implies that the only move forward must be an apocalyptic leap, not through the present but out of the present, out of this world, and into some new age. (p. 243)

Although I chose to stay in this world and voice my concerns, I often perceive myself as a visitor in alien territory. I encourage those who share this way of thinking about their positions in education. The view from this position is like none other. We are more observant and cognizant of our circumstances. In fact, we have not allowed ourselves to be absorbed into the exploitive spaces of educational traditions. Therefore, we have a better opportunity to become a part of the solutions to our crises rather than a part of the continuing problems.

In considering an “out of this world” experience, the theme of alien life surfaced when Pauline described her best-case scenario. She hopes to find that there is life on other planets. These alien beings would provide cures for all diseases, especially terminal illnesses. In sci-fi, alien life is often presented as far more advanced than humans and even more environmental conscious. This study finds concern among participants for the environment and for the technological advancements used in such a way that contribute to its destruction and ours.

We see the message of social responsibility for the Earth in “The Day the Earth Stood Still” (1951) and “The Abyss” (1989). Aliens in both films find humans to be insensitive and aggressive, which is in sharp contrast to their own dispositions. Allison notes that human beings are sometimes destructive. What is significant in “The Abyss” is that aliens decide to unleash a destructive disturbance in the ocean, a tsunami, because they perceive humans as incapable of peaceful interactions. The concern is that humans are likely to place the entire universe in jeopardy. We have actual experiences with what we mislabel as “natural” disasters. There is nothing natural about the effects of global warming. Humankind must recognize that such catastrophic occurrences are the results of the misuse of technology and the heartless attitude of those who control.

Aliens are often characterized as a threat. In H. G. Wells’ *War of the Worlds* (1986), aliens attack Earth whose weapons are no match for their war machines. What ultimately destroys the aliens is Earth’s environment. "At any rate, in all the bodies of the Martians that were examined after the war, no bacteria except those already known as terrestrial species were found" (Wells, 1986, p. 201). If we could imagine the environment personified, it would probably speak to us: “Those with the power to create technologies, those with the power to misuse them, and those that remain silent as I breathe my last breath are our aliens.” Again, the warning is given: “Danger! Danger!” Earth’s preservation is not only threatened by war but by the misuse of technology on the environment. Ferneding (2004) says,

> Although our present reality may be characterized by great technological feats and complex systems of control and production, the incessant marketplace kaleidoscope of mediated images and noise that characterizes our postmodern milieu belies the emptiness of our soulless and violent world and our quiet and desperate search for a deeper sense of meaning and purpose. (p. 57)

The messages of sci-fi remind me of C. S. Lewis's *The Abolition of Man* (1943). Lewis (1943) reflects on school, nature, and society and discusses respect for human life and the practice of justice, honesty, and mercy. He stresses the need for educators to encourage students to align their emotions with these ethics, which is a concern for Pauline. I find that, too often, students are immersed in drill and practice with no school experiences for developing an ethic of caring through meaningful and critical research. According to Lewis (1943), "by starving the sensibility of our pupils we only make them easier prey to the propagandist when he [or she] comes" (p. 24). Lewis (1943) posits that if scientific planners begin to realize their dreams, then only a few will exercise power over billions. We have certainly arrived. However, Lewis (1943) adds,

> There neither is nor can be any simple increase of power on Man's side. Each new power won by man is a power over man as well. Each advance leaves him weaker as well as stronger. In every victory, besides being the general who triumphs, he is also the prisoner who follows the triumphal car. (p. 55)

Lewis's contention causes me to reflect on the views of Walter Benjamin (1940/1968):

> Whoever has emerged victorious participates to this day in the triumphal procession in which the present rulers step over those who are lying prostrate. According to traditional practice, the spoils are carried along in the procession. They are called cultural treasures, and a historical materialist views them with cautious detachment. For without exception the cultural treasures he surveys have an origin which he cannot contemplate without horror. They owe their existence not only to the efforts of the great minds and talents who have created them, but also to the anonymous toil of their contemporaries. (p. 256)

We cannot afford to become numb to our circumstances because it is our emotions that keep us human. Otherwise, we become the androids of science fiction whose ethics are determined by those in power. I concur with John Weaver that science fiction unlocks and challenges the imagination to critique societal issues that plague our youth; and the classroom ought to be a space that welcomes this exploration. We ought to

encourage students to express their views rather than conform to ours. If not, they are apt to become victims of conformity that often function without emotion. These are the messages in Huxley's (1932) *Brave New World* and the sci-fi film, "Equilibirum"

Technology Resources

Access to technology is necessary if teachers and students are able to use them. For some participants in this study, their experiences span across thirty years while others are new teachers with as few as six years of teaching experience. Each participant has had both traditional and non-traditional experiences in education and their experiences can provide a clear analysis of how technology access has or has not changed.

Pauline, Karen, and Robert began teaching in the early to late-Seventies. They note that there were no technologies in their classrooms during those early years. Karen notes that there was very little technology in the classroom and there definitely were no computers. "If you wanted to use any type of equipment it had to be checked out of the library," she writes. Personally, I recall having to requisition the use of a projector, only to find that many times the projector was either unavailable or malfunctioning.

Carolyn began working in the early Eighties at a traditional public high school. At that time, the Title One program at her school was provided computers. Other classrooms did not have access to computers. In fact, only students assigned to participate in Title One were allowed to use the computer lab.

Today, teachers still complain of a lack of access to computer labs. Describing her current experiences in more traditional educational settings, Pauline says, "I am aware that there are computer labs in each school." However, she identifies these labs as sites of power struggles with scheduling issues at the center. "So its not like you can go in

possibly even once per week," adds Pauline. The OTA (1995) contends, ". . . equipment is often placed in locations where it is inconvenient for regular classroom use" (p. 24). In other words, there is a disparity between the existence of technology in schools and its availability to all teachers and students.

Joyce began teaching vocational education courses in the early Nineties. There were no computers in her previous experience in the classroom. In fact, there were no computers in the small non-traditional school outside of those in the office. Within her thirteen years of teaching, Joyce has also worked in a traditional high school enrichment program in which there was no access to computers.

This was also around the time of Allison's experiences at Butler High school. She recalls that "there were at least three computers in every teacher's class plus there was a lab. This is similar to the number that was first provided my classroom during the early nineties. However, my first classroom computers were the out-dated discards from the business sector. Soon to follow were the out-dated discards of the school district. As expected, these discards were short-lived.

Pauline moves back and forth between her high tech environment and traditional settings because of her involvement in science and math programs in various school districts. She provides a view of the classrooms of other teachers in the district as well as their behavior regarding access. Pauline says,

> When you collaborate with other teachers, by me going to different science meetings and workshops, you hear teachers talking about the one or two computers they have in the classroom are always down or when the computer breaks down it's hard to get someone in to fix it. And you don't have enough for the students per class, so it creates a problem and many times rather than deal with the problem they just don't use the computers at all.

Today, there are from six to nineteen computers in the classrooms of the participants in this study. However, "It is becoming clear that actual equity for technology today goes well beyond machine counts; in fact, machines are a necessary but not sufficient component of teaching and learning" (OTA, 1995, p. 43). Access to hardware is not the only concern. In many schools, the availability of software is a problem. Pauline utilizes an electronic curriculum but she reports that there is a lack of software needed to complete the reporting of their grades. According to the OTA (1995), "To use hardware effectively, schools also must acquire the computer software and video programming that give it life and must orchestrate the available equipment to make it accessible to teachers and students," (p. 91)..

It is interesting to note that in 1995 the OTA asked the United States Congress to consider an analysis of the possibility of providing tradeoffs to the private sector for funding educational technologies. The OTA (1995) added, "Congress could leave development of new education technologies entirely to the private sector" (p. 41). Today, the availability of hardware and software in each of the schools of the participants is due to partnerships between school districts and the business sector. It would be reasonable to assume that these tradeoffs would eliminate the costly problem of funding technology. However, I cannot dismiss Marcuse's (1964) contention that technology, the economy, and culture have merged into an "omnipresent system" of domination. Therefore, underserved students continue to exist.

Adorno (1966/1992) directs our attention to the fact that the goal of a profit-driven society is to shape humankind into subordinate roles that support its motives. He (1966/1992) insists, ". . . the human beings who actually have the needs, have been

socially pre-formed beyond anything which one might naively imagine" (p. 64). Metaphorically, the profit- driven society is the potter and we become the clay.

Although some teachers are often involved in the planning stages of programs for their schools, they often find themselves functioning within boundaries. This certainly has been my experience. Actually, these teachers may be involved in a mirage-like state of planning because plans have been predetermined within which they can only function. Adorno (1953/1994) reminds us that both naïve and sophisticated persons often fail to recognize inscrutable, absurd, and antagonistic situations of control.

All participants in this study work in high tech schools. With that in mind, one might not assume that Internet access is a major concern. However, it is a concern among some participants. For example: There is a lack of Internet access on the student computers of all six participants. According to Allison, "Our students' use of the Internet is limited because of the number of computers that we have that have access to the Internet." Pauline feels that one negative aspect to her school is the difficulty in accessing the Internet. Only one of the eighteen computers in her classroom has access. Karen also finds that a lack of access to the Internet is a major problem, especially when her seniors are expected to complete a research paper as a requirement for graduation. Karen says,

> We have a set of computers that have the Internet but they are so completely out-dated and they are so limited to the number of children who can use them, when they can use them, and how they can use until I have not even tried giving students assignments . . . It is too much of a hassle and no means to really use it effectively.

Structured lessons are designed to improve test scores. Pauline says, ". . . everything is so test oriented now." She notes that it is her belief that administration looks at the computer as "a tool or a strategy" to merely improve test scores. Therefore,

teachers with technology access may use the computer for drill and practice. According to the OTA (1995), a heavy focus on standardized tests, as the main assessment of achievement, “can also be a barrier to experimentation with new technologies because teachers are not sure whether the results they are seeking will be reflected in improved student test scores” (p. 18). The participants in this study have the added burden of high-stakes testing. Failure to pass any one of five tests, during the last semester of their senior year, will deter graduation.

Marcuse says (1938/1992), "Modern technology contains all the means necessary to extract from things and bodies their mobility, beauty, and softness in order to bring them closer and make them available . . . But only those groups with the greatest purchasing power can take advantage of the expanded capacities and their gratification (p. 165). Darder (2002) points out the fact that throughout the school systems of this country, access to computers in the classrooms is one of privilege.

As an itinerant counselor, Allison is a witness to inequities across her district. She maintains that her district’s decision to provide various emphasis areas to high schools accounts for these inequities. For example: Schools with an emphasis on communications and technology will be equipped with various technologies and their classrooms will reflect that emphasis. On the other hand, Allison visits schools without this emphasis. In those schools, monies have not been allocated for technology and this is apparent by the absence of upgrades and hardware.

Prior to becoming a high tech environment, my school was among those excluded from financial support for technology. Our meager school budget excluded funds for technology. Schools boards have elected to identity emphasis areas for high schools. As a

result, access to technology is determined by a small number of officials elected by their districts. Allison places responsibility on parents as well as district official. She believes that parents who are technology savvy will require the school district to provide financial support for technological resources for their schools. In schools where parents have a different orientation to technology, technology may not be a major concern.

Many schools have less access to computers, up-to-date software, and the Internet than wealthier schools with state-of-the-art equipment. Nevertheless, ". . . students are expected to compete academically as if they lived and learned on an equal playing field (Darder, 2002, p. 78). Carolyn, Pauline, and Karen urge policy makers to design programs that would afford students of low-income families opportunities to have access to computers in their homes.

Carolyn understands the challenge many low-income families experience and she shared her personal struggle to acquire a computer for her grandsons. These families have the same desires for their children as others; however, access to state-of-the-art technology is merely a dream. Parens (1998) reminds us that access to new technology is to “some extent limited by one's draw in the genetic lottery (para. 54). In discussing the reason for this, Pauline says, “Again, it goes back to the top. The administration has not seen the need or had the desire to want to go out and close that digital divide that we have, especially among the poor and economically disadvantaged kids.”

Non-profit organizations that are designed to place computers in the homes of students rely on individual and business donations of used hardware and software. These donations are made possible when donors find the need to upgrade. But we need to consider that we are continuing to fertilize marginalized grounds. Placing already

outdated technology in the homes of low-income families is not eliminating the inequities or leveling the playing field. Some participants in this study contend that schools ought to seek the support of their corporate sponsors in designing and implementing programs that will provide new technology in the homes of their underserved families. According to Gabbard (2000),

> Whether at home or school, the question of computer access and availability is an increasingly important issue, as computers in the form of multimedia learning systems and gateways to the Internet become increasingly important vehicles for the transmission of information and knowledge. (p. 301)

With this fact in mind, we ought to question whether such a limited access to the Internet is a deliberate act to curtail the amount of information our students could obtain or whether is it considered a costly frill that some students can afford to be without.

The OTA (1995) finds that "despite past investments in technology, many schools still lack the basic technology infrastructure to support the most promising applications of educational technology" (p. 18). More than a decade after this report, the findings are the same and they are noted in the voices of concerned educators:

> Pauline: Make enough computers available in all classrooms.
> Karen: We have a set of computers that have the Internet but they are so completely out-dated.
> Allison: Technology is not the same across the district. You will find that in some schools there is just so much more upgraded and updated technology and more technologies depending upon the school's emphasis.

I recall Ferneding's (2004) position that "the scarcity of resources for public schools, which arises from a general lack of political support, is a reality for many schools" (p. 53). But it is also a reality that as we redirect our focus to funding technology, our attention is drawn away from the scarcity of human resources and

abolished programs, “such as the arts, as well as teachers' aides and after-school programs” (Ferneding, 2004, p. 54).

At the time of this study, Carolyn, a paraprofessional, was aware that her district was drastically terminating paraprofessional positions. She is nearing retirement and a cutback could be devastating for her. We ought to be mindful of the importance of human resources in the lives of students, rather than perpetuate technology as the panacea. It is this “savior” mentality that Winner (1986) termed “myth information.” Winner (1986) and Ferneding (2004) concur that the development of a better world will not automatically appear as the result of access to technologies.

Training and Support

We cannot overlook the fact that teacher training in the use of educational technology is less than desirable. In an age in which new technologies are continuously birthed, many of our educational systems continue to nurture a factory model while avoiding the need for more effective methods of preparing teachers to integrate technology. Participants identify *a lack of training* as one reason for educators’ resistance to the integration of technology. “A majority of teachers report feeling inadequately trained to use technology resources, particularly computer-based technologies” (OTA, 1995, p. 2). Within my own school environment, teachers vary in their orientation and training and such is the case within other high tech schools with which I am familiar. Teachers were not assigned based upon their experiences with technology but based upon the need to fill a vacant slot. Therefore, pre-teacher training at the university level and on-going training for teachers in the field is essential.

In addition to operating the equipment, teacher training ought to include strategies for integrating technology in their particular disciplines. Personally, I taught myself and shared information with other staff members; however, this was time consuming and it continues to be so. In other words, "Teachers who want to use technology also may find that educating themselves enough to be able to use a particular piece of hardware or software can require considerable amounts of extra time and effort" (OTA, 1995, p. 134). Joyce and Robert spoke of their concern with the lack of time allocated for teacher training in the use of the electronic curriculum utilized by their program. After four years, these teachers are still learning through trial and error.

Even within high tech schools, many teachers do not have a clear picture of technology's influence because of scaled down training. Participants identify *a lack of understanding* as a factor contributing to teacher resistance. Many teachers are not aware of the creative potential of technology. There is a need for more training because of teachers' lack of understanding and fears. Karen argues that there are staff members who do not realize "how far technology has come and how far technology is going." Robert's self-appraisal explicitly states that his problems with a lack of understanding of the hardware and software were not resolved through training. Each of these participants' perceptions concur with the OTA's (1995) findings:

> When teachers discover ways that technology can strengthen their teaching, help them carry out administrative tasks, and enrich their professional growth, technology starts to make sense to them. It can be a resource for improving the preparation of new teachers as well. However, there are also many teachers who have not seen this potential, teachers whose use of technology is marginal, limited, and unenthusiastic. (p. 8)

Karen acknowledges that some staff members at her school still believe that the book is the best learning source and they avoid technology whenever they can. She says,

"I look at them and feel sorry. And I say, 'Where have they been? Have they not been keeping up?'" The majority of teachers at Karen's school are veterans whose limited training and orientation to educational technologies are, metaphorically, the rocks from which they emerge. Many of them may not have been exposed to various technical resources that could facilitate delivery of instruction as well as those resources to assist them in various tasks.

The certification of all participants in this study is based upon satisfying the state's course requirements for Integrating Technology (InTech). Allison states,

> It is my understanding that everybody in here who still has their certification has taken that course. That course was tremendous. It really introduced me to how to do a lot of the technologies, not that I wasn't aware but how to do them if I wanted to.

There are thirteen educational technology-training centers in my state. According to the state, "The mission of the ETTCs is to provide high quality, low cost, convenient access to educational technology training for educators serving, or preparing for service, in [the state's] Pre-K through Post secondary (P-16) schools." The course is a fifty-hour training in the integration of technology. However, educators in the state were offered the InTech Assess Online Test Out Option Exam that all of the teachers at my school opted to take. Basically, this test measured a person's skills in using Microsoft Office – Word, Access, Excel, and PowerPoint. After reviewing the day-by-day schedule of activities and resource links made available through InTech, I contend that educators that elect to test out actually fail to benefit from technology integration training offered by the state.

"As teachers gain experience with technology, they often discover ways it can help them carry out their varied duties better, faster, or more effectively" (OTA, 1995, p. 50). Many teachers search for training on their own. I purchased grading software and

trained myself to use it. Then I offered to train other teachers during our planning days. It has cut down the time I use in managing and calculating grades.

Robert believes that an effective training program would have remedied teacher concerns regarding technology adoption. I participated in training provided by the same software vendor. It was a two-day crash course that did not take into consideration the varied technical skills levels of the teachers. During the sessions, many struggled with simple operating functions and after the training they continued the struggle in their classrooms.

It is Feenberg's (2001) position that management's control of knowledge within its own domain is premeditated. Management's success, however, is dependent upon designing "training and organizational structure to spread intellective skill as widely as possible" (p. 95). Otherwise, those in power will use technology to promote the status quo. Feenberg (2001) adds that those with the most to lose from this situation "are the very ones on whom change depends" (p. 95).

Teachers experience a "lack of time and effort" and as a result, many resist technology integration. Robert concurs by stating that the training he received was done so hurriedly; therefore, Robert was slow in using the software as it was designed because of a lack of understanding. My training experiences have been the same; however, my orientation to educational technology is different. Unlike my own orientation and choices, many teachers have not taken their own time and effort to explore the uses of various software or to become familiar with computers. After workshops end, training continues through educators' efforts.

This lack of effort is apparent in Karen's analysis of some of her colleagues' resistance to embracing technology in instruction. As she spoke of their *back to the textbook* attitude, I recall having spent time and effort in designing an in-house staff development workshop on utilizing an electronic grade book. After the workshop concluded, only one teacher on staff used the software, which requires time and effort to implement. According to Robert, "Most of them are lazy." He admits that he once fell into that category.

Although Robert's description may apply to some, many teachers fulfill so many roles and there are so many expectations of them that time escapes them. Therefore, adding another activity to their crowded agenda is a displeasing thought. This study has revealed the fact that teachers are not afforded the time to collaborate with other teachers about trouble-shooting strategies, planning lessons, or using educational links. Joyce notes that teaching is an isolated experience that teachers rarely have opportunities to share and help one another develop technology skills.

In addition to so many demands on teachers, especially guaranteeing student success on high stakes testing, teachers lack the time and motivation to participate in technology-oriented staff development. Allison's 5-day InTech training could have been avoided by opting to take the Test Out Option Exam. Allison's motivation was her deep interest in technology, which began before entering the school community. In addition, Allison is a member of the support staff and she does not experience the stress of testing. I opted to test out because of the multiple demands on my time. However, Allison's positive reaction to her InTech experience prompted me to consider the state's course offerings at their training sites.

Seldom are teachers compensated for participating in staff development within their school districts. The state provides a variety of technology courses for teachers through their training sites. However, there is a fee for these courses, ranging from two hundred dollars and more. Further resistance to technology integration could continue to exist when teachers are expected to pay for training related to system reform choices. "Unless there are significant changes to the rhythm of the school day or changed incentives for giving teachers more time to learn and experiment with new technologies, this barrier to technology use will remain immense" (OTA, 1995, p. 25).

When using technology, many teachers experience technical problems that they cannot resolve. Carolyn notes that when she took computer classes through the school system, she noticed that the adults were nervous because they thought that they might break the equipment. Pauline states, "[Y]ou hear teachers talking about the one or two computers they have in the classroom are always down or when the computer breaks down it's hard to get someone in to fix it." As a result, these teachers avoid using computers. Regarding her own school, Pauline says, "Technical support here is good. It could be better because we are on their list to rotate as a rotational school and sometimes we are the last on the list, which is usually the case."

This study finds that parental influence and participation in schools are sometimes as varied as the technologies across the districts. Even as it relates to the resolution of technical problems, parental pressure can produce change. As Allison travels throughout the district, she is exposed to parent organizations that make things happen in their schools. However, there are those school communities in which the parent organization is ineffective because of parents' apathy to educational technology. This may be due in part

to parents' limited orientation to these technologies. Consequently, "If our technology is down and it doesn't seem to be a big concern with the parents, well, that is just the way it's going to be," insists Allison.

Schools also experience a lack of financial support for upgrades. "We can't get support. We can't get the funds. Funding, that's the biggie. Placing the money there for the things that we need from the technology perspective," Pauline maintains. It is also my position that technology goals are difficult to meet because of a lack of funding technology. The OTA (1995) recommended to Congress that applications for federal aid, which include support for technology, should identify a budget plan for both training and support. This would guarantee that technology would be properly used and "it will help to assure that teachers will be given support over the long term, not just when the technology is brought in the door" (p. 43).

Involvement in Planning and Design

> Developing a technology plan—thinking through the goals for technology use at the local site and involving teachers in the planning process—is an important step in ensuring that the technology will be used by those it is intended to support. (OTA, 1995, p. 130)

However, Horkheimer (1937/1992) reminds us that our cultural institutions are prone to expect its members to adhere to rules and regulations of which they have no input (p. 252). The teachers in this study were not involved in the planning of their high tech programs.

> Pauline: We were brought in to basically be introduced to the program; to be introduced to [the electronic software]; and how we would be using it with the students.
> Karen: When we knew about the program, they came in redoing our school and then they sent us for a summer workshop. That was my first time hearing about [it].
> Carolyn: No one ever involved her in the planning process.

Robert: [The designer of the program] introduced [the electronic curriculum] and told us this is the system that we would have.
Joyce: No involvement.

Teachers are expected to carry out plans of which they have no input. I cannot conceive of any other group of educators that are more cognizant of solutions to the problems that plague our schools. Pauline explains that no one knows students' needs and interests better than teachers. However, in most cases, their insight is not welcomed.

Restructured programs within their school are often designed without teacher input. "[These components] were just introduced to us and we were told what the expectations were and our role as teachers as to how to implement it with the students. We were not involved in planning per se," states Pauline. The decision makers merely explain their expectations of teachers in implementing those plans. Adorno and Horkheimer (1947/1992) contend that our application of knowledge should be aimed toward "the dissolution of domination" (p. 56).

Participants were not able to articulate the technology goals for their particular schools. This is evident of their lack of involvement in the planning stages. Because she has never seen the goals, Carolyn is not sure that she is helping to meet technology goals. Robert adds, "To be honest, I don't know . . . I guess it may be in some of the literature but I will admit that I haven't read a lot of the literature that they have."

It is difficult to determine whether or not you are successful in meeting any goals when you are not clear about them. "You're just playing it by ear," maintains Pauline. One inner-city school has an electronic curriculum. For Pauline and Karen, the perceived goal for this school is successful use of the electronic curriculum so that students can pass high-stakes tests. Karen adds, "[The decision makers] have not taken it pass that."

According to Reynolds (2003), “Schooling at all levels is reduced to testing, standards, and accountability, preparing good consumers for the global marketplace” (p. 100).

Even in cases where teachers have a voice in the planning stages of programs, implementing those plans may present a challenge. I have served on planning committees designed to merely promote decisions of those in control. Reynolds (2003) reminds us that what is considered profitable is maintained, while all else is eliminated if it does not promote the preparation of consumers and workers.

My own experiences remind me that this critical approach is a necessary process that is avoided by those who dominate decision-making.

> What human beings are and will become is decided in the shape of our tools no less than in the action of statesmen and political movements . . . The exclusion of the vast majority from participation in this decision is the underlying cause of many of our problems. (Feenberg, 1991, p. 3)

Robert feels that he would have been more familiar with the content if he had been involved in the initial planning stages. He says, “The first year, personally, I feel I cheated myself . . . I did things for the students because I wasn’t aware of what the computer was doing. Me and the computer were fighting a little bit.”

Ferneding (2003) suggests that we question technology “by means of a democratic process of discussion and deliberation” (p. 244) that involves parents, teachers, school administrators, and members of the community. “Support for technology use from the principal and other administrators, from parents and the community, and from colleagues can create a climate that encourages innovation and sustained use” (OTA, 1995, p. 130). However, Reynolds (2003) insists that “participatory democratic decision-making” is absent from educators’ experiences and school policy (p. 22).

Many of the struggles that teachers and schools experience when change is thrust upon them, could be avoided when teachers are an active part of the decision making process. Robert experienced a complete restructuring of his school from a somewhat traditional environment to a high tech program. Robert says that if he had been involved in the process, he "would have taken more time and just really made the teachers more at ease." His colleagues' technological skills levels varied; therefore, the majority of them were apprehensive. This is not unusual. Whenever our landscapes drastically change, especially with the inclusion of various technologies, some teachers become perplexed and frustrated. Few voice their concerns because they do not want to threaten their job security. However, their silent voices hold strategies that would make for smooth transitions.

Is the world fundamentally a better place because of science and technology? We shop at home, we surf the Web... at the same time, we feel emptier, lonelier and more cut off from each other than at any other time in human history.
- Palmer Joss ("Contact," 1997)

CHAPTER 7

CHARTING A NEW COURSE

All struggles are essentially power struggles.
Who will rule, Who will lead
Who will define, refine, confine, design, Who will dominate.
All struggles are essentially power struggles,
and most are no more intellectual than
two rams knocking their heads together.
- Octavia Butler (1993)

As I began this study, I was guided by the need to answer one overarching question: During an age of rapid growth and advancements due to science and technology, how does education in America continue to be plagued with challenges in using technology to enrich students' learning for life and to promote their need to be socially responsible? In order to answer this question, I chose to analyze the stories of new and veteran educators that have had traditional and non-traditional experiences in education.

I am convinced that digital kids will continue to inspire education towards self-directed learning described by several participants. I am equally convinced that the technological interests of these kids will continue to attract corporate partners in education because they recognize the market's value. Teachers will become facilitators of learning in either a virtual classroom or a multidiscipline environment, while the teaching of responsibility in the creation and use of technology will be virtually absent from the curriculum.

As a veteran teacher approaching thirty years in education, I find that our educational system in America moves at less than snail's pace in comparison to the advancements made by technology in other areas. In spite of our state departments'

technology plans for education, challenges to integrating technology in the classroom continue to exist. In order to determine why these challenges exist, I questioned educators regarding their involvement in planning and implementing technology plans for their schools; the roles they play in technology integration; their perceptions of technology; ways to study and teach technology as socially transforming and problem-solving; and the beneficiaries of technology in education. Their answers lead us to a clearer understanding of why the challenges continue.

Recognizing Reasons for the Challenges

How Involved Are Teachers, Principals, and School Support Staff in Designing and Implementing Technology Plans?

In its report to the Senate Committee on Labor and Human Resources, the OTA (1995) informed the committee that in order to ensure the use of educational technology teachers must be as involved in planning as they are in implementation. However, the majority of my colleagues and participants in this study have not been involved in our local site planning. What many of us are presented as planning sessions are actually sessions to plan on how to carry out "the plans." In other words, we are often given the challenge of determining how to fit a square peg into a round hole. According to Prain and Hand's (2003) study, teachers are more likely to be receptive of technology integration when they are able to claim "teacher ownership of this change."

Many of us have been and will continue to be involved in sessions designed to carry out the plans of others. I often wonder how program designers arrive at many decisions without the input of those who are expected to meet their goals and objectives. Participants questioned their reasoning. This reminds me of Horkheimer's (1937/1992) "Means and Ends." Our policymakers and program designers often scrutinize our

responses to their directives as either right or wrong. We are either in compliance or not. It is my hope that we all recognize that excluding teachers from the planning process is a derivative of objective reasoning rather than subjective reasoning.

All school environments are not carbon copies. But they are quite unique situations with various needs that teachers cannot address alone and that policymakers and planners ignore. Including teachers in the planning stages is an act of subjective reasoning that takes the physical landscape, the needs of students, and teachers' experiences in that landscape into account. "Ultimately subjective reason proves to be the ability to calculate probabilities and thereby to co-ordinate the right means with a given end" (Horkheimer, 1937/1992, p. 36).

Winner (1988) indicates that the first point of introduction to technology holds the best possible moment for analyzing problems and options. He notes,

> By far the greatest latitude of choice exists the very first time a particular instrument, system, or technique is introduced. Because choices tend to become strongly fixed in material equipment, economic investment, and social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made. (p. 42)

This appears to be exactly what many of us experience with technology integration. As problems arise, planners are so fixed on their initial choices that they refuse to consider alternatives. Flexibility is no longer an option.

It is obvious from reading the responses of participants in this study how alienated we are from the planning stages. Few of us, including many readers, are able to relate the particular technology goals for our schools. Many are aware of state InTech requirements but outside of those, teachers are completely in a daze. This certainly gives credence to the views of Feenberg (1991), Ferneding (2003), and Reynolds (2003) that what is

necessary but absent from our school policies is a participatory and democratic form of planning. This absence contributes to the continuation of challenges in the integration of technology.

What Roles Do Teachers Play in Technology's Marginalized Position?

Teachers are often the scapegoats when accountability is the issue. It has become commonplace for me to listen to program evaluators, and even support staff, link teachers to the source of problems related to test scores and school plans. We are always approached by what *we* need to do and what *we* should know. As a teacher, I recognize the influence of teachers in integrating plans, the majority of which we have had little input in the pre-planning stages. The challenge of technology integration is definitely an issue that often finds many teachers hopelessly lost in space, and identified as the characters in education that marginalize technology.

From this study I recognize the fact that teachers play a role in technology's marginalized position. Teachers play roles in education just as actors in sci-fi play the roles designed for them. Just as most sci-fi actors, teachers seldom deviate from the script. Adorno (1966/1992) maintains that those who find profit more important than the needs of people seek to destroy our individuality or personal identities by designing the roles we play without our input. According to Adorno (1966/1992), ". . . the human beings who actually have the needs, have been socially pre-formed beyond anything which one might naively imagine" (p. 64). We ought to consider technology reform devoid of the democratic process as a re-forming of our identities as teachers, while attributing technology integration problems to teachers for whom the scripts were written.

Nevertheless, within the script we can uncover a number of factors that affect teachers' use of technology in the classroom.

Isolation is one factor and it is the invisible force that blocks opportunities to assemble in order to discuss issues of concern. We work from day to day rarely seeing all colleagues. There are only fifteen staff members at my site and there are days when I only see many of them when leaving the building. When technical issues arise, we attempt to resolve those issues alone or we approach another with whom we have developed a strong relationship. Oftentimes, neither has the solution and days can pass before technical support arrives.

One participant spoke of isolation as a major problem and I concur. I also believe that isolation can nurture an atmosphere of indifference and hostility, especially in environments where technology integration procedures are under scrutiny. According to Finley and Hartman (2004), educators "need to be able to learn from one another and see what others are doing." Too often, this need goes unfulfilled.

Some readers may be aware of individuals who present a hostile attitude when expected to explain their use of technology in the classroom. We fail to realize that our technology-oriented school environments are becoming alien spaces because of feelings of isolation backed by indifference. I am reminded of "Enemy Mine," in which two enemies land on a hostile planet only to become allies in order to address their challenges.

Too many of us attempt to address challenges alone rather than collectively. Freire (1988) urges us to realize that our struggles to improve the system will be ineffective unless we stick together (p. 6). In fact, we find ourselves questioning our

circumstances and those that order our steps in the process. Many administrators utter the same question as teachers: Why do you give me these responsibilities and then construct barriers at the same time?

Policymakers' failure to consider teachers' technology orientation and efficacy prior to implementing technology plans in schools is another factor in the script. The staff will likely respond to technology integration ". . . if they feel they are knowledgeable and competently skilled . . ." (Finley & Hartman, 2004). However, educators' orientation to technology varies. I gathered an understanding of why veteran teachers and new teachers have a different approach to the challenges of technology integration.

New educators reading this study may find themselves among the first generation of digital kids. In other words, their orientation is aligned to that of our students. Both have "grown up in a new digital landscape" (Jukes & Dosaj, 2004, p.1). Veteran teachers' orientation is quite different. Computers and the Internet were not a part of their experiences as children. For most of them, computers were not visible resources during their years as students in high school or undergraduate school. Their introduction to new technologies came after they entered the workplace. Therefore, teachers' orientation to technology is a factor contributing to their perception of and behavior towards technology integration.

As teachers discussed their efficacy beliefs, I was taken back to my studies on the importance of one's efficacy beliefs through the work of Bandura (1993). "Teachers' beliefs in their personal efficacy to motivate and promote learning affect the types of learning environments they create and the level of academic progress their students achieve" (p. 117). In further analyzing the participants in this study, I find myself among

teachers with high self-efficacy that desire a future as leaders in technology reform. In addition, they are more prone to find ways to get around the obstacle of access problems in order to provide the best learning environment for students. According to Bandura (1993), "People with high efficacy approach difficult tasks as challenges to be mastered rather than as threats to be avoided" (p. 144).

In contrast, the majority of the veteran educators perceived themselves as “middle of the road” users of technology. Their orientation to technology differs from those with high self-efficacy. Although they favor the use of educational technology, they lack the same enthusiasm as those with high self-efficacy.

One veteran teacher participant has low self-efficacy. He describes himself as fearful of technology. He attributes his lack of enthusiasm to integrate technology to fear and laziness. He is unable to comprehend the roots of his fear but he does recognize this same attitude in the behavior of other teacher acquaintances. Participants in this study concur with him. They all attribute low self-efficacy among teachers as one reason for resistance to technology integration. According to these participants’ analyses, fear, a lack of understanding, and slothfulness demonstrate attitudes of low self-efficacy.

Because of the various technological experiences educators, we ought to regard the needs of those with limited experiences. Providing a great deal of moral support and time to experiment with new technology would build the efficacy levels of all participants in technology integration. Finley and Hartman (2004) also encourage rewarding teachers for making the extra effort to integrate technology. Administration cannot overlook the fact that change is a difficult process, especially when it affects teachers with limited use of technology. Snider’s (2002) study with pre-service teachers

uncovered what is the likely case for veteran teachers as well: ". . . they seldom saw technology use modeled in public school classrooms . . ."

Although educators' orientations and self-efficacy issues contribute to the challenge, we cannot overlook the lack of access as a major challenge to technology integration. Prain and Hand's (2003) study indicated access as a condition for effective use of technology in the classroom. In fact, this factor ought to be considered in an analysis of educators' orientation and efficacy because their pasts do not reflect comfortable and frequent use of new technologies, especially among veteran teachers.

Participants revisited past classroom experiences in which there were few, if any, computers. Some spoke of fellow teachers' present concerns that one computer does not amount to access. Presently, these participants work in small, non-traditional schools with a technology focus. Their environments are far from utopian. They, too, complain of the need to improve the infrastructure.

Participants expressed their concern that access is one of privilege. Privilege is also a label that can be attached to SF's origin in the pulps. The audience was White males around the age of twenty (Kyle, 1976). Women were depicted in what amounts to less than favorable situations and racism found its space within the pages of the early pulps (Ashley, 2000). We can draw analogous relationships between the bias of technology and that of science fiction

Winner (1988) addresses the political bias of technology as it relates to accessibility. From the initial planning stages of technology's possible uses, concern is focused on the power elite. As a result, many people "receive a better hand than others" (p. 40), leaving the poor and minorities in dire need of access to technology. The poor

continue to experience inequities and technology access is added to their list. “This is the paradox of reform from above: since technology is not neutral but fundamentally biased toward a particular hegemony, all action undertaken within its framework tends to reproduce that hegemony” (Feenberg, 1991, p. 65).

One participant described how access varies across her district. Schools’ technology budgets reflect the decisions of the school board and the emphasis areas assigned those schools. Strong parental presence and collective involvement influence these decisions. In cases where parents remain silent and apathetic, the availability of technology is limited. We ought to consider whether those that make ultimate decisions desire the lack of parental involvement. The top-down decision-making approach deters "the chance for true organic change involvement by parents and students is severely limited" (Walsh, 1996, p. 8).

In schools where technology is limited, you will find teachers who either struggle to implement plans without resources or you have teachers who contend that it is worth neither the effort nor the stress. Although computer labs exist in our schools, the location and the process of using these labs contribute to teacher apathy. The lack of access deters teachers’ integration of technology and contributes to the appearance that teachers may be responsible for technology’s marginalized position in education. “Having one computer in the classroom is not access, nor will it lead to significant student use.

Frankly, technology can't have an impact if children have not had the opportunity to access and use the technology” (Norris, Sullivan, Poirot & Soloway, 2003). This study revealed a concern among participants for a lack of access to home computers for their students. According to Becker (2000),

> . . . home access to computers will be a continued area of inequality in American society, and that schools must play a critical role in ensuring equal opportunity for less-advantaged children to access the benefits of the more intellectually powerful uses of computer technology. (p. 44)

If access continues to be a problem in America's classroom, the underserved students in our classrooms will be placed at a greater disadvantage than those families that can afford home computers.

The lack of proper training and support affect teachers' effective use of technology, including those working in environments where access is not a problem. Participants cite a lack of training as a crucial factor because they consider training to be a hurried event without substance. In addition, training is rarely ongoing and for teachers with limited technology skills, ongoing training would be beneficial. Technology support is similarly described. Most teachers lack the expertise to troubleshoot when software or hardware problems surface. Some participants noted that because of the possibility of technical problems, many teachers refuse to use the computers that are available. Educators also contend with the timely task of preparing students for standardized testing. Among the participants are high school teachers that have the awesome task of preparing students for high-stakes tests, which determine students' graduation status. One participant questioned whether administration viewed technology as merely a "tool" to improve test scores rather than as an enriching experience.

For many of us, our orientation to technology is grounded in our persistent need to view it as a tool. If policymakers maintain an instrumental view of technology in education, then it is reasonable to suggest that it is their desire to control what and how we teach through the use of technology. Heidegger (1977) terms this action as "enframing," (p. 27).

My program presents students with an electronic curriculum that I utilize fifty percent of the time, while many teachers engage it one hundred percent of their class day. Their concern for test scores is the bottom line because our names are attached to every student's printed test results. From this study, I began to see how easily teachers are transformed into the objects used to serve the computer as it dictates. The electronic software instructs the teacher on how and when to assign particular lessons. It even explains reasons for its diagnosis.

I recognize the importance of varying the learning experiences of students and I use the software in such a way that it is blended into the curriculum without being the primary source of learning and teaching. Otherwise, I would become a dehumanized teacher lacking creativity, emotions, and flexibility.

Overall, traditional standardized testing ought to be considered as a deterrent to effective technology integration. In its 1992 report to Congress, "Testing in American Schools," the Office of Technology Assessment (OTA) reported that teachers would likely resist the use of any new technological tools in classroom instruction. In 1995, their findings remained the same. Because their performance as well as the performance of their students is measured by test results, teachers cannot be assured that standardized tests would be in alignment with the types of learning promoted by new technology. High stakes testing and our traditional standardized methods of assessment influence teacher attitudes towards technology integration.

Although teachers play a role in technology's marginalized position, it is important to recognize the creators of the parts we play – the policymakers. In spite of the barriers they construct, e.g. an undemocratic planning process, limited resources and

training, a lack of financial support, a substandard infrastructure, and a questionable assessment process, few of us dare to improvise or complain collectively. The 1933 World's Fair motto sums up this situation: "Science Finds - Industry Applies - Man Conforms." Within their focus on technical innovations, the planners of this World's Fair relegated us to servants or objects of science and industry.

It may appear to be easier to follow the rules as outlined for us. Robert, a participant in this study, admitted to getting in line with the program in order to protect his teaching position. Winner (1977) warns us against adapting to thoughtless rules of change. He describes our choices in adopting technologies to legislative acts that become fixed.

> For that reason the same careful attention one would give to the rules, roles, and relationships of politics must also be given to such things as the building of highways, the creation of television networks, and the tailoring of seemingly insignificant features on new machines. (Winner, 1988, p. 43)

What Are Educators' Perceptions of Technology as an Integral Part of the Human Experience?

Technology is an integral part of our lives. It is everywhere around us; and technology has extended itself into our physical being. "Because all media, from the phonetic alphabet to the computer, are extensions of man that cause deep and lasting changes in him and transform his environment" (McLuhan, 1995, p. 237). With the emergence of computers in the classroom, I became known as a facilitator. As a result of six years of experience with computers in the classroom, I maintain that it is a powerful technology to enhance teaching and learning when integrated into the curriculum. However, we ought not to ignore the fact that technology is not neutral. It alters our view of self and technology in instruction can alter the way we learn. Therefore, it is important

that we not allow computers to distract us from learning how to function as a member of a relational community by imposing its own boundaries on life in the classroom.

Educators perceive technology as the vehicle for transporting us into a global world. However, they recognize the dark side of technology. The Internet can transport us to those unsavory sections of the global village where predators lurk. Turkle (1995) suggests that we engage in discussions on the dark side of information technology "and perhaps in the process we can develop some insight into how we might avoid such pitfalls, while still deriving the very real benefits which it potentially provides" (p. 316).

Although it may be an overwhelming task, participants suggest the need for parents and educators to monitor student use of the Internet. In addition, we ought to take advantage of this process to teach values and the importance of making moral decisions. Turkle (1995) advises parents to be as concerned about the Internet as they have been about violence, unsafe communities, and drugs. Turkle (1995) adds,

> These days, the Internet is the new unknown. Parents need to be able to talk to their children about where they are going and what they are doing. This same commonsense rule applies to their children's lives on the screen. Parents do have to become technical experts, but they do need to learn enough about computer networks to discuss with their children what and who is out there and lay down some basic safety rules. (p. 237)

Educators contend that we are becoming so dependent on technology that it is difficult to imagine life without it. Participants point out various uses of technology from banking and grocery shopping to driving their automobiles and telling the time of day. Everything is digitized and when those things fail to operate, we become so helpless that we tend to respond as one who has lost an integral part of one's being.

Ihde (2001) explains that as bodies in technology we are in a two-way relationship with the technologies we use. "Insofar as I use or employ a technology, I am

used by that technology as well" (Ihde, 2001, p. 137). Ihde (2001) also notes that the human and the machine adapt to one another. I recognize this two-way relationship between the users and the computers in my classroom. Whenever a computer is down, students become distraught that they are not able to complete an assignment based upon the time frames that they have set for themselves. I also thought about Ihde as students shut down the computers at the end of the day, leaving the computers silently behind. There are "implied limits to the machines we build and use" (Ihde, 2001, p. 138) when we consider the importance of this two-way relationship.

The findings suggest that technology has made tremendous advances in the medical field. We have only to consider how the laser has taken the pain out of various surgeries; although, we tend to ignore negative possibilities. Technology certainly has facilitated monitoring patients and at first glance it appears that it has made physicians' tasks easier to handle.

Nevertheless, we are becoming aware that its misuse is causing us discomforts while living on planet Earth. Educators voice their concern for problems generated by corporate misuse of technology without concern for our human resources or the environment. We are experiencing the effects of global warming. Our pharmaceutical industry creates drugs that are accompanied by warnings of potential danger to the user. Yet, we purchase them in hopes of delaying the danger in order to get a sense of immediate relief. Participants echo concern for the use of technology in warfare and the devastating effects it has on Earth's people.

On April 9, 2003, Langdon Winner spoke before the Congressional Committee on Science in Washington, D.C. regarding nanotechnology, which is concerned with

manipulating materials to build microscopic equipment. Winner acknowledged the enormous potential of nanotechnology to alter our lives and the environment. Therefore, he called attention to the fact that we ought to question who dictates that transformation. The following segment from his speech appeared on May 20, 2003 in "Tech Knowledge Revue," a column devoted to technology criticism in NetFuture, an online newsletter:

> Typically, what happens is that the promoters of a new technology, those with the most to gain in the short run, are the ones who speak first and most loudly . . . Indeed, they usually proclaim that there is a revolution just around the corner, one that will alter society for the better, making us wealthier, wiser, more democratic, and stronger in community bonds. Often the promoters try a clever ploy, announcing that the changes on the horizon are 'inevitable,' beyond anyone's power to guide or significantly alter. (para. 2)

The transformation of my school into a small high-tech environment was presented as "inevitable." Many readers may find themselves in similar situations when presented programs to implement regardless of the context. Promoters of new technology reform in education are always the first voices we hear. After that, we may find a few individuals willing to dissent in the interest of the students, education, and the promoters themselves.

Although technology is not viewed as a cure-all, participants in this study maintain that it has the potential to change teaching. Those teachers that resist change are those fixed in their traditions; therefore, they are likely to rebuke technology reform efforts. Teachers that embrace it vary in their use of technology but they concur that individualized instruction and research projects are facilitated through the use of technology. Petraglia (1998) addressed the issue of technology in education:

> Educators and technologists have held out great hopes for the prospect of increased student engagement in activities that use multimedia, hypertext, and other electronic-based learning applications. These hopes have been largely rooted in the belief that new technological advances will enable educators to

> contextualize, and thus, bring authentic learning materials and environments into the classroom. (p. 5)

However, most of us are still hoping for the opportunity to access the technologies and learning materials that would enable us to enrich student learning. In fact, we are still hoping for the freedom to imagine and implement authentic learning opportunities.

Too often, we limit technology to computers in the classroom. We ought to consider the importance of the technology of music in the lives of our students. I am reminded of Daspit (2000) who challenges us to rethink our reform efforts in such a way "the entire process of learning becomes more communal, and where technology and popular culture become 'human' forces . . ." (p. 176). This is a transformative break from our traditions because the imaginations of teachers and students are free to experience teaching and learning together.

It is within the various terrains of popular culture that our identities are structured and restructured. Our world is always changing and with those changes emerge new selves. It is so difficult for some veteran educators to understand the identities of our students because they may appear to be aliens from another planet or time travelers from the distant future. Therefore, studying popular texts is important, not merely to better understand our students but also to understand ourselves.

> Students, teachers and administrators have to become readers of popular cultural texts in order to construct meaning out of their lives and develop ethical imperatives that serve as (albeit temporary) markers and springboards to promote democratic schools and societies in which all voices are nurtured rather than ignored, erased, or silenced. (Daspit & Weaver, 2000, p. xv)

In *Teaching to Transgress: Education as the Practice of Freedom*, hooks (1994) describes a radical space in education as a classroom that is "an exciting place, never boring" (p. 7). This is the type of classroom depicted by Daspit and Weaver (2000) where

every voice is welcomed and encouraged. It ought to be a space where students and teachers discuss their perceptions of technology and how our identities change as technology continues to advance.

Each teacher has differing methods of approaching a lesson. In comparison, it must be recognized that every teacher will experience educational technology differently. In fact, teachers in high-tech environments tend to have preferences in their choices of technology to use at particular times. Some enjoy limiting their time to traditional methods coupled with computers and the Internet, while others may use overheads, video players, etc.

As we consider our experiences with technology in the classroom, the narratives of our educators suggest that technology is not the panacea for all needs in education. Even within a high-tech environment, teachers appear to use traditional and non-traditional methods of instruction, as well, based upon the needs of students. But, this is what is meant by the integration of technology in the classroom.

Again, however, we must be reminded that no integration can exist without the resources and the support to keep them up-to-date. Even within the high-tech environments studied, the infrastructure is less than desirable. Unless Internet access is available and rapidly aging hardware is replaced, these environments will become as chilling as the beginnings of the new Ice Age in "The Day after Tomorrow" (2004).

How Ought We to Study Technology in Such a Way That It Can Be a Problem-Solving and Socially Transforming Experience?

Participants in this study were asked to describe their schools' efforts to teach students the importance of social responsibility in the creation and use of technology. Unfortunately, this is not a goal of their programs. After contemplating the possibility

that the misuse of technology results in human and environmental destruction, these educators now realize how important it is to enter into a complex discourse with students.

Participants believe that our classrooms ought to be the spaces where students become aware that there is suffering throughout the world – human and environmental. Many students live in low-income neighborhoods where suffering from a lack of the bare necessities is constant. These students are also the potential techno-scientific minds that hold solutions to world issues. However, they also have the potential to use their creativity for destructive means. It is in the grasp of our educational systems to redirect our focus so that technology will be ultimately used to improve the quality of life rather than to continue to move ourselves, and the Earth, into further deterioration.

We have avoided discussing issues that contribute to the discontent with society that is depicted in the popular music of our youth. Too often, educators gather in staff meetings in order to discuss the behavior of discontented youth, rather than enter into dialogue with the students themselves. Weaver, Anijar, and Daspit (2004) question our logic:

> In regard to youth we have instituted curfews and dress codes and allowed the erosion of the individual rights of youth as we fail to address the root causes of youth discontent (i.e., the loss of the American dream as adults tell youth not to expect the standard of living many of their parents enjoyed). (p. 13)

Encouraging our students to take a pessimistic view of the future does nothing to liberate our students but it does everything to tighten the shackles on their minds. It is no wonder that adults are fearful when being approached at an ATM by a young person. Many youth are so mentally programmed to have a hopeless view of the future that taking the low road to crime and violence becomes their unhealthy choice. We fail to

realize that programming their minds, in such a way as this, is so similar to traveling in the dark and unsavory spaces in the virtual world.

In reviewing participants' discussion of project-based learning's use of research and technology as an effort to acquaint students with environmental concerns, I began to reflect on studies of authentic learning. For Petraglia (1998), instruction should take place in contexts that reflect "the real world" (p. 4). In other words, the information to learn and interpret as well as the environment itself ought to be meaningful to students.

It is difficult to argue against technology's importance in the lives of a digital generation. But many educators still ponder over the idea that technology can contextualize learning. I have listened to participants discuss the world brought into the lives of underserved students through the Internet. Dewey (1931) recognizes the fact that experience takes on a new feature when technology is involved. In *Living Philosophies* (1931), Dewey explains his position:

> 'Technology' signifies all the intelligent techniques by which the energies of nature and man are directed and used in satisfaction of human needs; it cannot be limited to a few outer and comparatively mechanical forms. In the face of its possibilities, the traditional conception of experience is obsolete. (Einstein, et al., 1931, p. 25)

Without leaving home, we visit special interest communities and chat rooms; we communicate via e-mail; and we visit game rooms. Completing high school and university courses is facilitated through the Internet. Shopping is no longer a drive from one mall to another. Touring homes and rental property is merely a click away. I have attended church services from the confines of my living room. Even those looking for *action* of all sorts can be satisfied through the virtual world. Because of technology, experience has taken on a new description.

Educational technologists “suggest that, using features such as multimediation, interactivity, and collaborative modalities, apprenticeship conditions for learning can be approximated and students can be engaged in the authentic activities of experts” (Petraglia, 1998, p. 6). I have used information technology for the purpose of researching societal issues with my students. Other participants’ students use technology for designing elaborate presentations based upon student interests, e.g. film editing, music, and software design. Educational technology continues to be engaging in my environment.

Participants find value in the use of collaborative and cooperative activities so that socialization is not compromised. "It is truly educative in its effect in the degree in which an individual shares or participates in some conjoint activity" (Dewey, 2005, p. 20). As it relates to technology, however, there are two opposing viewpoints of whether it is has the potential to promote or deter socialization.

An optimistic view suggests that the world is presented to those who would never have the opportunity to visit foreign places. We are connected to the world in such a way that the grandchildren of one participant can converse with children in another country. Even learning another language through this interaction is made possible. Other participants spoke of the acquisition of knowledge as being facilitated. Many students have jobs and the Internet provides an opportunity to research through e-zines and databases.

A pessimistic view suggests that technology creates isolation. This is the most voiced criticism of technology that I hear. When I entered my high-tech environment for the first time, I noticed how students began to tune out all that was around them. What

concerned them most was what was happening on the computer screen and within their own minds. I have shared both views at some point in my experiences in a high-tech school environment. Today, however, I recognize the importance of designing cooperative projects and problem-based activities in which students will use technology for research and product construction. It is important to provide students opportunities to work together to solve real-world problems.

Many of us have participated in authentic learning workshops designed to provide examples of activities in which to involve our students. However, the ones that I have attended have stopped short of examining the long-term behavior expected from authentic learning. We ought to be contemplating living authentic lives. "An authentic person, as described by Sartre, is one who acknowledges responsibility for himself and, in particular, his moral decisions" (Billington, 2003, p. 150).

The importance of teaching values was highlighted in this study because of the many dilemmas associated with the misuse of technology and the inequities accompanying technology reform. Heidegger believes that we must deal with the dilemmas by recognizing the importance of an authentic self. "The Self of everyday Dasein [existence] is the they-self, which we distinguish from the authentic Self—that is, from the Self which has been taken hold of in its own way . . . " (Heidegger, 1962, p. 167). These authentic selves will recognize attempts to make them objects of technology (Heidegger, 1977).

We can best understand the they-self by considering the choices we make everyday. Too often, we function to gain the approval of others regardless of the warnings from our inner voices. Our they-self is the Being constructed from the designs

of others, especially technology. In functioning as an authentic self, we are critically conscious of our dilemmas and we work towards eradicating them. In our efforts to work in the interest of social justice, we do not hide behind masks nor do we silently accept the ineffective guidelines of others.

In teaching social responsibility for our actions and technological creations, we must discuss the power of greed. The inner voices of those in power may speak favorably of avidya. Therefore, failing to follow those voices may not be the problem because a mind fixed on greed cannot be a social conscious mind. What we miss here is the need to recognize our connection to everything in the universe. Instead, attention is focused on the quest for power and materialism, which generates more inequities for the poor.

I began to reflect on my experiences with this study while discussing transcendentalism with my students. Thoreau recognized how we fall into the trap of greed, ultimately being possessed by our material possessions. He went to the woods to find self through meditation and communion with nature. Although withdrawing from society failed to eradicate the issues, reading Thoreau continues to be a space for uncovering our present circumstances. But I contend that SF goes a step further by calling our attention to the need to work collectively, aggressively, and continuously in order to bring about change.

Sci-fi is identified as the genre that unlocks the mind to imagine a different future while critiquing our present circumstances. Those that favor sci-fi contend that it is paradoxically more real than reality. Although one participant expressed a lack of interest or exposure to sci-fi, that participant admitted that sci-fi helps us think outside of the box.

When included in the course content, sci-fi provides a critical approach to analyzing the social messages purposefully implied within it.

Who Benefits from Technology in Education Reform?

Freire (1998) maintains the need for society to develop its technology. He adds, "No nation can assert itself through a wild passion for knowledge without venturing emotionally into constantly reinventing itself and without creatively taking risks" (p. 37). Our educational system is not exempt. Therefore, effective technology integration will benefit the system and society. The key is determining what is effective.

Parents, students, teachers, the community, and corporations were identified as beneficiaries in technology integration. As we continue to identify the beneficiaries, it is important to realize that no one truly benefits unless there is improvement in the infrastructure in all schools and unless students learn the importance of being socially responsible. One exception to this, however, is corporate involvement. Regardless of the conditions of our infrastructures or the availability of technologies, corporations will continue to be the first to benefit, the hardware and software vendors in particular. It is obvious from our history that those in power will continue to reap the benefits of education as a market for profit.

Throughout this dissertation, I have made mention of the 1992 and 1995 reports to Congress by the Office of Technology Assessment. It is important to note that the OTA was formed in 1972 by Congress to study technology's social, political and economic influences. Both reports call attention to the need to involve teachers in pre-planning and on-going staff development. These reports focus on the need to provide access to all

students, with a focus on the underserved. In addition, the OTA made reports to Congress regarding such issues as clean air, bio-terrorism, and energy conservation.

If our policy makers had adhered to the suggestions of the OTA, many of the challenges to technology integration would have been resolved. In fact, a leveling of the playing field would include those underserved as beneficiaries of technology integration. But the OTA closed in 1995 and its reports are now archived at Princeton having met with so much resistance.

Between 1972 and 1995, the OTA found itself tossed between political factions. Fulton (2004) states that many politicians "saw it as an independent think tank" (p.151), while others considered it an outlet for Democrats needing a job. But it is apparent from reading these reports that those functioning within the OTA were aware of the needs of all communities in America. Their efforts were designed to assist in planning the integration of technology in education with a focus of serving all students, regardless of socioeconomic status.

With this social attitude, the OTA stimulated controversy and those within the research and academic communities regarded it as a source to observe the policy making process. Fulton (2004) notes that politicians label the research community as basically liberal Democrats. "OTA was closed down, demonstrating again the uneasy relationship between the research community and the policy process" (Fulton, 2004, p. 151).

What we ought to consider is the obvious air of disagreement among policy makers. If they cannot arrive at a common ground in which to best resolve challenges in the use of technology that would benefit all humankind, then we can expect to continue to

search for the beneficiaries of technology integration on this side of the door to the policy making fortress.

Fostering Social Justice

As we consider the use of technology outside the educational systems, we recognize that the corporate world appears to have clearly defined plans and processes for technology. This is evident from the consistent emergence of new technologies that are birthed from relatively new ideas. Corporations are always functioning to improve for the sake of the market. Although these plans and processes are profit-driven, they exist, nevertheless.

Our system of education attempts to implement plans without functioning to democratically design courses of action to improve education for the sake of all participants in our landscape, especially those courses of action that lead to the integration of technology to enrich students' learning for life and to promote their need to be socially responsible. As long as policy-makers continue to overlook the need to address the issues expressed by social conscious educators in critical education research, the challenges will continue.

What is even more important is that our present system of education will become that planet ravished by welcomed aliens that were once interlopers. Too many of them are consumed by greed; yet, education welcomes them. As we blindly hand over the controls, we are destined to completely move education into the virtual world, controlled by multinational corporations interested in training for the sake of their own preservation. However, we cannot afford to nurture a system where greed is perpetuated. I cannot conceive of educators willing to relinquish their social responsibilities for the quest for

materialism. Yet, many support these systems without a word of dissent. Therefore, I consider a lack of ethics as the reason why we continue to search for a challenge-free world of education. The needs of all of us ought to be the focus rather than the selfish interests of a few.

In order for social justice to be realized in this world, each person must recognize and practice social responsibility. As educators, we must consider our own actions. We ought to question our own attitudes and our own motives because everything we do will affect other people, namely our students, their families, our colleagues, and ourselves. Silence is an action in which we abdicate our responsibilities to those who often find "self" as the focal point and our children, schools, and profession are left in limbo.

Our education system must demonstrate an ethic of caring. Most of us hear of discussions of ethics in education as a part of the curriculum designed for the students. We are urged to create caring school communities. But the space labs of policymakers ought to be the models for these caring communities as well.

The problem, as I have observed from my own experiences, is that the atmosphere within education is turbulent. Teachers feel isolated and unsupported and yet, they devote themselves to the education of the children. The same caring attitude that we provide students is what is needed for all of us regardless of status and position.

An ethic of caring is demonstrated by patience. Plans for technology integration ought to make concessions for teacher orientation and efficacy. Plans are to be implemented regardless of the varied levels of technology experience that teachers possess. Every teacher receives the same training based upon the expectations of the

program. These training sessions are often crash courses in the use of the technology itself and they do not focus on methods to integrate technology into instruction.

Educators are often overwhelmed by the responsibilities that accompany this profession. Many educators do no more than they are obligated to do. But, we must remember that they are doing what is familiar. Although technology integration is required, many teachers will bend towards their traditions and comfort zones. Fear and a lack of understanding technology can be remedied by a system that patiently provides its teachers with the time, resources, support, and training to become familiar with the technologies.

We ought to listen to the voices of educators that question the effectiveness of the current standardized tests, especially high-stakes tests. Within this study, you have read the concerns of teachers that administration desires technology as a tool to improve test scores. The OTA (1996) addressed concerns that standardized test programs would deter effective technology integration. This focus leaves little time to engage students in enriching activities to open them up to many worlds so that they are able to analyze issues that plague their communities. These would be opportunities to uncover solutions to their own problems. In fact, teachers would be encouraged to take initiative in developing research for students, rather than using a “one shoe fits all” process.

It is impossible to embrace an ethic of caring while demanding that the plans and the processes must go one’s way. Few of us are involved in decision-making. We are expected to implement plans, even when we concur that there is a malfunction. Being within the field provides many perceptions of solutions. Nevertheless, they tend to be overlooked because the course of navigation has been fixed for us all.

Whenever people are included in designing and redesigning a plan and whenever people's suggestions are welcomed at the intergalactic table, people buy into the process. As a result, they are more willing to experience the growth pains accompanying new efforts. They are more apt to support the process because they have a vested interest in it. In fact, they are loyal to it because they believe in their own ideas, which are rooted within the overall plans and the processes.

Our system of education cannot express this ethic when inequities are apparent. Some schools have access, while others do not. The scales are tipped. We cannot use technology to enrich students' learning when there is a lack of access to educational technology. Nevertheless, it is expected that no child will be left behind. Because many of us live in very different worlds, I believe that our views from our vantage points are quite dissimilar. There are those of us that travel between these worlds and it is more obvious to us that inequities exist within our systems and there are very real spaces where children, parents, and educators have all been left behind.

As I consider this situation, I imagine Saturn and its seven rings. I view Saturn as the center and its rings as marginalized spaces. In the center are those schools that have a strong infrastructure, financial support, and human resources. The seven rings vary in size and brightness. Metaphorically, these rings are the spaces for schools of those that are marginalized.

We often enter into discourses regarding the marginalized and I suggest that there are many such spaces because marginalized people create margins for others as well. I have traveled between these rings and I have observed schools that have slightly more

than others. As many readers have done, I have dedicated my professional life to bringing a caring attitude to these, sometimes, cold spaces.

But in moving from the margins to the center and back, I find that the center is not as stable as it appears. In comparison to Saturn, it is not a solid foundation. The rings are the sources of Saturn's brilliant appearance. It is the marginalized spaces that give the center its appearance of strength and power. In analyzing technology reform that is at the center of education, I contend that technology reform is not rock solid because of the existence of inequities and the absence of an ethic of caring.

Curriculum Studies: Challenging Traditions

The positive and negative facets of our use of technology are discussed in this study. What is alarming is that these same discussions are absent from our elementary, middle, and high school classrooms. I thought about this absence as I was afforded opportunities to investigate various topics on curriculum in Curriculum Studies at Georgia Southern University. This is a vast change from traditional methods that limit our study to content. This non-traditional method - Curriculum Studies - provided opportunities to focus on an area of personal concern: technology integration. This study is the result of that opportunity and I recognize that critical research findings presented throughout the field of education is an impetus for change.

Curriculum Studies is the space that challenges us to understand curriculum and our present circumstances through the study of curriculum theory, "the interdisciplinary study of educational experience" (Pinar, 2004, p. 2). In keeping with the focus of Curriculum Studies and curriculum theory, this study was designed to examine the

educational experience of educators in the field who are challenged to integrate technology in instruction.

As I listen to the repetition of the phrase No Child Left Behind, I have a mental image of students throughout the country who are recipients of decades of promises from our system of education to provide quality materials, equipment, and learning experiences in schools. Many teachers have waited patiently for the same promises to materialize, although, they have had little to no input in the types of reform efforts that could best benefit our students. Still, many more disenchanted educators leave the field for what appears to be the greener grass of corporate America.

Our schools have welcomed such reform efforts as the Modern Red Schoolhouse and America's Choice, both carrying with them tones of nostalgia or patriotism. Today, the main concern in education is that the quality of public school education continues to be less than desirable. Curriculum Studies guides us into recognizing the fact that, in order to confront and resolve problems in education, we ought to make connections between educators, students, the environment, and the curriculum. In order to do so, there is a crucial need for educators who are willing to collectively join forces for the purpose of being actively engaged in providing leadership with a social conscious voice resounding above a mere whisper. This study is intended to reach within and outside of the university walls, revealing its findings to corporate partners, parents, teachers, support staff and administrators on the district and state levels. In order to affect change, we must remove ourselves from our comfort zones and move into spaces where a critical and constructive disturbance is long overdue.

Curriculum Studies prepares us for the challenge of change through its position that school improvement is dependent upon the positive interaction of the home, school, and environment. Otherwise, learning will continue to be plagued by inequities and power struggles will persist with underserved and poor students as their victims. This study examined the inequities within technology reform that continue as the result of on-going power struggles in education and the silence of those within the field.

Accompanying new technology reform in education is the focus on accountability through standardized testing. Not only are tests scores used to measure student learning, but also teachers' performance is measured by standardized test results. Curriculum Studies is critical of standardization efforts. As a teacher who is bombarded with standardized test preparations, especially high-stakes tests, I find myself resenting the pressures imposed on teachers and students to "perform" rather than to teach and learn reciprocally. Participants were swift to identify standardized tests as a deterrent to effective teaching and technology integration. In concurrence with Daspit and Weaver (2000), I understand that students should not be treated "as manageable products quantifiable by standardized and normed tests" (p. xiv) and teachers ought not to be viewed as mere classroom managers. Rather, the classroom ought to be the space where all participants are valued contributors to the learning process.

This study was designed to find reasons for the challenges of technology integration as a part of curriculum. What it also uncovered was the view of technology as a tool of standardization. Again, a new reform effort emerges as the panacea only to be viewed as a tool. Curriculum theory is critical of reform because these efforts continue to promote politicians' desire for accountability in education without recognizing that it is at

the expense of learning. “By linking the curriculum to student performance on standardized examinations, politicians have, in effect, taken control of what is to be taught: the curriculum” (Pinar, 2004, p. 2).

I became cognizant of the importance of examining the metamorphosis of our school environments and our roles as educators in the field through Curriculum Studies. Therefore, I used this study to encourage participants and readers to reflect on their past in order to gain an understanding of their present circumstances in education. I chose to encourage participants and readers to find value in the metaphorical and analogical power of SF to analyze education and our roles within it. “We push the boundaries using science fiction as our central metaphor, negotiating previously uncharted territory to reconceptualize epistemological, axiological, and ontological constructions” (Weaver, Daspit, & Anijar, 2004, p. 15). This is an autobiographical and narrative analysis of our circumstances that I consider supported by Pinar’s stance on currere. As Pinar (2004) contends,

> . . . this autobiographical method asks us to slow down, to remember even re-enter the past, and to meditatively imagine the future. Then, slowly and in one's own terms, one analyzes one's experience of the past and fantasies of the future in order to understand more fully, with more complexity and subtlety, one's submergence in the present . . . To undertake this project of social and subjective reconstruction, we teachers must remember the past and imagine the future, however unpleasant each domain may be. (p. 4)

Sharing my experiences in a Curriculum Studies program with those who have an interest in improving education is my responsibility. Through my personal readings, reflections, and this study, I have become even more focused on daring to teach using technology to encourage students to become social change agents. However, this may be a daunting task for educators because our schools’ identities are changing to reflect the corporate world. Reynolds (2004) calls our attention to this transformation:

> They are also becoming corporatized themselves. We can notice that the call for accountability and testing within the context of the ever-present calls for school reform reflect a corporate-like demand for profitable and pragmatic results. And, at the same time, this call completely ignores issues such as ethics, equity, and social justice. (p.22)

Although I am aware that standardization is likely to continue, we must find the determination and a space to transgress in the interest of students and education because our schools are losing their identities as sites of learning. Transgressing does not suggest that we do not care about our public schools. To the contrary, it indicates an ethic of caring about the students, colleagues, administrators, and policymakers because each group is connected to the other as links in a chain.

Some of us may question why we ought to care about those who exclude us from the planning process. We may question the need to care about our oppressors. It is easier to care about and to work in the interest of those oppressed and those with whom we have a positive relationship. As a result of my life experiences, I have arrived at the position that working in the interest of the oppressed is working in the interest of society as a whole – the oppressed and the oppressor. Ethics is a critical area covered in Curriculum Studies. From the vast amount of discussions and readings on ethics, I am even more confident that an unrelenting demonstration of an ethic of caring by a social conscious person is active dedication to the obliteration of injustices.

A New Beginning: Continuing the Story

At this point in Earth's life, the story continues with both a tone of pessimism and optimism. In order to tip the scales in favor of optimism, we ought to teach our students the importance of social responsibility involving technology. A new beginning in education would find an environment in which students and educators become

knowledgeable of the influence that technology has in the construction of our identities and the future life of this planet. After all, it is technology that education positions in the forefront of reform.

The environmental changes that are accompanying the misuse of technology will have even more devastating effects if we do not inspire students to become the problem-solvers of their forefathers' errors in judgment. We can no longer continue to ignore the psychological and social issues that result from the misuse of technology. We can no longer continue to ignore education's absence from the plot of integrating technology with a social focus. Our perception of technology will determine how we react to it.

In "The Matrix" (1999), Morpheus offers Neo the choice of waking up to the truth behind the Matrix or waking up oblivious to its true nature. If we continue to ignore the catastrophic consequences of our choices in the use of technology, we will wake up as slaves of our own creations. We will be living in the Matrix with no knowledge of the conditions of our existence.

In the field of education, we must create the space to enter into a discourse that examines whether or not our actions or a lack of reaction to technology's misuse has destined us to awaken to a "world that has been pulled over your eyes to blind you from the truth" (Morpheus, "The Matrix," 1999). In fact, we often look for heroes to fight for more resources, better facilities, and improved wages. Lauren, the protagonist in *Parable of the Sower* (1995), speaks of the hero who outsmarts the company. However, she says that in reality our heroes "fight like hell to get taken in . . ." (p. 110). Therefore, another question may be more appropriate today: Are we living in the Matrix?

It is inevitable that the worlds of our children and their children will be a more complex technocultural space. But as we experience the greenhouse effect and global warming we ought to teach our students the importance of examining the processes and taking an active role in working to support efforts that aggressively search for ways to reverse the likelihood of total devastation. From this study, I have arrived at the same position regarding technology as Palmer Joss in “Contact” (1997): “I'm not against technology . . . I'm against the men who deify it at the expense of human truth.

There are those that may call me a hopeless optimist; but I believe that there is goodness inside of us all. I also believe that attitudes of injustice and greed are nurtured from childhood and expressed through our behavior at all ages. The education of our children ought to include value lessons; and parents, educators, and policymakers ought to recognize the importance of demonstrating an ethic of caring about each other.

Science fiction provides opportunities to draw analogous relationships between its expositions and those in education. For example: Ringworld is a gigantic ringed surface that rotates around its sun (Niven, 2004). Thousands of alien races of different cultures live on the surface in complete isolation. Our system of education consists of many levels, numerous divisions, and families of various cultures. As we enter our offices and classrooms, we ought to consider whether or not we are working without the knowledge of and concern for others – students, parents, teachers, administrators, support staff, and policymakers. Metaphorically, our present system of education is Ringworld and its sun ought to reflect each one of us living and working on the surface in the interest of others.

My own classrooms are filled with resilient young people whose present situations would otherwise bring dismay to many of us. But they have taught me that in

spite of the most turbulent times hope for a better day is a powerful source of energy. Therefore, when we look ahead and perceive the probability of a future in which technology is liberating we will recognize that education in America has taught its children well.

It is from numberless diverse acts of courage and belief that human history is shaped. Each time a man stands up for an ideal, or acts to improve the lot of others, or strikes out against injustice, he sends forth a tiny ripple of hope, and crossing each other from a million different centers of energy and daring, those ripples build a current that can sweep down the mightiest walls of oppression and resistance.

-Robert F. Kennedy, South Africa, 1966

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APPENDIX A

STORY MAP

A Story Map for: _____ School Setting: _____

Each area refers to new technology experiences. Use the back of this form to continue comments if necessary. Return this form to your principal or to me at the address provided as consent to participate.

	Self-Identity Views of *self* in the use of technology	Family Perceptions of family's use of technology	Business/ Community Experiences within the community	Formal *educational* experiences with technology	Work Environment Experiences with technology in the *workplace*
Past Experiences					
Present Experiences					
Future Projections & Desires					

APPENDIX B

INTERVIEW I: ORIENTATION TO TECHNOLOGY

1. Describe your involvement in the designing, planning and implementation of technology plans for your school.

2. What are the technology goals for your school?

3. How successful have you been in achieving these goals? Describe any challenges, if any.

4. What goals do you want to see included?

5. How has instructional technology changed the way you teach?

6. How often are your students provided opportunities to access the Internet?

7. What are the barriers, if any, to providing Internet access to all students and teachers?

8. Describe how this school environment is similar and different from your last as it relates to the use of instructional technology.

9. What is your view of technology as a focal point of education reform?

10. Who are the beneficiaries of technology in education reform?

APPENDIX C

INTERVIEW 2: EXPERIENCES IN THE FIELD

1. What steps, if any, is the school taking to address the issue of teaching social responsibility in the creation and use of technology in our daily lives?

2. Describe any projects involving technology that could be used to teach students to explore societal/world issues.

3. What is your perception of technology as an important part of the human experience?

4. How ought we study technology in such a way that it can be a problem-solving and socially transforming experience?

5. Science fiction has been critiqued as a genre that stimulates us to consider the effects of technology in our lives. Describe the worst-case scenario of the effects of technology when it has been misused.

6. Describe the best-case scenario of the effects of technology when created and used in the interest of human beings and the environment.

APPENDIX D

SCI-FI ANALYSIS (AN OPTIONAL ACTIVITY)

Briefly discussed prior to the beginning of the first interview and presented as follows at the end of the second interview.

I have maintained that we can draw analogous relationships between the expositions (characters, conflicts, and settings) of science fiction and those of education, especially as it relates to technology. Would you consider viewing a film or reading a sci-fi story for the purpose of drawing such relationships? If so, you can select your own sci-fi film or story or you can select from the following: "Blade Runner," *Harrison Bergeron*, "Spiderman," "X-Men: The Last Stand," *Johnny Mnemonic*, "I, Robot," "Fahrenheit 451," or any "Star Wars" film. Within the selection, you may find that a relationship exists between you and one of the characters. If so, reflect on it as well as the themes of the film that are reflective of those within education (e.g. power, technology, support, accessibility). I am aware that time is a concern for teachers in middle and secondary schools; therefore, I ask that you submit a written analysis of the film or story within the next three weeks. If you need more time contact me. Submit your analysis via e-mail (vickij717@aol.com). If you choose to discuss your analysis, I would make arrangements to meet with you at your convenience.