Chapter II: Study of the Problem

Problem Statement.

The problem addressed in this practicum was that the writer's work setting, an environmental science and technology magnet school, has a wide variety of state of the art technology available for curriculum, but the faculty and student body were not utilizing it. Parents, students, the community, and the school board were expecting the school to provide the students with an innovative and exciting curriculum integrated with environmental themes and technology. The school was not fulfilling its role as a model for other schools to follow on the effective use of technology in education.

Problem Description

Teachers were using traditional teaching strategies and were delivering instruction via textbooks, lectures, and worksheets. Computers and printers in most of the classrooms were not being used. The hardware and software available in the media center were rarely being checked out. In addition, e-mail and the Internet were not being utilized.

The school was in its infancy. The school was not physically ready to open when it did. It opened with dirt for landscaping, exposed holes in science rooms where sinks are now, and a caved-in ceiling in the media center. The more than 400 computers were still in boxes stacked from floor to ceiling in the gymnasium along with most of the school's
textbooks, equipment, supplies, and furniture. The lack of readiness in opening the school set the tone for the remainder of the past 2 years. Every day trucks delivered dozens of boxes of supplies, equipment, and technology that the staff had to unpack and inventory. The staff has never had the time or the opportunity to catch up.

The writer, at the time, was part-time technology coordinator and taught three science elective classes. In the summer prior to the opening of the new school, the principal and the magnet coordinator proposed a new 18-week elective class entitled Study of Aquatic Indigenous Life Forms (SAIL). The intent of this class was to fulfill the vision and mission objectives of the school with a focus on Florida's environment. The writer was assigned the task of designing this course because of her science teaching background, certification to teach the state boating course, experience in writing the middle school science curriculum for the county, and her expertise in technology. The course had no existing curriculum, nor were any textbooks available. The writer developed the curriculum as the course evolved. This was time consuming and affected the responsibilities the writer had as technology coordinator. It was not until the middle of the first year that the computers were set up in the classrooms.

Numerous other obstacles presented themselves as the year progressed. The county was restructuring the department of Education Technology Services (ETS) reducing its staff to
half of what it was, and relocating it from the central administration building to a new office in a suburban city within the district. The technology experts were not readily available to assist the writer in setting up the network system throughout the school site. Many complex problems arose due to having IBM compatible and Macintosh computers networked on a Windows NT server. ETS personnel have not yet solved many of these issues.

The principal of the school hired the staff from several other middle schools. Consequently, the staff had to learn to work with new individuals on their teams and within their departments. They also had to adjust to a new administration and facility. The administration held team-building activities on early release and planning days allowing for little time within the school day to perform other tasks. The staff had so much to contend with that they resisted expending additional energy and time to learn new teaching strategies and tools. Minimal time was available for the writer to assist teachers in using the technology because of the time being spent to unpack, inventory, and set up the hardware.

**Problem Documentation**

Several sources provided the evidence that the faculty and student body were not using the technology that was available for curriculum. An office clerk was hired full time to photocopy. An analysis of her time logs (see Appendix B) collected daily for 1 month revealed that she spent 92% of
her time photocopying worksheets for classroom teachers. The remaining 8% of her time, she spent running off bulletins and newsletters for the administration and guidance departments.

An examination of 35 lesson plan books collected randomly from the 68 teachers showed that they were delivering traditional lessons. The teachers were primarily using textbook readings, lectures, and notes. An audit of the Bibliofile check out system in the media center showed that only 15 of the 68 teachers checked out the hardware and the software available. A visual sweep of the classrooms revealed that the computers and other technologies were not being used at all in most of the classrooms and very infrequently in others. Informal conversations with teachers confirmed that most of them were not using the technology in their classrooms. Every teacher filled out a technology needs assessment (see Appendix A) included in the Media and Technology Handbook. An analysis of the assessments indicated that the majority of teachers on staff were computer and technology novices. Further analysis of the technology needs assessment forms (see Appendix A) also revealed that the teachers were not using the hardware and software because they did not have the necessary skills.

Causative Analysis

The diverse causes of the problem were rooted in a combination of factors ranging from the basic general nature to the specific experiences of individual human beings.
Teachers, as human beings, like to maintain the status quo or homeostasis. This factor resulted in change resistance.

Age and gender affect a teacher's attitude toward the use of computers and other technology. The experienced and more mature teachers (only 21 teachers have taught less than 3 years) used traditional teaching strategies requiring textbooks and worksheets. They feared change precipitating a phobia toward technology. The 56 female teachers exhibited more fears about using technology than the 12 male teachers.

The teachers lacked a knowledge of technology that has hampered their using it. The teachers on staff transferred from schools that had very little technology available. Therefore, the teachers had very little experience with computers or other technologies. Additionally, the teachers on staff had not taught at schools where the administration had expected them to use technology.

Very few teachers had their own computers at home to acquire experience and comfort in using them. The technology needs assessment (see Appendix A) indicated that only 27 of 68 teachers had computers at home prior to teaching at the present school. Most of the computers the teachers had at home were IBM compatibles making it very difficult to transfer skills to the Macintosh computers.

Teachers did not know how to use the technology, nor did they know how to integrate it effectively into the curriculum. Therefore, they did not value its potential, viewing it negatively as more work that occupied time in
their already overburdened day. The school administrators did not know the capabilities of technology beyond that of word processing; consequently, they could not function as instructional leaders encouraging teachers to use the technology as tools to enhance instruction and learning.

**Relationship of the Problem to the Literature**

Professionals have written extensively about the problem, noting that many school districts have expended large amounts of money on technology to have it collect dust on shelves. The problem that existed in the writer's school setting was not a unique problem. Use of technology in America's classrooms has been extremely restricted (Armstrong, Davis, & Young, 1996; Fulton, 1996; Means, 1994; Perelman, 1992).

Students, on the average, have used computers about 2 hours a week in their classes. In the higher grades, the statistics have been even more alarming for students using computers for all subject areas combined. In Grade 5, students spent 24 minutes a week on computers. In Grade 8, students spent 38 minutes per week. In Grade 11, students spent 61 minutes per week (Office of Technology, 1995, online). A study done by Becker (1994) estimated that students used computers during school hours an average of 1.7 hours per week at the elementary level, an average of 2.0 hours at the middle school level, and an average of 3.0 hours at the high school level. Bulkeley (1988) reported that in Mario Umana High School in Boston, four computer labs were
available for 900 students, but, unfortunately, only 5 out of 75 teachers used them. A more recent study done by the CEO Forum (1997), a partnership program among 21 U.S. education and business leaders, found that only 3% of the American classrooms have been fully integrating technology.

The causes of the problem have been diverse as evidenced in numerous research and professional articles. Tally and Grimaldi (1995) pointed out that teachers have clung to established methods of teaching as a means of survival. Teachers have been working in environments that have been uncertain and characterized by requirements that have been in constant flux. They pointed out that teachers have been conditioned and ingrained with values about what a school, a teacher, and a classroom should be. Thornburg (1991) stated, "I believe that some people in the educational establishment are stalling so they don’t have to confront a basic truth - deep down they are afraid to rethink the educational process" (p.17). Teachers are only human; fearing change, they want to stay within their comfort zones. This was very apparent when the writer made informal observations of the teachers.

Surveys done by the Dell Computer Corporation (1993) and Donoho (1994) revealed that 55% or more of the population fear some type of technology. A recent survey of 1,000 Americans was conducted to explore their use of, and attitudes toward communication technologies. This study revealed that three out of five people felt uncomfortable with technology (Weil, 1998). According to Rosen and Weil
(1995), 45% of the elementary and secondary teachers sampled were technophobic. An alarming 32% of the computer education coordinators in elementary schools were found to be uncomfortable with technology in a survey done by Educational Testing Service (Bulkeley, 1988).

Age and gender have been found to influence teacher use of technology. Older teachers have been more set in their ways exhibiting more fears toward technology than their younger counterparts. They have been, therefore, less likely to embrace opportunities to change. Gardner’s (1985) study on cyberphobics revealed that cyberphobics were primarily over 50 and female. Rosen and Weil’s (1995) study showed age to be a discriminating factor among people who use consumer, business, and entertainment technology. In their study, technophobia appeared as one of the primary determinates for the use of technology. They found that older adults had less training and more fears about using technology.

Because women dominate the teaching profession, the existence of gender differences in the use of technology is critical in understanding why the technology is not being used in the classroom. In a study on gender differences in attitudes about technology by the Center for Children and Technology (Brunner, 1997), females were found to view a computer more as a communication tool, whereas males focused on the machine itself. Females saw the computer as a means to an end, whereas males viewed it as an end in itself. Hearn,
Poplin, and Lasley (1986) found that at the junior high level, computer aptitude is related to mathematical ability. McTeer (1986) determined that male high school students expressed strong preferences for math and science, while female students expressed strong dislikes for these subject areas. A study conducted by Brosnan and Davidson (1996) using the Bem Sex Role Inventory and a computer anxiety questionnaire compared masculinity and feminity with attitudes toward computers. Their study showed that masculinity correlated with positive attitudes toward computers. Cambre and Cook (1987) found that adult females described themselves as computer anxious more often than males. Hyde, Zakrajsek and Blumer (1987) found that men in universities have more computer experience than women.

Teachers have not been receiving adequate and appropriate training of a quality necessary to allow them to establish a comfort zone in using technology in their classrooms. Teachers have not been satisfied with technology training; therefore, they have not used what they have learned (Siegel, 1995). The Office of Technology's research published in the report, Teachers and Technology: Making the Connection, (1995, on-line) found that only 15% of U.S. schools' technology budgets were spent on training; whereas, 55% was spent on hardware and 30% on software. Becker (1994) analyzed the Denver-based Quality Education Data (QED) research. His analysis indicated that schools spent more than $3.6 billion on technology in the 1994/1995 school year, and
they were expected to spend more than $4 billion in the 1995/1996 school year which equated to $94.07 per pupil. Only 4% of those expenditures however, had been appropriated for technology training, which equated to $3.35 per pupil. Electronic Learning, Instructor, and Middle Years conducted a nationwide survey in 1995 on technology staff development. They determined that the percentage of technology budgets spent on staff development was only 8% (Siegel, 1995).

McQuarrie and Iwamoto (1990) indicated that attitudes toward computers correlated with variances in exposure to computers. The adults who had the most positive attitudes toward computers were those that used computers at home and at work. The adults who had the most negative attitudes were those that had no exposure to computers at all. Accessibility to the technology can be critical. Researchers have shown that teachers need access to the technology enabling them to explore the technology on their own, and to practice what they have learned in training workshops (Bockisch & Redfearn, 1995; Carter, 1996; Guhlin, 1997; McKenzie, 1991; Office of Technology, 1995). Fortunately, the writer’s work site had the technology easily accessible to the teachers.

White (1995), the technology director for the Cabarrus County Schools in Concord, North Carolina, pointed out that the traditional one-shot workshop approach has not worked when training teachers to use technology. The literature documents that technology for teachers must accommodate different learning styles, be hands-on, be useful, and most
importantly, be ongoing (Hurst, 1994; Lovely, 1997; McKenzie, 1991; Ritchie, 1996; Sudzina, 1993; Schrum, 1998; Yocum, 1996). These writers emphasized that teachers have not been receiving the appropriate technology training that they have recommended.

School systems have begun to recognize that the administrative staff must also become skilled users of technology in order for teachers to receive the necessary support they need to effectively make technology an integral tool of instruction. Georgia's regional technology centers have begun to offer administrators workshops (Harrington-Lueker, 1996). Memphis has made professional development in technology a priority for principals (Harrington-Lueker, 1996). Ritchie (1996) stressed that technology implementation can best be supported when administrative leadership formulates a vision for the implementation and models its adoption and usage.

Kearsley and Lynch (1994) concluded that any attempt to infuse technology into classroom curriculums will fail if administrators are not visionary leaders with ample skills in using technology. Dempsey (1997) stated, "The administrators' use of technology will serve to convey the level of importance and significance of such use by staff members and students" (p.1). Williams (1993) referred to administrators without technological vision and leadership as "technology terminators" (on-line). Administrators must realize that if technology is to be integrated seamlessly into the
curriculum, they must model positive attitudes while using the technology themselves.

The writer is fortunate to work in an environment that is conducive to educational restructuring. The principal selected teachers who are elite professionals, innovative, and willing to learn new pedagogy. Most of the teachers are veterans of 11 years or more, and are female. Although they were techno-phobic to some extent, they were professional enough to express a need for training. They expressed a desire to learn new techniques, strategies, and tools of instruction.

The research explored previously indicates that certain conditions have to exist to enable teachers to learn new teaching strategies and to empower them to integrate technology into the curriculum. Access to the technology existed, but because of time constraints, the teachers found little time to explore it. Time for training needed to be provided, and it needed to be ongoing to be effective. It was also imperative that the training be provided by a trusted staff member. The training had to be hands-on, accommodating multiple learning styles. Administrators must be supportive and must exemplify the use of technology as a tool. Before the implementation of this practicum, these conditions did not exist.