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ABSTRACT

This study examined the effective use of computer stations across the curriculum. Research was conducted in a fourth grade classroom in Lena, a small, rural farming town in northwestern Illinois. Desks were arranged in circular clusters of five. The students moved to five different stations, one of which was an IBM computer mini-lab. The lab, used as one of five language arts stations, was successful in motivating students to learn keyboarding, brainstorming for ideas, practicing various styles of writing, using the word processor, and working in cooperative learning groups. The objective of the study was to determine how to transfer the use of the computer stations concept to another content area, such as social studies. Attitudinal surveys, observation, whole-group dialogue, and portfolios were used to determine if the computer stations were being used effectively in social studies. Questions on the attitudinal survey included items about frequency of use; favorite and least favorite activities; application of individual talents; improvement in academic skills; social developments; and leadership opportunities. The survey was distributed at the beginning and at the end of the 1995-96 school year. Results of the study indicated overall increased computer use and increased student motivation and interest. Class activities are described in detail and 17 figures depict photographs of the classroom and copies of student projects. (Contains 39 references.) (AEF)

EFFECTIVE USE OF CLASSROOM COMPUTER STATIONS ACROSS THE CURRICULUM

By

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Chapter I

INTRODUCTION

The Focus of the Study

The setting for my classroom research was a small, mostly white, rural farming community in northwestern Illinois. Employment in the area includes a mixture of farmers, factory workers, professionals, and some homemakers. The majority of mothers have jobs outside the home. The unemployment rate is very low.

My fourth grade classroom was located on the top floor of a very old three-story brick building. Student population was approximately 400. In my classroom I taught all subjects and tracked for reading and math with three other fourth grade classrooms. For the last two years, I have arranged my desks in circular clusters of five desks each. The students moved to five different stations, one of which was an IBM computer mini-lab. The installation of the mini-lab was part of a district pilot program to promote the teaching and learning of computers in the classroom, instead of students leaving the room to go to a central lab.

Every day, for one and a half hours, I used the lab as one of five language arts stations, using the *Writing-to-Write* program. This program had been successful in motivating students to learn keyboarding, brainstorming for ideas, practicing various styles of writings, using the word processor, and working in cooperative learning groups. Activities at each station not only improved writing skills,

but also advanced student opportunities to be group leaders, explore special talents through open-ended assignments, and perform hands-on tasks. To appeal to different learning styles, activities included teacher instruction, independent seatwork, partner sharing, small group tasks, and student use of the overhead projector. Students looked forward to being "leader of the day" for their group and formed many friendships with students they normally would not have. Parents made positive comments about the computer stations. The principal was getting requests from parents to have their child in my room for the next year.

As the year progressed, I noticed that the five computers were sitting idle during other subjects like social studies and science. The computers were only used when the high-achievers finished their homework first and rushed to the mini-lab to primarily play games, improve typing speeds, and publish creative writing on the word processor. The low achievers never finished early enough to use the computers. It seemed unfair that only certain students were rewarded with extra computer time, and, more importantly, that the lab was not being used as a tool of learning in other subject areas.

My big question was how to transfer the use of the computer stations concept to another content area like social studies, in addition to the language arts stations I had already been using. Geisler and Stockman (1995) say that technology must be interwoven into an academic

curriculum. It requires students to research and analyze complex information and take risks. It also encourages students to learn in new ways, initiate tasks, and direct their own learning. The resultant learning far exceeds traditional grade level expectations. I knew my students could experience the fun, success, and boost in self-esteem that the computer stations offered. According to Joyce, Weil, and Showers (1992), students who operate in groups learn more from each other, build better relationships, gain respect and admiration from others, and have fewer feelings of inferiority.

Using the technology of computers is more than just gaining information. According to Dubois and Schubert (March, 1986), for some of the students, the poor reader, the math phobic, the detail oriented worker, the computer might be a tool that increases their motivation and improves their skills.

Rationale for the Study

I have not always felt this enthusiastic about using cooperative learning groups. I have taught for a total of twenty years in three different small, rural farming communities. I spent one year in a split fourth and fifth grade, one-half year in a first grade, and two and one-half years in a fifth grade. I have been in my present position as a fourth grade teacher for sixteen years. Most of my students came from traditional two-parent families, just as I did. Discipline problems were minimal, so it was easier

for me to settle into a structured approach to teaching.

The first fifteen years of my career was based on what I experienced in my childhood, a structured and very traditional home, elementary school, and high school. I believed I learned a lot through lecture, no noise, and straight rows, so I used that model in my own teaching. Coming from a family background that taught me stability, punctuality, routine, and strict guidelines, I viewed hands-on and small group activities as being frivolous, noisy, and disruptive.

I've changed in these last five years, because of teaching colleagues who sparked an interest in attending workshops on topics like cooperative learning, learning styles, authentic assessment, multiple intelligences, and use of computers for instruction and learning. I thought back to Mr. D'Hondt, my sixth grade speech teacher, who was somewhat ahead of his time, as he asked us to fulfill some fun assignments that allowed for individual expression. I was ready to loosen the reigns and let my fourth graders have some choice about their learning in their cooperative learning groups.

I discovered that working in cooperative groups allowed the low-achievers in my class to network with others, model behavior of high-achievers, and have their chance to shine as group leaders. This was quite the opposite from my own grade school experience, where low-achievers were scolded and humiliated for unfinished work and failed assignments.

Everyone needs that special niche and the feeling of belonging to the group. Schmuck and Schmuck (1992) say that the continual rejection of a student by both his or her classroom peers and teacher feeds the negative cycle of low self-esteem, unfriendly approaches to others, and poor academic performance.

I realized that if I encouraged my students to operate successfully in my classroom groups and computer stations, these successes transferred over to being successful leaders in other groups such as scouting, church, and sports. For myself it was being in the school choir or being a camp counselor that made me believe I was a leader and able to get along with other people.

Methodology for the Study

In my study of effective use of computer stations in other content areas, I used qualitative research. As a qualitative researcher I believe as Rist (1975) says, the direct observation of human activity and interaction is an ongoing, naturalist fashion. To find the truth about my problem, I used the broadened positivist approach. I saw how I evolved to become less strict in defining the truth. I grew up believing in very logical views and clear values that were unwavering, with little room for interpretation, discussion, or excuses. It was like the cop on "Dragnet", who only asked, "Just the facts, ma'am." I discovered the need to allow for individuality, special circumstances, and following my gut feeling.

There were many ways to measure progress and gain understanding about my study. I learned this in watching my own son's poor performance on standardized tests, like the Iowa Test of Basic Skills. His scores never reflected the above average work he was doing on daily papers and projects. I learned more about my study by relying on other assessments like observation, portfolios, and dialogue with the students.

Data Collecting Methods

In order for me to know if the computer stations were being used effectively in social studies, I used attitudinal surveys, observation, whole-group dialogue, and portfolios.

Questions on the attitudinal survey included items about frequency of use, favorite and least favorite activities, application of individual talents, improvement in academic skills, social developments, and leadership opportunities. The survey was distributed to my 1995-1996 homeroom class at the beginning and end of the school year.

As I observed the students throughout the year, I recorded impressions of my feelings, students' feelings, and significant reactions to increased use of computer stations. I also documented the number of students and amount of time the computers were used.

During whole-group discussions students were asked to offer suggestions and solutions for problems concerning the use of computers, cooperation in groups, and ability to complete tasks.

I had already implemented the use of portfolios in my classroom for the last three years. I had students save samples of computer-generated projects, in order to show evidence of increased knowledge in social studies, individual creativity, and mastery of computer skills.

Chapter II

REVIEW OF LITERATURE

Introduction

In order to further investigate the problem of effectively using computers in the classroom, I looked for clues as I studied the background of successes and failures teachers experienced when increasing student time using technology. Reviewing the studies of other authors, experts, and educators helped me find answers to effective computer use with cooperative learning.

I used the ERIC search at the Rockford Public Library. Classmates in my National Louis University class and my instructor came across articles and gave them to me. The library at Northern Illinois University had most of the documents and titles I was seeking. I was able to gather titles on the philosophy of technology, cooperative learning, software, specific methods that have been tried, and various problems encountered by teachers. I wanted to find out specific information concerning positive and negative experiences that teachers encountered as they increased computer use. There were plenty of articles on how to implement a district-wide plan, but very few that documented the day-to-day struggles of a classroom teacher.

In this literature review I began by explaining some terms. Then I examined the impact of using computers on the school, the teacher, and the student. Next I studied how

cooperative learning works with computers. Finally, I looked at particular methods and software. This research gave me a substantial setting for my own classroom research.

Terms

Cooperative Learning - activities that accomplish learning tasks in groups, using a variety of ways to provide rewards for individuals in groups (Johnson and Johnson, 1993)

CD Rom - data publication and retrieval medium like Grolier's Electronic Encyclopedia; it contains "read-only" data, not for saving information (Tanner and Bane, 1988)

Database - information stored in computer files, divided into sets of records to make it easy to enter, search, and retrieve information

Graphics - pictures from photos, clip art, and drawings; these can be in color or black and white

Hardware - monitor, keyboard, disk drive

Hypermedia - combination of text, graphics, video, sound, and animation on computer

Internet - a connection of computers throughout the world that accesses information from many sources

Keyboarding - typing words, sentences, and commands on computer

Software - individual programs loaded onto the computer menu that allow users to perform a variety of tasks like writing, games, graphics, databases, and hypermedia

Technology - any scientific tool that accesses information, communicates ideas, or generates products

Word processing - using text or words that can be stored, saved, revised, and printed ("Features and Capabilities...", 1994)

Directing a Dream for Schools

Morton (1996) looked at the history of how technology has evolved in education. In the seventies teachers were quickly disillusioned because they had no direction and no time to reflect on how computers could be used. In the eighties there was an immediate rush to fund technology, but little training for administrators. The computer was only seen as an "add-on" tool among many others. "We live in a society where a technological environment is accepted as part of our lives. It is only in schools that we consider the computer to be an add-on, a thing little related to skills development or communication" (Morton, 1996, p. 416).

Morton also states that when a district does have a plan, it takes about four years to implement, including upgrades and attainment of goals. In the state of New York millions of dollars were spent on teacher training. After ten years it was found that there was little change in how teachers were instructing and in advancement of skills. Opportunities were lost because of local squabbles, lack of leadership, and misleading information from the federal government. Staff development that links technological expansion with long range instructional priorities is

essential. The administration needs in-service to develop plans.

Ely (1995) researched a Colorado elementary school that had eighty networked computers divided among various classrooms. He found that teachers were using the computers to adapt to the individual needs and interests of the students. The amount and quality of cooperative learning activities were increased. The following factors contributed to successful implementation.

1. Each class had access to at least four computers all day.
2. There was evidence of shared vision of school reform through mutual support and resource sharing.
3. A supportive district and principal was evident.
4. There was a strong computer coordinator.
5. Teachers had early and thorough training with continuing in-service meetings.
6. Teachers were allowed to take computers home.
7. Hardware was easy-to-use and high quality software was user-friendly.
8. Teachers were given time to plan, learn, and integrate computers.
9. Teachers were paid during summers to plan for computer use.

Ely also discovered that the classroom teacher was usually the last to reap the benefits of technology. The administrators usually were the first to get computers, then

the libraries, next was the computer lab, and last were the classrooms.

Morton also believes that funding must be 3% of the district's annual budget. Schools should not rely on bond issues. Computers have a built-in obsolescence and must be changed and upgraded regularly.

Moersch (1995) also studied the importance of funding to successful computer use. Using a variety of sources, such as Eisenhower grants, in addition to yearly district funding and bonds is necessary.

Teachers Coping With the Cutting Edge

Moersch (1995) developed a way for teachers to evaluate their own level of computer use in the classroom. He called it the LoTi Framework. He believes there are seven levels.

Level 0 - Nonuse - The teacher uses dittos, chalkboard, overhead projector, and textbook.

Level 1 - Awareness - Computers are not relevant to teacher.

Level 2 - Exploration - Technological tools supplement existing instruction program as an extension or enrichment.

Level 3 - Infusion - Technology augments isolated instructional events.

Level 4 - Integration - Technology is a tool to solve authentic problems.

Level 5 - Expansion - Access to technology is extended beyond the classroom, through businesses,

universities, and research.

Level 6 - Refinement - Technology is a process used to develop a product, an invention, or more software.

Moersch found that these levels change the focus from being teacher-centered to learner-centered. Moving up this scale depends on a teacher's belief in his/her own abilities. Teachers who have a lower belief in their own abilities will only choose a level of innovation that they believe they can handle. Teachers with a higher level of belief in their own abilities are more inclined to accept change at any level.

When Wiburg (1994) compared two different schools that put computers in the classroom, he found five factors that kept computers from "gathering dust":

1. support and leadership by administrators,
2. instructional orientation of teachers,
3. a high quality of professional training,
4. partnership with outside organizations and businesses, and
5. an overall plan of integration.

Between 1983 and 1994 the number of computers in U.S. schools had gone from 50,000 to 5.5 million. In spite of this increase, students in the late eighties only had computer access one hour per week. Teachers are still only using computers for drill exercises, enrichment, and basic skills. Today, it is rare to find computers being used to allow independent exploration that supports instruction

(Mehlinger, 1996).

Mehlinger also claims that teachers must adjust their own style of teaching to the computer-rich environment. This may involve changing the teacher's role from presenter of information to mentor. Teachers must overcome the feeling of stupidity while learning a new tool. Undergoing this change requires plenty of teacher training and adequate technical support from a coordinator. These changes evolve over time and do not occur quickly.

Training undergraduate students is important. When Morton (1996) surveyed New York and Rhode Island universities in the nineties, he concluded that only 2% of the universities offered regular computer training to undergraduate students studying in the field of education. 14% of other university departments offered some computer training. The rest of the universities offered no training at all for future teachers.

Communicating with staff members is important. If teachers start with small successes, they will venture forward more confidently, especially if colleagues are coaching them. Technology is a powerful tool that opens doors for teachers, students, and parents. Teachers and students must look at all their technology options and visualize new connections. This will allow students to communicate ideas more forcefully and meaningfully (Buckley, 1995).

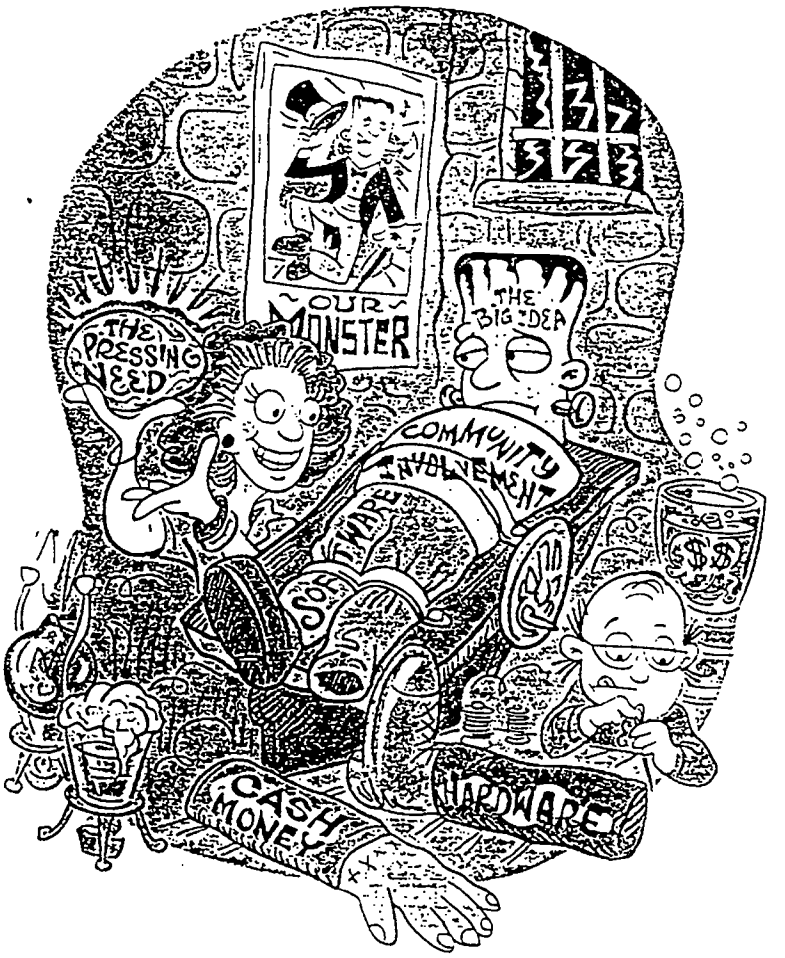
Guthrie and Richardson (1995) agree that teachers who

work with technology need support from other faculty members. Working on teams is best. "Too often teachers work in isolation, grappling on their own with issues on how to integrate technology" (Guthrie and Richardson, 1995, p. 16).

With technology, teachers can be victims or survivors. D'Ignazio (1995) admits many educators are locked inside the technology dream. A good example of push-button or fantasy technology is shown on the T.V. cartoon, The Jetsons. The Jetson family pushes a button and zoom, they have a meal or they travel hundreds of miles in a second. Teachers fantasize and fail to set realistic goals. "Technology creates as many problems as it solves. Technology is a problem" (D'Ignazio, 1995, p. 45). Bulbs break, printers are down, and students trash files. This creates cranky teachers. It is disappointing for everyone when costs keep rising, computers break down, and constant training is needed to keep up with the changes. "Being on the cutting edge is hazardous to the pocketbook...and the cutting edge keeps receding over the horizon" (D'Ignazio, 1995, p. 45).

Keeping alive in the never-ending circle of technology is difficult and costly. We've created a monster (Norris, 1996, p. 20). (See Figure 1)

Figure 1



Transforming Students Through Technology

"At the heart of the change process is the belief that we can no longer teach all the knowledge that individual students will need in the future" (Ely, 1995, p. 14). Ely recognizes that computers and technology will help students

raise the right questions, learn where to get information, how to find information and apply it. As a result, the learner becomes responsible for his or her own learning. His research also indicates that computers motivate students, young people like using them, and computers reduce boredom and misbehavior.

Mehlinger (1996) researched the effects of computer use and found that students showed more evidence of cooperative learning. They were not bored and their desire to use computers increased. Standardized test scores did not fall. Students took responsibility for their own learning. Inquiry, collaboration, and technological problem solving were evident. Technology had brought about many of the key ideas of school reform.

As Mehlinger looked at software studies, he found that technology affected a student's overall achievement, promoted positive learning attitudes, and allowed for more student-centered instruction. This study showed cooperative learning as a benefit of technology. Also, more one-on-one interaction between student and teacher became prevalent.

The computer alone cannot change the quality and quantity of teaching and learning. Using the technology is not going to be the cure-all, but "...it can create a set of tools to support specific kinds of instruction and intellectual inquiry" (Guthrie and Richardson, 1995, p. 17). Student productivity rises and pieces of writing produced on the word processor are longer in length. Printing out and

posting writings and illustrations highly motivates students.

When computers are used, Morton (1996) claims the following learning processes are engaged:

1. gather information,
2. teacher as facilitator,
3. involvement in experiential learning,
4. lifelong learning,
5. global communication,
6. expanded creativity, and
7. testing of new knowledge.

At a time when school boards are demanding increases in standardized achievement scores, Morton sees a different kind of achievement, not measurable with research data. "The value of computer use is not so much the improvement of students' achievement, but the improvement of students' ability to achieve" (Morton, 1996. p. 418).

As students use classroom computers to make choices and initiate their own activities, they will view technology as part of their active learning, not just a lab that is visited once a week. This rich environment will be meaningful and viewed as a "celebration of learning" (Murphy, 1995).

Murphy also outlines basic individual and group processes that result from using computers:

1. social growth,
2. problem solving,

3. peer teaching,
4. communication,
5. independent work,
6. explore,
7. discover,
8. learn, and
9. make choices.

An in-depth study of computers in a Native American classroom gave Bennett (1987) important data about how students use computers. She maintains that computers are a visual tool and that they provide the "concreteness" that is needed for many students, especially those in special education. It is essential to have graphics programs that allow for design and illustrations. Students learn more quickly when they have both visual and verbal cues. Picturing a concept helps the learner actually see and remember it.

Bennett concluded another benefit of the computer is communication skills. Working in pairs and groups at computers requires students to talk with each other and contribute to the "team spirit" approach. The simple task of taking turns using the keyboard and mouse promoted cooperation.

Bennett also concludes that computers motivate students' willingness to finish given tasks, even when the process requires long periods of time.

Orr, Butzin, and Berquest (1989) claim that there are

five positive outcomes for learners who use computers.

1. Students learn more using computers.
2. Students are on-task more often with computers.
3. Reading comprehension improves with computer use.
4. Standardized test scores remain the same, and in some cases, rise after using computers.
5. Students become more independent with computer use.

If computer use increases in a classroom, Wiburg (1994) believes that students will not have to spend so much time on acquiring facts, but will be able to devote more time to inquiry and critical thinking. The classroom focus will be on developing a sense of curiosity and a desire to learn.

Valdez (1986) studied 2,300 schools and found that computer assisted instruction yields positive results for students. Valdez stated that students using computers gained an additional 24% to 29% year's growth in reading, math, and language arts after a year. His studies found that computer assisted instruction resulted in the following:

1. enables students to learn 10% to 40% more in a given amount of time, and
2. maintains long-term retention rates.

"Computers increase one's attention span. You can't be passive and you have to be constructive. Instructions on the screen and use of the keyboard require feedback. There's so much that's being called for, that you have to put in" (Turkle, 1986, p. 15). She states that computers

free up the imagination and allow for individual feelings and styles. "Computers make humans think what is special about feeling human" (Turkle, 1986, p. 16).

Cooperative Learning by Collaborating Through Computers

Dewey's research indicated that schools should be a "miniature community" where students experience what it is like to be part of a city or neighborhood. Separating students from each other while doing their school lessons does not give the students the collaborative experiences they need to function in a real world. He believed that when students always work alone, it fosters a sense of fierce competition. If a child sees the learning process as a fight to get ahead of others, he/she fails to see the value of working with others to achieve a common goal. In the past many educators have reprimanded students for helping others. It was viewed as cheating. Dewey states, "...mutual assistance is the most natural form of cooperation" (Dewey, 1990, p. 16).

Cooperative learning has six major characteristics, as viewed by Johnson and Johnson (1993). They are:

1. positive goal interdependence of group members - sharing common goals and differentiating tasks,
2. individual accountability - each group member is responsible for his own learning, as well as helping others learn,
3. heterogeneous groups - assigning groups that have members with different abilities, culture, gender,

and race; everyone has unique contributions,

4. teacher observation and intervention - when appropriate, the teacher monitors and helps to focus group goals,
5. instruction and collaboration skills - this includes role playing, active listening, and disagreeing in an agreeable way, and
6. group processing or debriefing at the conclusion of a lesson - looking at how well the group functioned.

There are four models for ways that groups can use cooperative learning:

1. Learning Together, the group looks at particular material together.
2. Jigsaw, each student is the "expert" in some area and teaches it to the rest of the group.
3. Student Team Learning, students are taking tests or playing games as a team; teachers give rewards for improvement.
4. Think/Pair/Share, two students present information to each other and question each other.

Johnson and Johnson view cooperative learning as a more efficient way to use scarce resources like computers. Their study reveals that cooperative groups increase individual student achievement, especially for the under-achiever. Students learn how to explain and analyze information to others. When a student has concern for other group members, his/her self-esteem increases. Johnson and

Johnson summarize the five major benefits of cooperative learning:

1. more on task,
2. more motivated,
3. learning is easier,
4. more fun, and
5. students have a desire to learn (Johnson and Johnson, 1993).

In Bennett's (1987) study of using computers and cooperative learning in a Native American language class, she documented the "type of talk" that was heard. She saw students frequently use the following types of dialogue:

1. explaining information and asking for information,
2. asking for help (most frequent),
3. offering help (most frequent),
4. evaluating self and others, and
5. telling others about the project.

The most important factor Bennett noticed was how one child would imitate the computer-generated pictures and sentence structure of a partner. The student was not cheating, but merely using the partner as a model.

Bennett views cooperative learning as the balance between individual and group needs. Native American students relied heavily on the cooperation of the tribal family for survival. Exposing these minority childrer to a lonely and big world made them feel out-numbered. The cooperation they experienced at school helped them survive.

Bennett also found that cooperative learning prevented students from the feeling of being "put on the spot". Being singled out for working as an individual can be embarrassing, especially if you know too much or if you know too little.

Utilizing classmates as major resources is the focus of cooperative learning. Guerrero (1988) found that even though the students had no formal training in cooperative learning, they worked considerably well at the computers doing word processing, databases, spreadsheets, and problem solving games. The teacher was the consultant and circulated around the computers to check progress, critique, give praise, and intervene on problems. The jigsaw and pair/share models worked well. Students had fewer mechanical errors working with a partner and had the feeling of belonging. Guerrero also noticed that sometimes students could explain concepts better to each other than the teacher could.

"...individual achievement is hampered when students do not effectively use the resources of their peers. The processes of individual development are hampered when students are not psychologically connected to each other" (Schmuck and Schmuck, 1992, p. 14).

Procedures for Progressing

The most puzzling things about using classroom computers are how to use them, why to use them, and where to place them in the curriculum. Making sure that computers

are closely connected to the curriculum is essential. Too often the computer is an "add-on", according to Ely (1995).

"There is a difference between really needing a tool and artificially creating a need for a tool" (Miller and Olson, 1994, p. 135). Teachers need to identify what current practices and routines they are using in their room and then shape the computers to these purposes. Miller and Olson found that successful use did not mean a drastic change in the teacher's curriculum. Teachers should examine their own instructional philosophy and then look for software that will enhance it. It takes time and imagination to find and use appropriate software. Allowing technology and software to have too much control over how a person teaches and what is being taught should be avoided.

Getting caught up in the regiment of a pre-selected scope and sequence is dangerous. "The best way for students to learn is to use computers for accomplishing real tasks in a variety of content areas" (McIsaac, 1994, p. 24).

IBM (1991) has developed a philosophy for T.L.C. (Teaching and Learning with Computers). Students use computers by rotating to different learning stations in the room. A classroom mini-lab of five computers is one of the stations. These computers are connected to a central server loaded with software. Other stations might include both individual and group activities such as library research, editing, publishing, and mini-projects. This process insures that each group gets their share of time at the

computer station. Even though this method means a busy and noisy classroom, the teacher has more time to work with individuals. The teacher's role is now facilitator instead of lecturer and giver of information. The use of stations can be applied to language arts, math, and other content areas.

Orr, Butzin, and Berquist (1989) studied a more structured approach where teachers were assigned to teams and followed a learning activity teacher's guide. The room had stations and task cards to explain station activities. Students worked independently, except when at the computers to do practice skills. Activities included paper/pencil work, hands-on tasks, and textbook work. At times certain students were off-task and there was no feedback mechanism to tell students if they were right or wrong. Orr concluded that there was an increase in standardized test scores, reading skills, student independence, and attention span. The software used was unfortunately, of poor quality. There was not enough teacher planning time, and materials were hard to get for the stations. Student progress was not accurately recorded (Orr et al., 1989).

Guerrero (1988) found a less structured plan for use of computers. Students created original drawings of simple objects and added text with the word processor. The jigsaw cooperation model was used. Jigsawing allowed each student to be an expert in some area and teach it to the rest of the group. Groups shared knowledge with other groups and also

did group evaluations of success and failures. Students were not frustrated by their mistakes, but jointly planned how to fix errors. Even though the teachers felt they were not adequately trained in cooperative techniques, they felt success as they observed the pride of each group's creation. Again, the teachers felt choosing appropriate software was a problem. They wanted guidance in this area.

White (1993) argues against over-use of the word processor. Word processing is only a short term goal. Students need activities that promote problem solving skills.

Madian (1986) claims that word processors are great motivators and are flexible enough for all content areas. Some of the trendy software is narrow in focus and confining. He observed a class that grew so fond of their word processor that they named it Hal, The Pen Pal. Students enjoyed writing letters to Hal.

Computer games and drill & skill software should be limited in use. Software should be open-ended, so the student uses creativity and makes choices (Trumball, 1986).

McIsaac (1994) recommends open-ended software so students can do concept mapping, webbing, diagraming, brainstorming, outlining, and writing. Paint programs like *Linkway* and *Kid Pix* help students create comic strips, maps, timelines, and electronic folders. Hypermedia activities using the CD Rom, laserdisc, video cam, and audio recorder stimulate creativity. Using the theme approach to do

projects is also successful. Possible themes include foreign cultures, immigration, and political candidates.

Mapping and webbing are effective uses of the computer. Through the use of a paint program called *Inspiration Software*, students are able to construct knowledge after studying a body of material. This helps students avoid the frustration of messy maps made with pencil and paper (Anderson-Inman, and Zeitz, 1993, p. 7) (See Figure 2)

Kid Pix allows students to create multimedia presentations that follow themes. The theme of Mexico was chosen. With the help of parent volunteers, students drew Mexican pictures that depicted the culture. Accompanying dialogue was made by actual recordings of student voices. Another unit on volcanoes was done in the same way (Kennedy, 1993, p. 45). (See Figure 3)

Computer maps that students created using *Kid Pix* were more complex and had more symbols than those done with paper and pencil. The teacher needs to give a detailed list of requirements, model the procedure, and show examples of making maps (White, 1994, p. 28). (See Figure 4)

"Integrated and thematic units keep student interest high and tie subjects together. They also provide you with a good way to engage kids in regular computer use" (Zaidel, 1991, p. 60). A fifth grade class had a unit on bees, using five stations: writing, research, math, activity, and computer. Much of the instruction was centered around using student created vocabulary lists and computer-generated

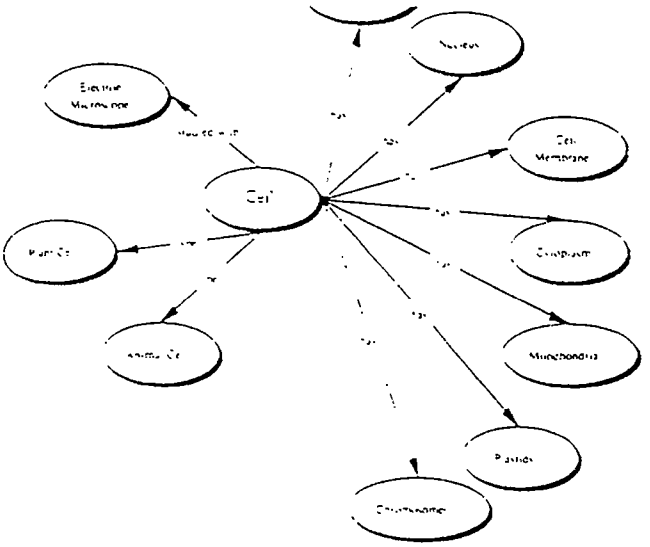
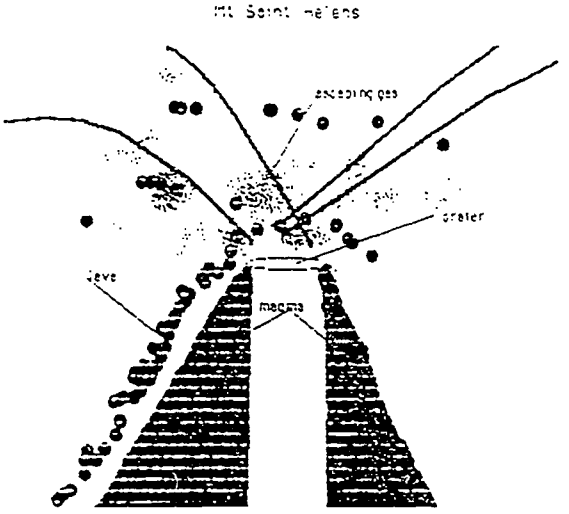


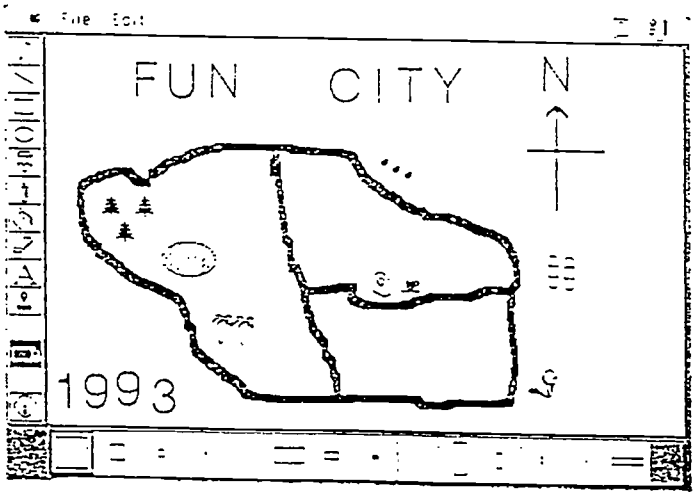
Figure 2

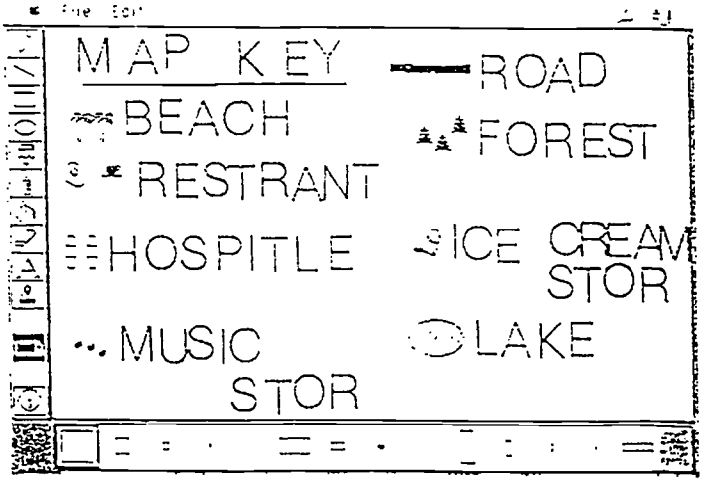
Jesse Ronret
5/11/92
Science-4R



Mt. Saint Helens is a cone volcano. It's been quite for 11 yrs. The volcano is located in Oregon. It erupted on May 18, 1980. It's one of the largest volcano in the world.

Figure 3





Kid Pix Map Requirements

The map has two parts
1. Map Page— this is the actual map
2. Map Key Page—this shows the symbols use in the map

The Map Page must have
1. Title
2. Compass Rose
3. Seven different Symbols
4. Date (year only)

Figure 4

stories using those words. Students did research using library materials to brainstorm facts. Other station activities included art, games, and cooking. Third graders had a thematic unit on weather using the station concept. Computer activities included making graphs of temperatures and other weather data. At the stations, students created skits, plays, poems, raps, and banners in cooperative groups.

The station concept can be enhanced in a variety of content areas by using two main strategies.

1. Think/Pair/Share - use chart paper and colored markers. Have teams write down all possible answers to a proposed question.
2. "A to Z" - think of a topic. On chart paper write a related fact, idea, concept, or phrase that starts with each letter of the alphabet (Cummings and Ealtzley, 1993).

The database is another vehicle that allows students to select categories, such as fruits, vegetables, pets, fairy tales, dinosaurs, or animals. Students research the category and enter clues and pictures about a specific item in that category. Other students try to guess the item. This can be done using software called *The Learning Game Generator* (Miller and Olson, 1994).

Peha (1995) believes that using the Internet system is successful if a full time computer coordinator is hired to do the troubleshooting. Otherwise, teachers do not have the

freedom to experiment. Gathering information, writing pen pals, and tapping special resources are the tremendous benefits of using the Internet.

By sixth grade, students need to become computer literate. White (1993) believes students should know how to perform the following skills:

1. format a disk,
2. know basic computer history and purpose,
3. use *Microsoft Works*,
4. create a *Hypercard* stack,
5. use a CD Rom,
6. know word processing, cut and paste, print hard copy, store, save, revise, and import pictures,
7. know computer graphics, create and design something using *LOGO*, *Banner Mania*, or *Kid Pix*, and
8. use *LOGO* for creating drawing instructions and *Hypercard* for interactive buttons.

Conclusion

In the future technology will be faster, cheaper, more powerful, and easier to use. As a result, Mehlinger (1996) concludes that computers will change our environment, but the process does not happen overnight. It takes time, money and patience.

"If the teacher has great enthusiasm for technology, then students pick up on it. The teacher, not the technology, is the key to the classroom" (Stansberry, 1993, p. 36).

Computers should help students comprehend and communicate. Computers are not just another subject to be taught. "Today's teachers need technology to be able to work smarter, not harder" (See, 1994, p. 30).

"...how students interact with each other while working with a computer is relatively ignored. It should not be. How teachers structure student/student interaction patterns has a great deal of influence on how well students learn, their attitudes toward school and subject areas, their attitudes toward each other, their self-esteem, and their attitudes toward the computer and computer related careers" (Guerrero, 1988, p. 12).

Chapter III

THE STUDY

Introduction

The following description portrays the context of the study. My research was centered around a fourth grade classroom in Lena, a small, rural farming town in northwestern Illinois. The majority of the students come from white, two-income families. Farmers, factory workers, professionals, and a handful of full-time homemakers are the major part of a spectrum of occupations. The unemployment rate is very low. Parental support at school functions is extremely high. A small fraction of the students come from split families, but most children adjust well, and parents are relatively supportive of their children and school.

The elementary building's most notable features are its age and crowdedness. The old three-story brick building houses second through fifth graders. Student population is approximately 400 with four sections of each grade level. The small library also houses the central computer lab. There are no empty rooms in this building. This space problem makes scheduling classes for the library and central lab difficult.

My top floor classroom consisted of thirteen boys and eleven girls who were tracked for reading and math with three other fourth grade classrooms. I taught all subjects, except for music, P.E., and art. The academic level of my students was a mixture of low, medium, and high achievers.

One of my students left the room during part of our *Writing-to-Write* rotations to go to a gifted English class. Two of the students received Chapter I reading assistance, and none of the students were in special education. Discipline problems were minimal, except for a few students who talked incessantly. Three of the students seemed to be unmotivated and had difficulty turning in written assignments on time.

The physical arrangement of my small classroom included five circular clusters of desks. There were five desks in each cluster. For the last two years my room contained a row of five networked IBM computers along the wall. The building's outdated electrical system occasionally caused fuses to blow when using the lights, computers, and outlets simultaneously. This was a source of frustration for me and the custodian. The administration kept reminding us to be patient until we moved into our newly built elementary school. The school's central computer lab in the small library consisted of twenty-two stations, available to each classroom for approximately one hour per week. Some of the computers in my room and the central lab were older and had limited capability, which made it difficult to load certain programs.

The mini-lab in my room was part of a district pilot program to promote the teaching and learning of computers in the classroom, instead of students leaving the room to go to the central lab. The community, parents, and school board were excited about classroom technology, but financial

constraints limited our progress. Five of the sixteen homeroom teachers had mini-labs in their classrooms. The plan was for each homeroom to eventually have a mini-lab. The district accomplished a third of its goal in three years.

Knowing how to integrate the mini-lab was up to the teacher. Two years ago the school board approved the financing of my mini-lab and bought a $2,000 language arts program called *Writing-to-Write* the year before. This program was meant to run only for one and a half hours every day. Students rotated to different stations that included activities such as keyboarding, brainstorming for ideas, learning styles of writing, library research, word processing, and cooperative activities. I noticed that these activities gave students a chance to be group leaders, become more prolific writers, and display creativity through open-ended assignments. As the facilitator I not only performed demonstrations and instruction, but also moved freely to the stations to help with independent seatwork, small group tasks, and student use of the overhead projector.

During the first year that I had computers in my room, I was bothered by the fact that they were not being used for any other subjects like science and social studies. In those subject areas I was using the traditional lecture and class discussion techniques, with some cooperative learning activities on occasion. The computers were a reward for

those who finished work early. Usually the high-achievers played games, improved typing speeds, and played around with the word processor. I felt this was not fair to the slower workers who never finished early enough to use the computers.

The second year our entire school began using the *Accelerated Reader* computer program, which dramatically increased the computer use all over the school. This program assigned a reading level to each student and had a preferred reading list of books that were worth certain point values. Students read books at their own level, took computerized tests, and earned points for classroom and school rewards. The program was extremely successful. I had students from the other fourth grade rooms and even second graders coming to my room all day long, asking if they could take an *Accelerated Reader* test on our computers. Using the computers to take tests was not my idea of their most effective use. I still wanted my students to have a more meaningful experience using technology.

I gave a computer pre-survey to my twenty-four students to find out their attitudes about frequency of use and most favorite activities. (See Appendix A p.85-88) In the pre-survey about half the class expressed they did not have access to the mini-lab when they had free time. Twenty of the twenty-four students admitted they usually played games and about half said they sometimes, but not often, did writing. Eighteen said they really enjoyed the computers,

so I felt there was a need to be more equitable in computer use. (See Appendix A p.85)

I was well aware that my students were good at using the computers for writing. Twenty-one students in the pre-survey said they were good at word processing and twenty admitted they had become better writers because of the computers. The kids seemed to enjoy their language arts experience on computers, but they realized other content areas were lacking. Eighteen students said they rarely or never used computers for science, and sixteen said they rarely or never used them for social studies. (See Appendix A p.87) I wondered what I needed to do to advance the computer as a tool of learning in other subject areas, outside of language arts.

I didn't feel qualified to expand the use of computers. I had forgotten the information I learned in all the computer workshops I attended four years earlier. At that time I didn't have a mini-lab, and my students could only go to the central lab one hour per week. One hour per week was not enough time to implement all these new ideas. Also, the building did not have a full-time computer expert or coordinator who could help immediately with problems. Our librarian had computer training, and the district had a part-time computer coordinator who worked out of the high school. A fifth grade teacher and a third grade teacher were good resources for help. They were largely responsible for sparking interest in technology for our

building.

I had occasionally observed a fifth grade teacher making efficient use of her classroom computers, but I never had the time to find out exactly what she was doing. At the end of the first year with the computer mini-lab in my room, I was determined to find out ways to transfer the use of the computer stations to another content area, like social studies. Using the stations allowed for each student to have their fair share of time at the computers. For this study I focused on the social studies area only, otherwise my research would become overly complicated, and the procedures would become difficult to implement in just one year.

Investigating and Gathering Resources

To prepare myself for my research I thought about three questions. What do I already know about computer programs and how to use them? What do I need to know about further computer use? Where do I find the sources of this information?

I thought about the training I had four years ago and that I needed to look at the menu items on our school's network. I remembered in my literature review that Trumball (1986) recommends the use of open-ended software, which enables the student to employ creativity and make choices. I found four programs on our menu that could be used to study the United States in social studies. The *Information Finder* is an electronic encyclopedia that allows students to

research facts about each state. The *Measurement, Time, and Money Recording Tool* enables students to make graphs that compare various state statistics. The *Linkway* paint program is used to draw pictures and type accompanying text about concepts covered in the text. *Linkway* is also used for making electronic slide shows with sound and video. *Children's Writing and Publishing* is capable of word processing in different fonts and choosing from a small bank of compatible pictures. The menu also included the games most students already knew which were: *Where in the U.S.A. is Carmen SanDiego?* and *Oregon Trail*. These are used to increase problem solving skills.

I stayed after school five days in a row for about two hours each night, trying to become familiar with the capabilities of these programs. I tried to get the *Information Finder* to load. In the pre-survey I found that over half the class had tried at some time to load this program, and eighteen students said they would enjoy using it. (See Appendix A p. 86,87) This is a program that three of my boys were anxious to use. They saw me load it once and immediately asked if they could do a report on bats, because we had learned about them in our study of rain forests. Every morning the boys would try to pull it up, but the encyclopedia would not load. I was disappointed, especially for Craig, a student who normally was hard to motivate. Billy, my talker, was excited also, and I thought this bat project was an excellent way for them to spend

time, instead of getting into trouble.

I talked with the Chapter I teacher who also wanted to use the electronic encyclopedia, and she was not having any success either. I consulted with our librarian and district coordinator who said they would check on it. After further inquiry I found that our older computers did not have the capability to load the encyclopedia. This was disappointing to me and the students. The boys who wanted to research bats eventually lost interest, because the encyclopedia would not load.

I had three other programs to explore. The *Recording Tool* was capable of producing tables, single bar graphs, and double bar graphs. In my pre-survey I found that twenty students expressed an interest in making graphs, but seventeen had rarely or never used it. (See Appendix A p.86,87) Once they all learned how to use it, I hoped to have them do research and make graphs on their own as part of station activities for social studies. We were studying the rain forest, and I wanted to make graphs comparing rainfall in Illinois to that of Brazil. I took my class to the central lab to teach them how to use it. When we all logged in on the computers the system became jammed. We sat there for twenty minutes while the librarian tried to reload it. Finally, we left because it wasn't working.

Brett, another one of my students who was hard to motivate, had some free time in our room and asked if he could try to bring up the *Recording Tool* on our computers.

It worked, and he spent his free time filling in tables, printing out double bar graphs, and coloring them in. In the next two weeks I was able to load the program in our central lab and finally train the students to make graphs. The students were anxious to finish their written work in class, so they could go to our mini-lab computers and print out their graphs. I noticed that some of my slower workers were more on task on the day that it was their turn at the computer. Making graphs was one of the easiest programs to use. (See Appendix B p.96)

The program that I was most enthusiastic about using was *Linkway*, but I was not very knowledgeable in its use. The program was designed as a multimedia program for students and teachers to present research and ideas through a visual and audio slide show or folder. I wondered if the district purchased the *Sound Blaster* card, microphone, and digital camera for *Linkway*. Without this hardware the *Linkway* program could not be used as a multimedia tool. The paint or drawing capability of this program was quite popular with the students. As I observed students in their free time at the computer, I noted that at least half were using *Linkway*. In the pre-survey, twenty-three students said they knew how to use the paint program. Almost everyone expressed an interest in making a slide show, but less than half said they knew how to make one. (See Appendix A p.86) This was a program that required extensive training for me and the students.

I asked the librarian for the computer manuals so I could learn how to use *Linkway*. Comprehending the manual was like reading a foreign language. While in the teacher's lounge one day, I happened to mention this problem to a fifth grade teacher. I was totally unaware that she knew anything about *Linkway* folders. She and the other fifth grade teacher had taught their students how to make the folders without audio. She said she would be glad to have her fifth graders meet us in the central lab and train us. Each of my students chose a state and outlined landmarks and tourist attractions they wanted to visit. Their slide show would actually be a preview of their "Dream Vacation".

On Monday I told my students that the fifth graders would meet us in the lab on Thursday to help us learn *Linkway*. One of my quieter students, Debbie kept asking all week long, "When do we meet with the fifth graders?" When the training day came, I noticed a lot of excitement in the fifth graders also. The fifth grade teacher mentioned they were just as anxious to train us as we were to learn. During that half hour in the central lab there was a quiet sense of confidence in the fifth graders. Each one of my fourth graders was paired with a fifth grader. The fifth graders were proud to show off their expertise and my fourth graders were impressed. When time was up, students in both grade levels were asking when we would meet again. The success of the two grade levels coming together was evidence of Murphy's (1995) belief that peer teaching was an

important group process that resulted from using computers. The problem was they trained us so well that my students caught on right away, and we really didn't need a second training session. (See Figure 5 and 6)

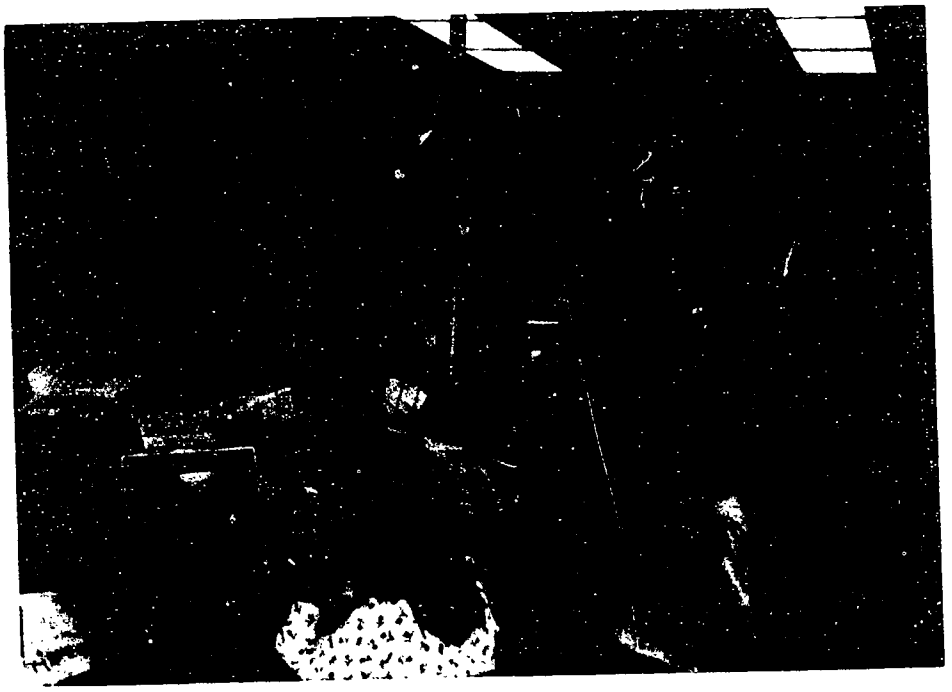


Figure 5

Figure 6

The next day Brett, my fourth grader, asked if he could work on his *Linkway* folder instead of doing his reading assignment. Again, Brett was one who avoided written assignments. I told him as soon as he finished his reading workbook page he could work on his *Linkway* folder for the last fifteen minutes of class. It didn't take him long to finish his reading, and then he went right to work on the computer.

Using the *Children's Writing and Publishing* word processor was a program that the students had learned in second grade. I had seen the primary teachers display many of the projects the students had completed. In the pre-survey over half the class said they used the computers voluntarily for reading class. (See Appendix A p.87) I had observed many students rushing to the computers to write up their Wednesday projects. This was strictly done on a voluntary basis. I felt very comfortable with promoting the use of the word processor in other content areas, since it was so popular in my reading class.

Consulting with other teachers who had successfully integrated computers was most helpful. On the day that I announced my research topic in my National Louis master's class, a fellow classmate invited me to visit the mini-lab in her third grade classroom at. She was employed at a school district that had already used the mini-lab concept for several years. I immediately scheduled a visit and took a professional leave day to study her room.

I observed her station rotations for one morning. Station activities included math, phonics, social studies, writing, and using the *Linkway* computer paint program. Each student had just finished creating a drawing on the computer and wrote text to show their knowledge of various homonyms. Later in the morning her entire class gathered around the computers as each child explained their drawing and the meaning of each homonym. This was definitely something I wanted to try in my room. Students who shared their creations felt a sense of pride and accomplishment. I noticed that the students freely gave compliments to each other.

My classmate also arranged for me to view a fourth grade classroom using stations. This classroom was using the *Writing-to-Write* program as a word processor and not necessarily following the program's predesigned outlines and formulas for writing different styles. I had forgotten that *Writing-to-Write* could be used in this way. I could use this in social studies and my students could also use the spell-check, which was a feature that *Children's Writing and Publishing* did not have. When students knew that they did not have to stop and worry about how to spell every word, their writing flowed more freely. I shared my new knowledge with our gifted teacher, who was quite interested in computers. She did not realize that *Writing-to-Write* had a word processor or spell-check. She passed this information on to her students. The gifted teacher also asked if

Children's Writing and Publishing had cut and paste capability. I told her I didn't know, but I would experiment to find out. That night I stayed after school and found out we could cut and paste. This was a more complicated feature that the gifted students could use, but I planned to teach it to my next year's students. This study enabled me to look more closely at the capability of our computer programs.

Our building's most experienced user of classroom computers allowed me to see some things she was doing in her fifth grade room. She continued to use her language arts stations as I did. She used the rotation idea to make sure that each student had an equal amount of computer time. In math, every day, one group came back to the computers and did computation exercises while the other students worked on the daily assignment. In social studies she had kids doing the same thing, but used the computers to work on their *Linkway* folders about explorers.

Later in the year I had the opportunity to attend a computer workshop on integrating computers across the curriculum. The presenter, Peggy Stearns, emphasized that integration is a slow process. She said teachers should identify one good idea and try it. It was not necessary to have the latest and greatest hardware and software. She demonstrated a couple of different electronic slide shows that were more user friendly than our *Linkway*. She also demonstrated how to use laserdisc players, which are like CD

Roms. They contain thousands of photos and video segments that can be used in making electronic slide shows. Our school had disc players and laserdiscs, but we did not have the expertise or hardware to integrate with our Linkway. She also mentioned barcode readers which allowed immediate access to photos and videos on the discs. Our district had a barcode reader, but no one knew where it was, and we never were able to make it work.

I was very interested in her review of a program called the *Graph Club*, because it allowed students to not only generate bar graphs, but also line graphs, pie graphs, and pictographs. I supposed my students could draw their own pie and line graphs using Linkway, but this would be time consuming. She did give me a few hints on ways to use our bar graph maker for studying differences in state sizes, landforms, resources, weather, seasons, tourism, and origin of ancestors. I also became very interested in a program called the *Time Liner* which allowed students to produce data about U.S. and family history. My students could try to draw their own timelines using *Linkway*, but this was not as efficient as the *Time Liner*.

The workshop was informative, but I went away discouraged because our district did not have the funds to purchase many of the programs and hardware. I also realized that having a full time computer coordinator in our building would ensure that teachers had a place to go for questions. I felt anxious, because I realized many of the programs we

now had were becoming outdated and were not user friendly. I knew I would have to make the best of what programs we had.

At this point in the study I had gathered lots of ideas for what to do at the computer when we rotated from station to station. I still needed to brainstorm activities that the students could do at the other stations. I realized that up until this time most of the learning in social studies took place through lecture, class discussion, workbook, and occasional group projects. I needed to find activities that students could do on their own. I looked at my game shelf and found three sets of state cards that could be used for games. I went to the 3R's teacher store and found some manuals for studying states. I gathered all the resource books from my library that contained facts about states. Mike, my gifted student, noticed I was gathering state books and brought in a book from his gifted teacher's library. I got ideas by skimming through my teacher's manual and kit that came with our social studies text. I now felt that I had a wealth of ideas to get started on my stations.

To get organized I made a list of various computer and non-computer activities that could be done at different stations. The following is a list of possible computer activities:

1. Students will use *MTM Recording Tool* to make a graph of states to compare weather, seasons, landforms,

resources, size, tourism, and origin of ancestors.

2. Students will use *Linkway* to make a folder about a state. Pages of the folder will contain buttons and pop-up text.
3. Students will use the *Linkway* paint and text program to make a concept map of certain features of a state like products, natural resources, manufacturing, making a living, weather, landforms, bordering states, regions, and capitals.
4. Students will use the *Linkway* paint and text program to make a map and key of a state showing its capital, major cities, rivers, and landforms.
5. Students will use the *Linkway* paint and text program to make a drawing about a certain concept from the text and type an accompanying paragraph.
6. Students will use *Children's Writing and Publishing* or the *Writing-to-Write* word processor to design a travel brochure for a state.
7. Students will use writing formats from the *Writing-to-Write* program to introduce a famous person, narrate a historic event, or persuade a reader to visit a certain state. Social studies and language arts classes could be combined to allow for more time.
8. Students will use *Linkway* to draw a timeline of a state or family history.
9. Students will play *Carmen SanDiego* or *Oregon Trail*

and earn points for their team in a class competition.

The following is a list of non-computer activities students could do at stations other than the computer station:

1. Students will research facts for their computer project using a variety of books such as the text, encyclopedias, an atlas, an almanac, maps, a globe, and state books.
2. Using the *Daily Oral Geography* book, students will try to answer oral questions about basic geographical facts.
3. Students will play *Five State Rummy* using a set of state cards. The object of the game will be to get five states that border each other.
4. Students will play *Guess That State* or *Guess the Capital* using a set of cards that have the state's outline.
5. Students will be assigned to read portions of the social studies text or Weekly Reader and write facts they learned on giant chart paper with markers.
6. Students will compose a song about a state, using an outline provided by the teacher.
7. Students will do pages from the social studies workbook.
8. Students will make a shoebox diorama of a state.
9. Students will use the printout from the state report

they wrote on the computer. They will glue it on paper and decorate with crayons and markers.

10. Students will play *Roll the Ball*, a game that has a giant ten-sided cardboard ball labeled with different topics like capitals, rivers, weather, earning a living, resources, and manufacturing. Students will name items asscciated with that topic for a particular state.
11. Students will be assigned to read a literature book about a famous person or event in a state.

Throughout the study I used different methods of gathering data. I began by giving my students a pre-survey. I took field notes, had class discussions, took photos, and gave a post-survey. I kept samples of student work that was done on the computer.

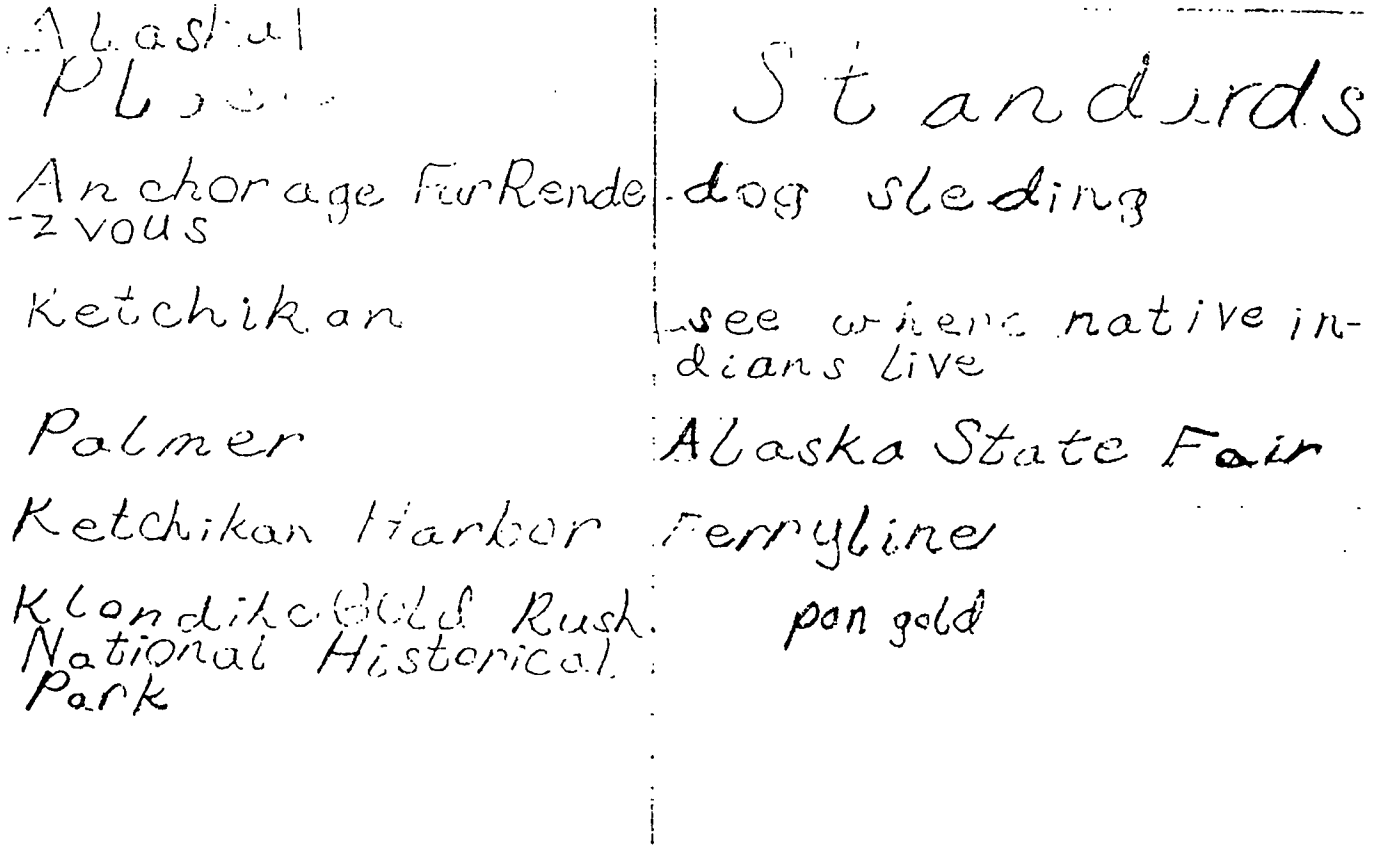
Using the Computers More Effectively

After gathering all the information on possible activities, I was ready to expand the use of computers in social studies.

For the first project, I started with something simple, so the students felt confident and successful. In English class we were already rotating stations and learning the writing format for setting standards and making a decision. I grouped the students heterogeneously according to sex, academic ability, and behavior. In social studies we were studying the United States. I combined the two subject areas, and the students used the computers to write and

design a brochure for a dream vacation to the state of their choice. Before starting the station rotations, the students used encyclopedias to research their state and made notes on an index card. On the card they listed the standards they set for the vacation. They had to find places, events, and scenery that met those standards. (See Figure 7) The students were eager to get started.

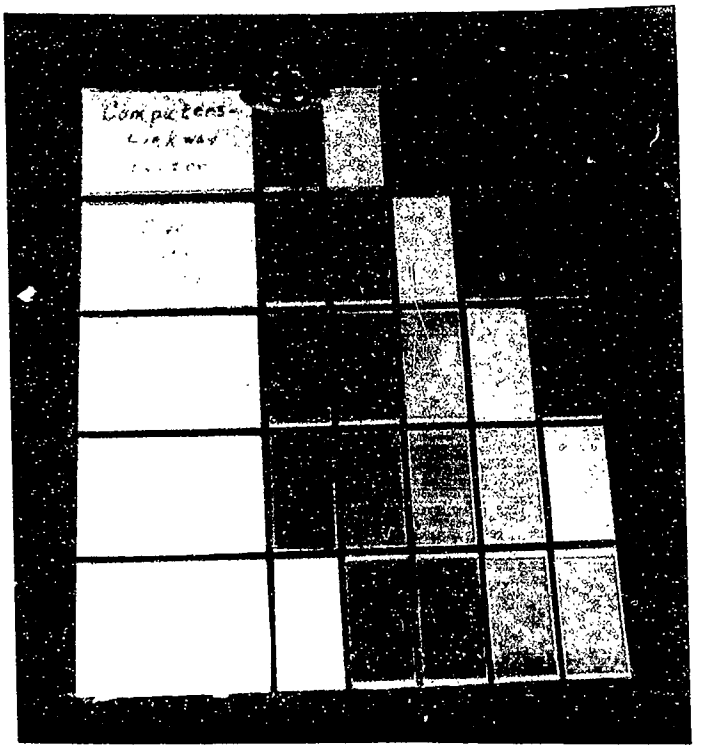
Figure 7



Each station lasted for one half hour. It took one whole morning and a half hour of the next day to get through the entire rotation. It took about a week and a half to

finish the project. Each group was assigned a color and followed a color chart so they knew where to rotate. (See Figure 8)

Figure 8



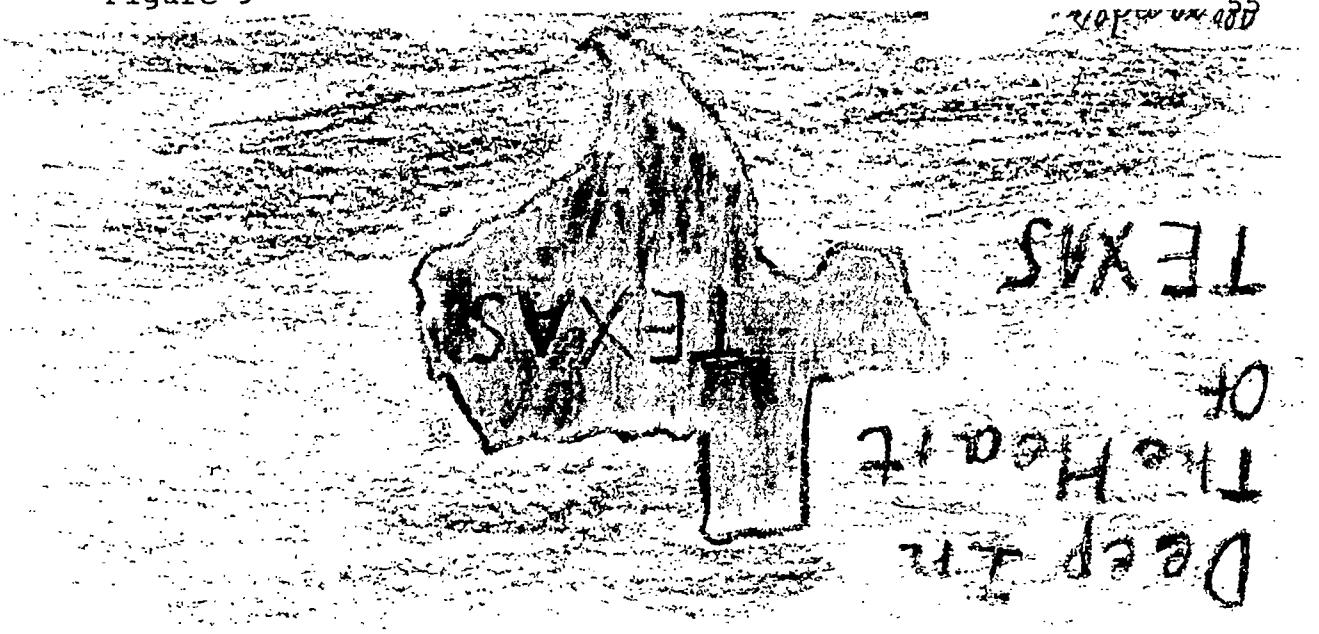
The following list explains what activity was performed at each of the five stations:

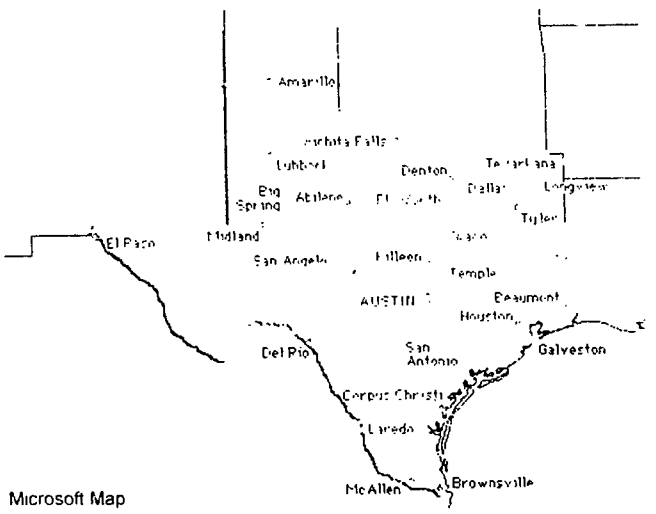
1. At the computer station students used the *Writing-to-Write* format for making decisions to make a brochure for a dream vacation. When they finished they exported the paragraphs to *Children's Writing and Publishing* and chose their own font.
2. Students played *Guess That State* using a set of cards showing the state's outline. The team leader kept score.

3. Students finished working on shoebox dioramas of their favorite state for the academic fair. Later on, this station became a publishing center for designing and coloring their vacation brochures.
4. Students continued studying their grammar and punctuation for English class by doing *Daily Oral Language* exercises. They also did *Daily Oral Geography* questions.
5. Students were assigned to read portions of the social studies text about the Southwestern part of the United States. (See Appendix C p.101)

I noticed an immediate difference in the amount of time the computers were being used. Before the computer rotations for social studies, the computers were only used for half the morning. Now the computers were used right up till lunch time. Every day I was turning away four or five students from the other fourth grades who wanted to come in and take *Accelerated Reader* tests on the computers. They were getting frustrated, because they had been use to just walking in and using a free computer. Some of the other fourth grade teachers had asked me why I was turning their students away so often. I explained my new project. I saw this as a positive step for my classroom. Not only were the computers being used more often, but hopefully for more effective learning. (See Figure 9)

Figure 9




Amarillo
Lubbock
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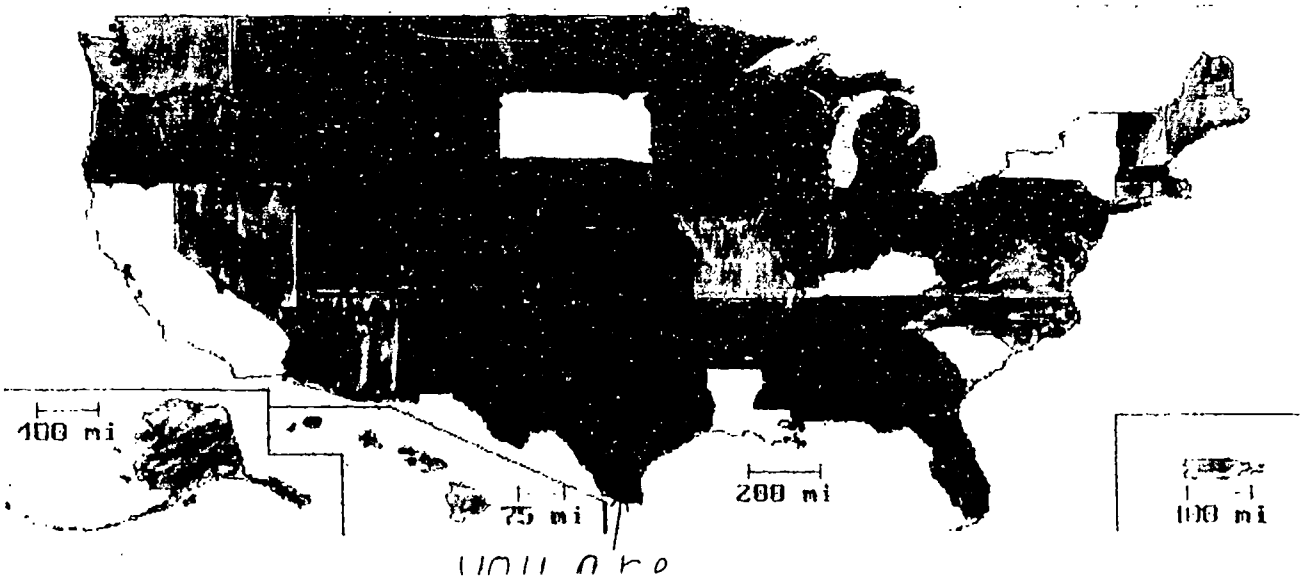
Del Rio
San Antonio
Corpus Christi
Laredo
McAllen
Brownsville
Microsoft Map


100 mi
75 mi
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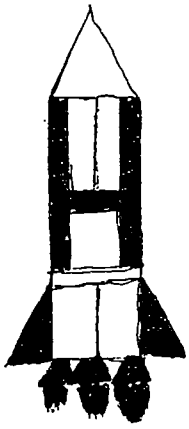
I am making a choice about what kind of place I should go on vacation.

It should have a pro sport team because I might want to go see a game. There should be a space center so I could learn about space travel. The place needs to have a big city so I could go shopping. It should have a place to go swimming in case there's a hot day. There needs to be celebrations so you can watch a parade.

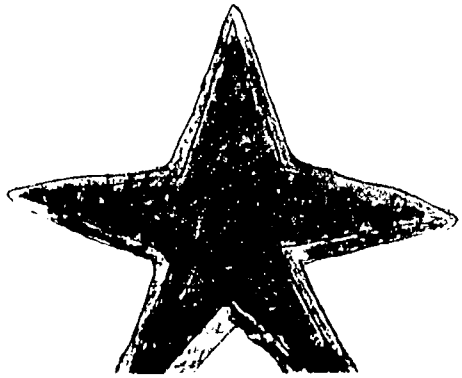
fold

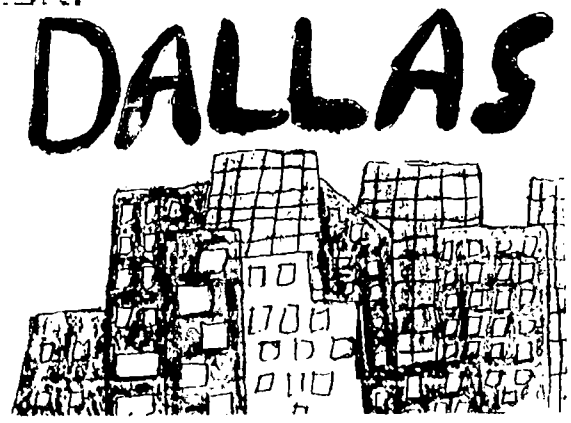


I have chosen the state of Texas for my vacation. If I wanted to see a pro sport team I could see a Dallas Cowboys Football game. The Lyndon B. Johnson Space Center is a good place to learn about space. I could go to Dallas because it has a lot of stores to shop in. If I wanted to go swimming I could go to the Gulf of Mexico. I could see a parade in Austin because they have a Cinco De Mayo celebration.

fold

I hope you will think Texas is the best place to visit.





Another difference I noticed was the change in student attitude. Debbie, one of my quieter girls, who rarely showed emotion, asked to stay in at recess to finish her dream vacation brochure on the computer. Two or three other students also asked to stay in. I have had requests to stay in at recess to play games on the computers, but never to finish an assignment.

The kids were helping me come up with ideas for the project. Nate, who I affectionately call, "my shadow" brought in U.S.A. outline maps that he generated on his home computer. Nate loved coming up to my desk to talk all the time, and told me earlier in the year that he wanted to be a teacher. He said, "Here, Mrs. Hatfield, maybe the kids can use these for their brochures." I told the kids to incorporate the maps into the design of their brochures. Erin, one of my brightest girls, brought in colored physical maps of each state, that she had made on her computer at home. The kids also used these for their brochures. On my survey I noticed that over half the class had computers at home. (See Appendix A p.88) I didn't realize the potential of contributions from home, and that students could see the endless possibilities of computers to enhance learning at home and school.

I also noticed a high level of interest when the project was completed. After all the students finished their brochures, I had a pair/share session so they could show off their project. Students read their partner's

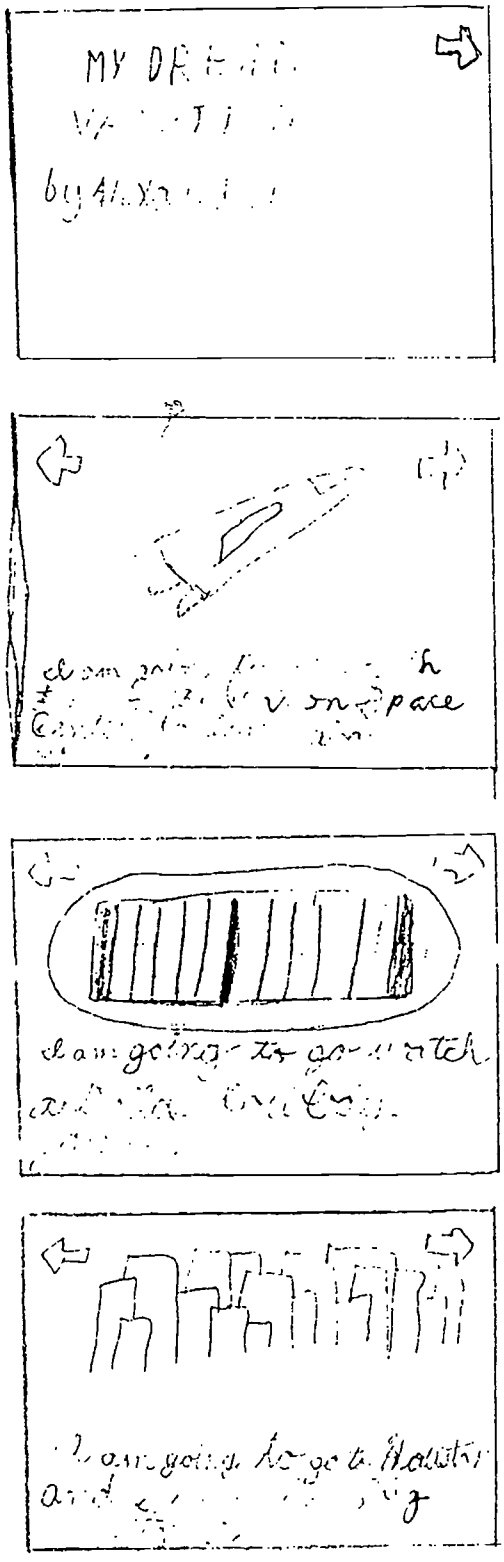
brochure and vice versa. I then had them change partners to share with someone else. Each student had a chance to share their brochure three times. When I told them we were done, they moaned, "We want to keep going! Can we share some more?" So I let them. I felt the project was a success.

For my second social studies computer project, I was anxious to have the students try making a folder using *Linkway*. We were already trained by the fifth grade class, so the students were ready to do the folders on their own. I used the stations format again to make sure each student had an equal amount of computer time. Each rotation lasted for one-half hour. It took a couple of weeks to finish the project. To make it easier, first I had them use their notes from something familiar, their dream vacation. Next they made the outline for their folder. (See Figure 10) The assignment involved drawing and writing three pages about their state using *Linkway* and linking the pages together with buttons. I wanted the students to concentrate more on how to use the program, and worry less about the content of the product. The next time I assigned a project on *Linkway*, I would require more research and longer paragraphs.

The following list explains what activity was performed at each of the five stations:

1. At the computer station students used the *Linkway* program to make a folder about places to visit in their state. Students made a title page, drew three pictures using the *Linkway* paint program, and wrote

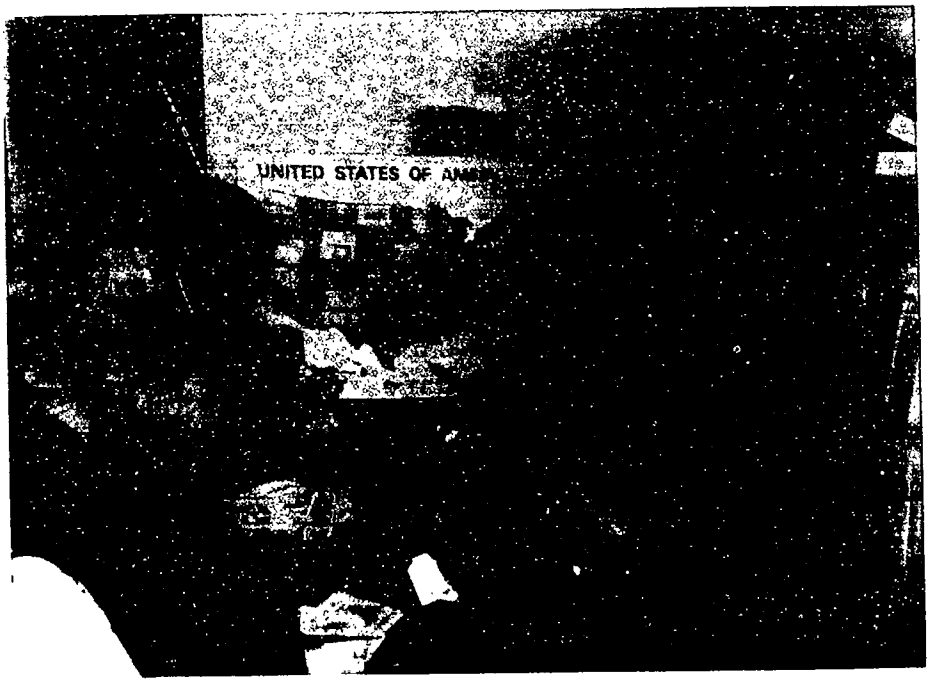
Figure 10



a sentence for each picture. Next they linked the pages together with buttons and ended with a button that "popped up" the name of the state.

2. Students played *Five State Rummy* using a set of state cards. The object of the game was to get five states that bordered each other. A colored map of the United States was nearby, since the students were still not familiar with locations. (See Figure 11)

Figure 11



3. Students made up a song about the Southwestern United States using an outline made by the teacher. Students also practiced performing the song. (See Appendix C p.103)

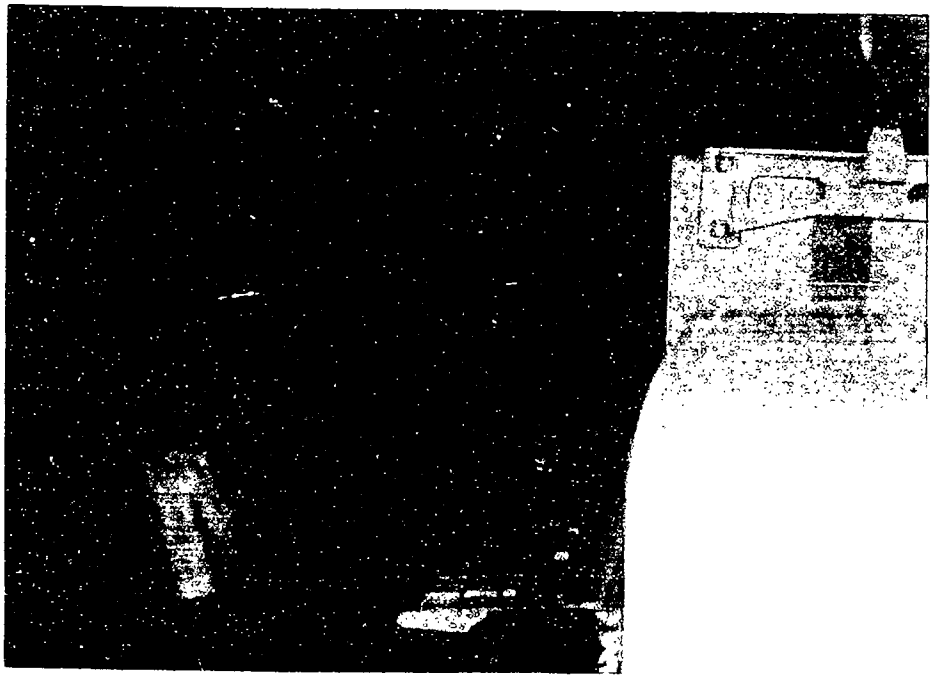
4. To practice their grammar and punctuation skills, students wrote sentences for *Daily Oral Language* and answered questions for *Daily Oral Geography*.
5. Students read assigned portions of the text and used colored markers to write down two main concepts they learned on giant chart paper. The concepts were later reviewed in a whole group setting.

Again, I noticed the computers were being used more. Students repeatedly were asking to stay in at recesses and at free time to work on their projects. Those who were having trouble catching on to the procedures of using *Linkway* were eagerly helped by others. Whenever I asked for volunteers to help on the computers, dozens of hands went up. Hannah, my chronic truant and complainer, who had already missed about fifteen days of school, surprisingly said, "Can we do this every day?" I was shocked. I didn't expect this from her. Hopefully, this was a motivator for her to be at school and be happy.

The students had a chance to share their slide show with the kindergartners. The kindergarten class had come down from the Winslow building to look at the academic fair projects in the gym and hallways. Each fourth grader was paired with a kindergartner and gave him/her a tour of the building. We had some leftover time and Debbie asked me if the class could share their *Linkway* folders with the kindergartners. The idea sounded great, and the kindergartners' eyes were glued to the computer screens.

The Winslow building had no computer labs, so this was special for them. (See Figure 12)

Figure 12



Parents also had the chance to see that the computers were being used more effectively. I thought it would be a good idea to let parents come in the room the night of the academic fair. Usually, teachers did not want this night to turn into another open house or conference night, so they locked their room doors. I saw the fair as an opportunity for the parents to see what the students were doing with the computers. Almost all the students said in their pre-surveys that they talked about their school computer projects when they came home after school. (See Appendix A p.88) Two thirds of my students came to my

room that night and showed off their *Linkway* projects. (See Figure 13) Sandy's mom asked, "How did they put all this together?" Sandy took her mom through the program and showed her how. Mike, my quiet Chapter I student, had trouble finishing his folder. He came the night of the academic fair and worked for almost an hour so he could show a finished product to his mom.

Figure 13

The next day I had all the students gather around our computers while each person shared the slide show for his/her state. (See Figure 14) Billy and Rich, my best artists, received many compliments for their use of the paint program. I felt I had accomplished the goal of learning how to use that program. The kids and I felt comfortable with it. In my post-survey all the class said

they felt they knew how to use the program, and everyone said they would like to do it again. (See Appendix A p.90)

Figure 14

For my third project I assigned the students a variety of computer activities that showed concepts they learned about the Pacific Northwest. I wanted to have a variety, so the students were familiar with all the capabilities of our system.

I told the students to chose from four possible computer activities about the Pacific Northwest region, so we ended up with a variety of examples. The following list explains what activities were performed at each station:

1. Some students at the computers chose to make a graph about comparisons of states that border or do not

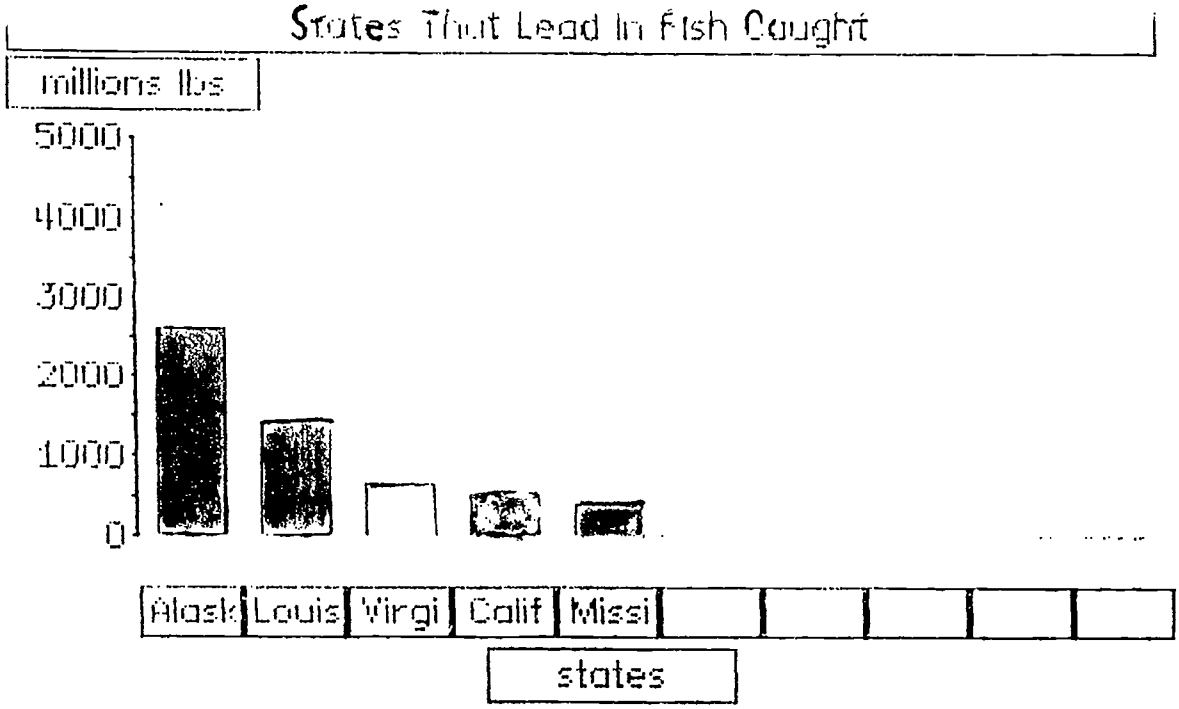
border oceans, states that have or do not have mountains, states that lead in manufacturing, and states that lead in production of fish. Other students read portions of the Pacific Northwest chapter from the social studies text, drew a *Linkway* picture, and wrote a summary for it. Some students made maps of Pacific Northwest states using *Linkway*. The maps included a key, a compass rose, the capital, major rivers, landforms, and cities. The last choice for students was to use *Linkway* to make a concept map of a Pacific Northwest state, showing its natural resources, manufacturing, and agriculture.

2. Students did workbook pages that covered map skills and major concepts about the Pacific Northwest region.
3. Students read assigned portions of the Pacific Northwest chapter of the text. Each student wrote down two major concepts they learned from the text, using colored markers on giant chart paper.
4. Students played *Five State Rummy* using a set of cards with the outline of each state. The object was to collect five states that bordered each other.
5. Students used this station to do research for their computer project. They used the atlas, encyclopedia, wall maps, state information books, and the social studies textbook.

In the post-survey, nineteen students said they believed they knew how to make an entire report using only the computer. (See Appendix A p.93) I hoped they saw the computer as a tool to express their ideas and creativity on a topic of their choice. (See Figure 15 and 16)

After we finished this last project, I had the students gather around the computers to listen as each person explained their Pacific Northwest map, graph, drawing, or concept map. The post-survey indicated that all twenty-four students learned about the Pacific Northwest as they listened to each computer presentation. Twenty-two students said they received a compliment on one of their computer projects, and all twenty-four said they gave compliments to other students. (See Appendix A p.93,94) Hopefully, the students gained confidence in computer use and learned more about their use in social studies.

Figure 15

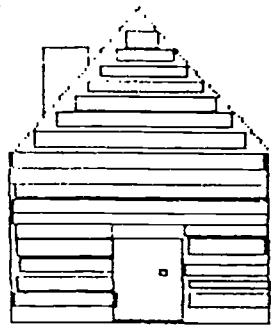


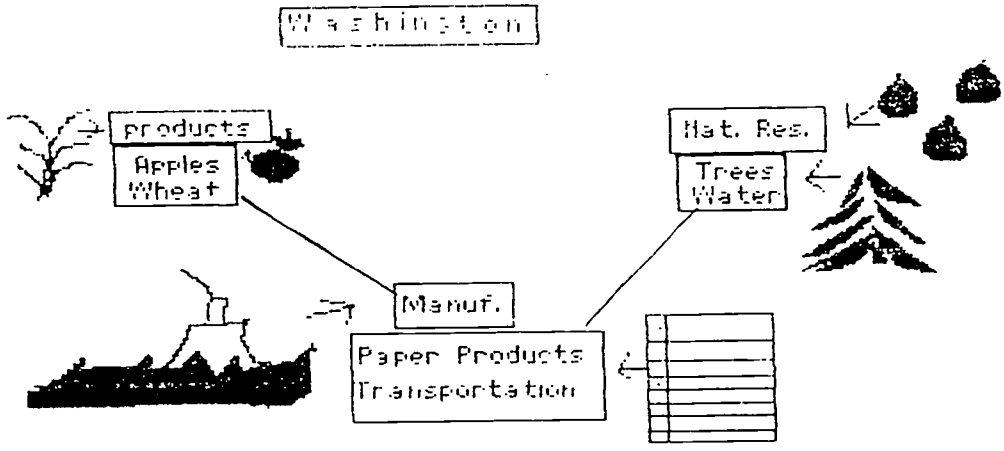
States That Lead In Fish Caught

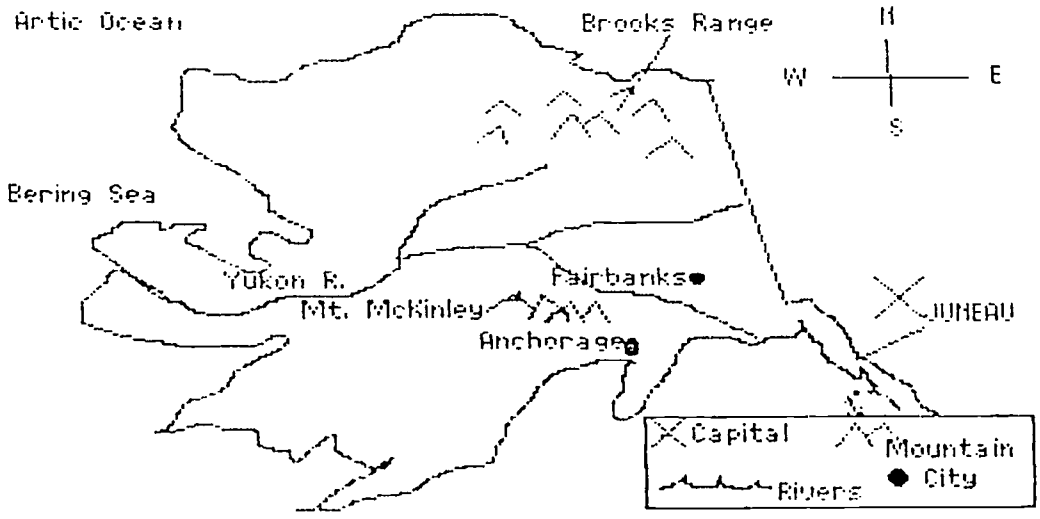
	states	millions lbs	
1	Alaska	2600	
2	Louisiana	1400	
3	Virginia	650	
4	California	500	
5	Mississippi	400	
6			
7			
8			
9			
10			

Figure 16

In 1848 James Marshall was a mill worker digging and he found gold. The government tried to keep it a secret. Then in the year 1849 villagers went to California because they found out about the gold and it became a gold rush.







Conclusions

As I looked back at what the experts said about effective computer use in the literature review, I wanted to see how well my class progressed. I wondered how well our school measured up to a model technology school, how far I moved up on Moersch's (1995) scale of computer use, and if my students realized that computers helped them be more responsible for their own learning. I questioned whether or not the students were cooperatively working together to act as resources for each other and if the computers were closely connected to the curriculum, as Ely (1995) suggests. I studied the answers to each of these questions and was able to determine if the expanded use of computers was really effective.

The administration and computer committee in my school district were committed to making sure each classroom had at least five computers, just as Ely (1995) recommends in his research. It took three years to reach one-third of this goal, because the district did not have immediate funding. Our small district did not have the luxury of major businesses to help with funding. Grants enabled us to have training and certain hardware, but did not pay for the mini-lab equipment. By the time teachers got their five computers, they would need more training and review in use of certain software.

Often teachers in my district were asked to take professional leave days to go to computer workshops, but

they did not like leaving their students during the regular school day. Sometimes teachers attended after-school workshops and summer workshops, without being paid stipends. Perhaps, extra pay for attending these workshops would be an incentive for teachers who were not motivated to gain knowledge in computer integration. Again, our district did not always have the funding for extra pay.

Wiburg's (1994) research indicates the necessity of a plan for integrating computers. My district had a timeline for purchasing computers, but the teachers had no plan for integration. My district could only afford a part time computer coordinator at the district level. Teachers could not always communicate their needs, questions, and concerns about using computers. We needed to employ a coordinator in each building, so teachers had immediate access to an expert. We, like many other districts, were indeed caught in the vicious circle of pressing needs, but limited funds to meet those needs.

As I looked back on my computer experience from the teacher's viewpoint, I reviewed Moersch's (1995) scale of use to see how well I measured up. When I started this study I was at Level 2, which is exploration. I was only using the computer as a tool to supplement or enrich an existing instruction program. I moved to Level 3, which is infusion. I did not merely add extra activities, but used the computer to increase student's ability to find information and apply it. In the post-survey, twenty-two

students were aware of an increase in computer use for social studies. (See Appendix A p.87,91) Two-thirds of the class saw more of a dramatic increase in usage since doing the social studies rotations. Almost all my students agreed that the computers were used more now by everyone than at the beginning of the school year. (See Appendix A p.93,95)

Buckley (1995) stresses the importance of communication among staff members. I found this to be one of the most serious problems in my building. I noticed there was a degree of competition and jealousy among teachers and grade levels. When teachers had complaints, they told everyone except the person who could do something about the problem. When a teacher discovered a great idea, there was a tendency to keep it quiet, so he/she could get special recognition. I was guilty of this and was determined during this study to share my ideas with others. Two of my grade level colleagues and the Chapter I teacher came to me for help. Knowing their interest in computers, I told them about my discoveries.

D'Ignazzio (1995) warns educators about being trapped in the technology dream. Teachers from a neighboring school district visited our elementary building to get ideas for their new computer labs. I felt honored that we were recognized as a model school and on the cutting edge of technology. I showed them what I was doing with the kids. They were impressed, but then I decided to be realistic and gave them information about problems with older equipment,

unfriendly software, and the need for a computer coordinator for each building.

I thought about teachers' frustrations using older hardware and software. This discouraged one of my fourth grade team members from progressing in her use of computers. She went to the central lab to use the *Writing-to-Write* program, and would have trouble with the commands. I was also discouraged by unfriendly software and breakdowns. Technology caused as many disappointments as it did successes.

I re-examined the experiences of my students and if they took responsibility for their own learning. Debbie exemplified this when she asked for special permission to come in after school to work on her *Touch Typing* speed. Ely (1995) says that students must know where to get information and then apply it. In the post-survey almost all students said that there was a substantial increase in their knowledge of computer use since the beginning of the year. (See Appendix A p.92) Students felt they had learned more about computers, but I was not sure if they caught on to the idea of taking responsibility for their own learning. This was the first time I asked them to do research and make a project on the computer. I guided them through each step. I let them make some choices, but not all were their own.

I looked for evidence of students who gathered information, relative to what we were studying, without me

having to give specific instructions. I remembered that Brett wanted to make those graphs at recess without any prompting from me. Debbie asked if she could use *Children's Writing and Publishing* to type up the fifty states to help us memorize them for a song we were learning. There were the boys who wanted to do the research on bats. They knew where to get the information, but the *Information Finder* would not load. Erin and Nate brought in outlines of the entire United States and of each individual state for our brochures. Emily asked if she could use the computers to type a message for the Mother's Day cards we were making in art. Even though this project centered around the use of computers in social studies, I brainstormed other uses for computers in other content areas. (See Appendix E p.108,109)

Hopefully the other students caught on to the endless possibilities of using the computer. The next time my students were assigned a project in any subject, I hoped they would explore what computer information was available and knew ways to use it. Guthrie and Richardson (1995) say that computers should enable students to have a good set of tools to support their inquiry about topics. I felt I gave them the tools. They did not have complete freedom to chose their own topics, but they showed individual creativity in their drawings and sentences.

I was unsure about whether or not my students showed any significant change in their academic achievement. In social studies class, I still gave chapter tests and daily

written work. I did not see any significant changes in their grades. Mehlinger (1996) states that academic progress is often a result of increased computer use. In the post-survey every student said their knowledge of the United States increased. (See Appendix A p.93) At the time of this study I did not have results of the Iowa Test of Basic Skills, therefore, I could not make conclusions about increased knowledge and retention.

Murphy (1995) states that another product of increased computer use is social growth. I observed some changes in this area among my students. At the beginning of using stations, I had difficulty with students being rude in their comments to each other. I did not mind useful noise, but sometimes there was unnecessary talking and conflict. Phrases like, "He's cheating, she's not talking loud enough, he's talking too loud, and they're not doing it right," were often heard. We had several class discussions on how to solve problems. We agreed that many students needed to be more polite in their criticisms and tone of voice. We tried having a noise monitor for each group, but the monitor often forgot to do his/her job.

Because the groups were heterogeneous, I observed positive interactions among students with whom they normally did not associate. Students complimented each other and freely gave assistance. I did not notice any new friendships or permanent bonds as a result of the grouping.

Staying on task was a serious consideration. I knew

Orr, Butzin, and Berquest (1989) say that students who use computers are more on task. I agreed that the students at the computers rarely stopped working and were motivated to complete their project. The students were excited about the newness of the programs and the visual element that kept them involved. This visual element was quite helpful to my Chapter I readers, Craig and Mike, who needed other cues, in addition to words. Students who were at non-computer stations did have trouble staying on task. If the talk was centered around the project or assignment, I did not mind. Often there was inappropriate laughter, gestures, and wandering around the room, that drew me away from being the facilitator. There were times that I felt more like a policeman than a teacher. I knew that I needed to change the make-up of the groups, because I did not separate all my talkers.

Since there were only five computers, my students were forced to share these scarce resources all year long. Students worked in pairs to learn programs, give assistance, and share results. In the pre-survey, nineteen students said they preferred to work alone in social studies. In the post-survey, twelve said they preferred to work alone. (See Appendix A p. 88,92) This showed that more students saw the advantages of using others as a resource. I observed students enjoying the fun and fellowship that the group concept allowed, but those twelve students felt their projects could be completed just as well without the input

from others. I wondered why they wanted to be alone. I considered the competition factor of coming up with a unique project and the need for some students to have full say in how their project was completed.

The computers seemed to be a determining factor in getting students to work cooperatively. Even though one-half of the class said they preferred to work on a project alone, nineteen said they would rather have a partner when working on the computer. (See Appendix A p.88,92) The post-survey also showed that almost all of the students thought it was easier to learn a new computer program with a partner. An overwhelming majority of the students displayed positive social interactions using the computer. Nineteen students said they enjoyed showing others how to do things, and twenty-two students said they asked others for help. (See Appendix A p.93,94)

Ely (1995) says that software should be user-friendly. I realized that our programs were adequate at the time of purchase, but because technology changed so fast, it was financially impossible to update programs all the time. I thought about the teachers from another district who visited our school to look at our labs. They were just getting started on their technology. I envied them, because they were in a position to buy the more modern programs. They were wise for shopping around to see what other schools were doing.

In the pre-survey and post-survey a great majority of

students said they enjoyed using the software I had chosen. (See Appendix A p. 85,89,90) I'm sure if they saw the newer software that is coming on the market, they would immediately notice the more colorful and easy-to-use features. *Touch-Typing* dropped in popularity as the year progressed. Learning the keyboard is drudgery for many students, but is necessary for using technology. In the pre-survey and post-survey, almost all the students said they would rather use the word processor than pencil and paper and were proficient in its use. Evidently, they had mastered enough keyboarding skills to realize the efficiency of the computer. (See Appendix A p.86,87,90,91)

Since a major part of the students' projects were based on using the drawing feature of *Linkway*, I asked them about its use. In the post-survey, almost all the students said they found it easier to make and read maps and graphs that were made on the computer. (See Appendix A p.93,94) I noticed that my good artists used just as much detail in their computer drawings as they did using paper and pencil. The lines and circles were cleaner, but drawing curves and special shapes with the computer took longer.

Recommendations

It would have been helpful to me if I focused on the progress and reactions of just two or three students, instead of trying to keep track of the reactions of all twenty-four students. The pre-survey and post-survey helped me get a general idea of the students' feelings, but I still

wondered how computers specifically affected each student.

It also would have been helpful to have students put their names on the surveys. I thought anonymity would allow for more honest responses, but I would have rather known their identities. I should have trusted my students ability to give honest reactions. I could have matched student quotes with survey responses to get a better idea of attitude changes.

Giving surveys to a control group also would have helped me make better comparisons of student advancement on computers. This would have helped me find more similarities and differences among students who use computers and students who do not.

Reflections

Something that really bothered me was the noise and "organized chaos" of a classroom that had cooperative learning and stations. I talked with other teachers who tried stations, did not like them, and went back to straight rows and lectures. I had been using the stations for two years now, and I questioned if this was the right way to go or if it was just another fad.

I did not want to give up the groups, because I knew the students needed the leadership skills and socialization. Hopefully, these students would be more successful in group situations as they became adults. They learned skills for getting along with others.

I realized I needed to give myself more time to gather

effective activities for the stations. I needed to relax and enjoy the useful noise that came from cooperative learning. This had been quite a change of philosophy for me. This change cannot happen overnight. I needed to make adjustments in choosing effective group activities, teaching students how to stay on task, and solving group conflicts.

As I reviewed my study, I saw a definite change in my attitude. The day I went to the computer workshop and saw the technology of an ideal classroom, I became discouraged. I did not envision our district being able to keep up with the changing pace of technology. Our district had not yet met its goals, and I was worried that we were struggling to keep up with just a fad.

I knew the leaders in our district had a heart for technology. After all, we had risen from Level 0 to Level 3 on Moersch's (1995) scale of computer use. We had gone from none-use to infusion. Technology was starting to augment instructional events. Our fifth grade teacher and her progress with Internet had moved to Level 5. She was accessing technology beyond the classroom.

I began to see that we were headed in the right direction, but it was going to take time. Studying how to use computers more effectively helped me have a clearer picture of the future. I realized I could help the district computer committee come up with a more specific plan on how to use certain software. Part of that plan involved money

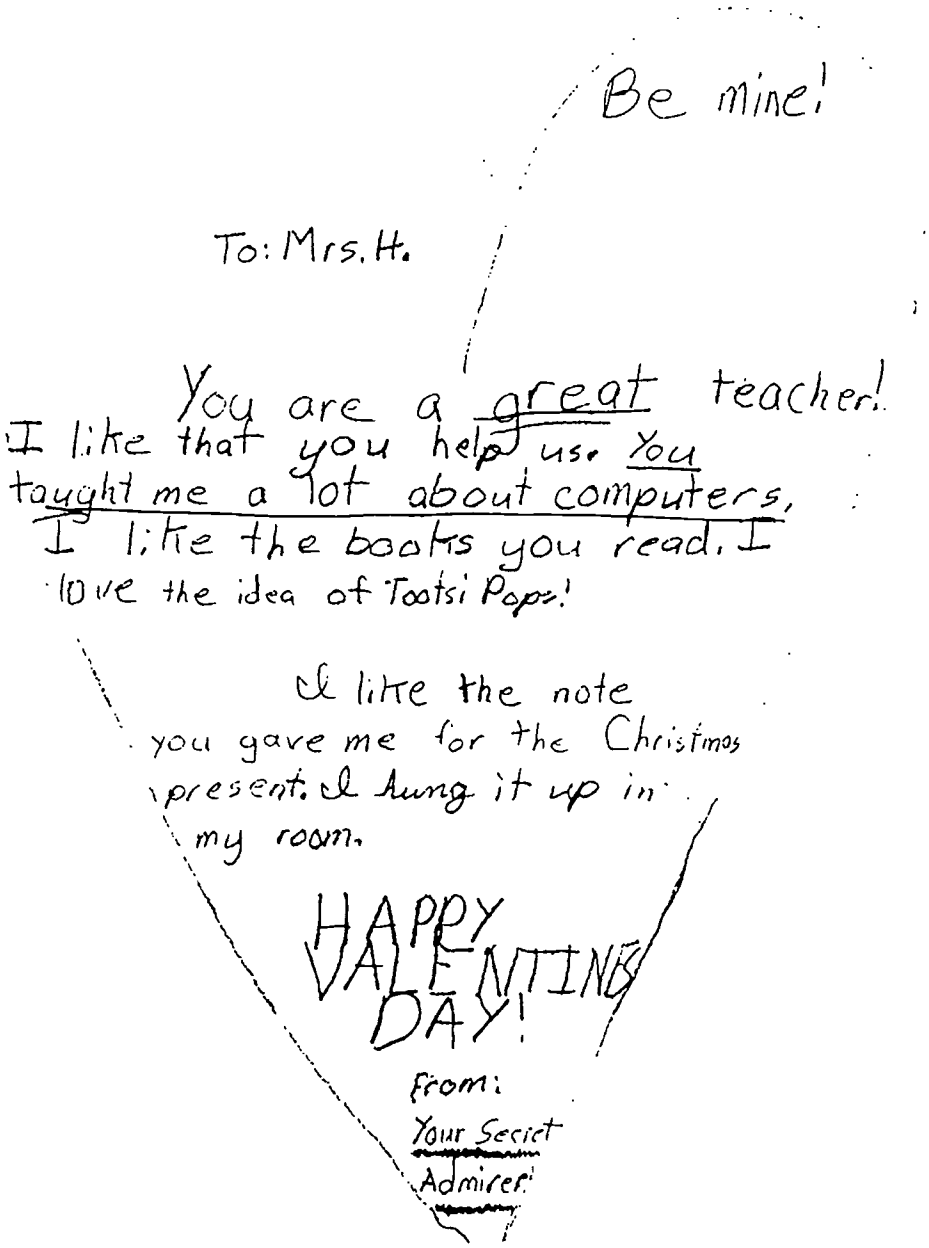
for teacher training, more thorough previews of software, and a campaign to employ computer coordinators in all the buildings.

Not only was I more committed to pursuing our district's computer goals, but also the goals of each classroom teacher. Some parents and teachers still did not see the value of technology. I saw a need to reassure them that computers cannot replace the enthusiasm and guidance of a teacher. Logistically, teachers cannot present all the knowledge that students will use for the future, so computers are there to help find information and apply it.

Students are changed by technology. Guerrero (1988) says that computers change students' attitudes toward school, increase their ability to learn, help them get along with others, and influence their self-esteem. I believed my students made progress in all of those areas. (See Figure 17)

It would be wonderful to see our students reach Level 6 on Moersch's scale of computer use. It is mindboggling to imagine using classroom computers to develop a product, invention, or more software. That goal seems too hard to reach, but at least I know the pathway to get there.

Figure 17



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Appendix A

Pre-Surveys and Post-Surveys

COMPUTER PRE-SURVEY

The two most frequent responses are in bold italics.
* An asterisk indicates the most frequent response.

1. There is always a computer free when I get done with my work.

Strongly Agree	***Agree***	***Sometimes***	Disagree	Strongly Disagree
1	4	*15	2	2

2. I usually am one of the first people to use the computers at free time.

Strongly Agree	Agree	***Sometimes***	***Disagree***	Strongly Disagree
1	3	*9	8	3

3. I don't get to use the computers at free time.

Strongly Agree	Agree	***Sometimes***	Disagree	***Strongly Disagree***
2	3	*11	4	5

4. When I get free time at the computers, I usually play games.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
*11	9	3	1	0

5. When I get free time at the computers, I write paragraphs, letters, or stories.

Strongly Agree	Agree	***Sometimes***	Disagree	***Strongly Disagree***
0	2	*10	5	7

6. I like working on computers.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
*18	4	2	0	0

7. I enjoy using Writing-to-Write.

Strongly Agree	Agree	***Sometimes***	Disagree	Strongly Disagree
5	3	*8	4	4

8. I enjoy using Touch Typing.

Strongly Agree	***Agree***	***Sometimes***	Disagree	Strongly Disagree
5	5	*10	2	2

9. I enjoy using Oregon Trail.

Strongly Agree	***Agree***	***Sometimes***	Disagree	Strongly Disagree
*14	4	4	1	1

10. I enjoy using Carmen SanDiego.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*8	*8	1	3	4

11. I enjoy using Children's Writing and Publishing.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
4	7	*9	3	1

12. I enjoy using Information Finder.

Strongly Agree	Agree	*Sometimes*	Disagree	Strongly Disagree
*7	5	6	4	2

13. I enjoy using MTM Recording Tool to make graphs.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
5	6	*13	0	0

14. I am good at Touch Typing.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
4	*9	7	2	2

15. I know how to use the paint program in Linkway.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*18	5	0	1	0

16. I know how to make a folder using Linkway.

Strongly Agree	*Agree*	Sometimes	*Disagree*	Strongly Disagree
2	*7	2	*7	6

17. I would like to make a slide show using Linkway.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
8	*13	2	1	0

18. I would like to make a graph using the computers.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
2	*10	8	4	0

19. I would rather write papers on the computer than with pencil and paper.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*15	4	2	2	1

20. I would rather make mind maps on the computer than with pencil and paper.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
8	*9	4	2	1

21. I would rather use Information Finder than encyclopedias.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*12	5	3	1	3

22. I use computers for science class.

Very Often	Often	*Sometimes*	*Rarely*	Never
0	1	5	*14	4

23. I use computers for social studies class.

Very Often	Often	*Sometimes*	*Rarely*	Never
1	0	7	*8	*8

24. I have used MTM Recording Tool to make graphs.

Very Often	Often	*Sometimes*	*Rarely*	Never
0	1	6	*14	3

25. I have tried to use the Information Finder.

Very Often	Often	*Sometimes*	Rarely	*Never*
5	4	5	1	*9

26. I have used the computers for reading projects.

Very Often	*Often*	Sometimes	Rarely	*Never*
3	6	4	1	*10

27. I am good at using the computers as a word processor.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
3	*12	6	2	1

28. Computers have helped me become a better writer.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
4	*11	5	2	2

29. Touch Typing makes using the computer easier.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*8	*8	6	2	0

30. I would like to use stations in social studies to complete a project on the computer.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*11	8	4	1	0

31. I would rather work alone on a social studies project than with another person.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
1	1	3	5	*14

32. I would rather learn about social studies from the textbook than using a computer.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
1	1	3	5	*14

33. I would rather use the computer with a partner than work alone.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
1	2	3	6	*13

34. I have a computer at home.

Yes	No
*14	10

35. I talk about what I do on the school computers when I am at home.

Very Often	*Often*	*Sometimes*	Rarely	Never
2	5	*13	1	3

36. I know more about computers this year than in third grade.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*15	7	2	0	0

37. I know less about computers this year than in third grade.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
0	0	2	6	*16

38. I know the same about computers as I did in third grade.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
1	0	6	*10	7

COMPUTER POST-SURVEY

The two most frequent responses are in bold italics.
* An asterisk indicates the most frequent response.

1. There is always a computer free when I get done with my work.

Strongly Agree	Agree	***Sometimes***	***Disagree***	Strongly Disagree
0	1	*20	3	0

2. I usually am one of the first people to use the computers at free time.

Strongly Agree	Agree	***Sometimes***	***Disagree***	Strongly Disagree
0	2	*16	5	1

3. I don't get to use the computers at free time.

Strongly Agree	Agree	***Sometimes***	***Disagree***	Strongly Disagree
2	3	8	*9	2

4. When I get free time at the computers, I usually play games.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
*11	8	5	0	0

5. When I get free time at the computers, I write paragraphs, letters, or stories.

Strongly Agree	Agree	***Sometimes***	***Disagree***	Strongly Disagree
0	0	*14	6	4

6. I like working on computers.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
*15	6	3	0	0

7. I enjoy using Writing to Write.

Strongly Agree	***Agree***	***Sometimes***	Disagree	Strongly Disagree
2	*10	7	3	2

8. I enjoy using Touch Typing.

Strongly Agree	***Agree***	Sometimes	***Disagree***	Strongly Disagree
5	7	3	*8	1

9. I enjoy using Oregon Trail.

Strongly Agree	***Agree***	***Sometimes***	Disagree	Strongly Disagree
*11	6	6	1	0

10. I enjoy using Carmen SanDiego.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
5	*9	5	2	3

11. I enjoy using Children's Writing and Publishing.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
2	*9	*9	4	0

12. I enjoy using Information Finder.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
3	*10	6	4	1

13. I enjoy using MTM Recording Tool to make graphs.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
0	*10	*10	4	0

14. I am good at Touch Typing.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
3	*7	*7	4	3

15. I know how to use the paint program in Linkway.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*18	6	0	0	0

16. I know how to make a folder using Linkway.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*15	9	0	0	0

17. I would like to make a slide show using Linkway.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
8	*13	3	0	0

18. I would like to make a graph using the computers.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
3	*11	8	2	0

19. I would rather write papers on the computer than with pencil and paper.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*14	5	4	0	1

20. I would rather make mind maps on the computer than with pencil and paper.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
*10	9	4	1	0

21. I would rather use Information Finder than encyclopedias.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
*12	5	3	1	3

22. I use computers for science class.

Very Often	Often	***Sometimes***	***Rarely***	Never
0	0	7	*11	6

23. I use computers for social studies class.

Very Often	***Often***	***Sometimes***	Rarely	Never
2	*11	9	2	0

24. I have used MTM Recording Tool to make graphs.

Very Often	***Often***	***Sometimes***	***Rarely***	***Never***
1	3	*14	3	3

25. I have tried to use the Information Finder.

Very Often	***Often***	***Sometimes***	Rarely	***Never***
4	5	5	2	*8

26. I have used the computers for reading projects.

Very Often	Often	Sometimes	Rarely	***Never***
6	4	3	3	*8

27. I am good at using the computers as a word processor.

Strongly Agree	***Agree***	***Sometimes***	Disagree	Strongly Disagree
3	*11	8	0	2

28. Computers have helped me become a better writer.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
4	*12	5	1	2

29. Touch Typing makes using the computer easier.

Strongly Agree	***Agree***	Sometimes	Disagree	Strongly Disagree
9	*10	3	2	0

30. I liked to use stations in social studies to complete a project on the computer.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
6	*9	*9	0	0

31. I would rather work alone on a social studies project than with another person.

Strongly Agree	Agree	*Sometimes*	*Disagree*	*Strongly Disagree*
1	2	*9	6	6

32. I would rather learn about social studies from the textbook than using a computer.

Strongly Agree	Agree	*Sometimes*	Disagree	*Strongly Disagree*
0	1	5	4	*13

33. I would rather use the computer with a partner than work alone.

Strongly Agree	Agree	*Sometimes*	Disagree	Strongly Disagree
4	3	*12	2	3

34. I have a computer at home.

Yes	No
*14	10

35. I talk about what I do on the school computers when I am at home.

Very Often	*Often*	*Sometimes*	Rarely	Never
0	9	*13	1	1

36. I know more about computers this year than in third grade.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
11	*12	0	1	0

37. I know less about computers this year than in third grade.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
0	0	0	10	*14

38. I know the same about computers as I did in third grade.

Strongly Agree	Agree	Sometimes	*Disagree*	*Strongly Disagree*
2	0	3	*14	5

39. I learned about the Pacific Northwest by observing each student's computer project.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
3	*20	1	0	0

40. I learned about the United States by observing each student's Linkway folder.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
5	*19	0	0	0

41. It is easier to learn a new computer program when another student sits with me to show me how.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
5	*11	7	0	1

42. It is easier to learn a new computer program when the teacher explains it, and I try it on my own.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
3	7	*12	2	0

43. I worked on my social studies computer project whenever I had free time.

Very Often	Often	*Sometimes*	*Rarely*	Never
2	2	7	*9	4

44. I worked on my social studies computer project through recess, because I wanted to finish it.

Very Often	Often	Sometimes	*Rarely*	*Never*
4	2	3	7	8

45. I believe I could do an entire state report using the computer.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
7	*9	3	3	2

46. I have used the computers more in the last few weeks than I have at the beginning of the year.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*7	8	2	4	3

47. Maps made on the computer are easier to read than a map drawn by hand.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
4	*14	4	1	1

48. Graphs made on the computer are easier to read than a graph drawn by hand.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
6	*12	6	0	0

49. I would rather make a graph using the computer than draw one by hand.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
7	*10	6	0	1

50. I would rather make a map using the computer than draw one by hand.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
8	*11	5	0	0

51. I am getting better at using Linkway to draw pictures.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*14	8	2	0	0

52. I would rather make a drawing by computer than draw one by hand.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
6	*9	8	0	1

53. I enjoy showing others how to do things on the computer.

Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
6	*9	5	3	1

54. I usually ask another student for help when I don't know what to do on the computer.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
2	9	*11	1	1

55. I usually wait for the teacher when I don't know what to do on the computer.

Strongly Agree	*Agree*	*Sometimes*	Disagree	Strongly Disagree
2	8	*12	2	0

56. I have complimented other students on their computer projects.

Very Often	*Often*	Sometimes	Rarely	Never
9	*10	5	0	0

57. I have received compliments from other students on my computer project.

Very Often	*Often*	*Sometimes*	Rarely	Never
3	9	*10	1	1

58. I believe the computers are used more now by everyone than at the beginning of the year.

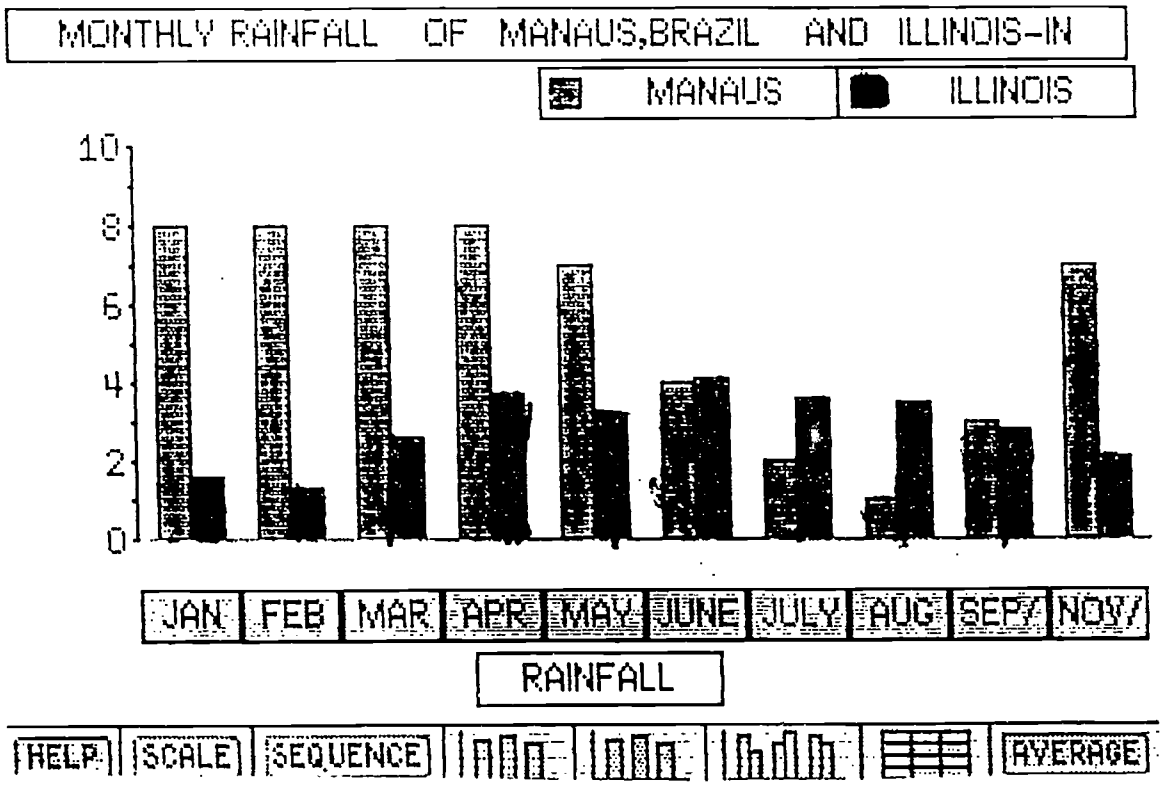
Strongly Agree	*Agree*	Sometimes	Disagree	Strongly Disagree
*11	9	2	1	1

Appendix B

Samples of Computer Generated Projects

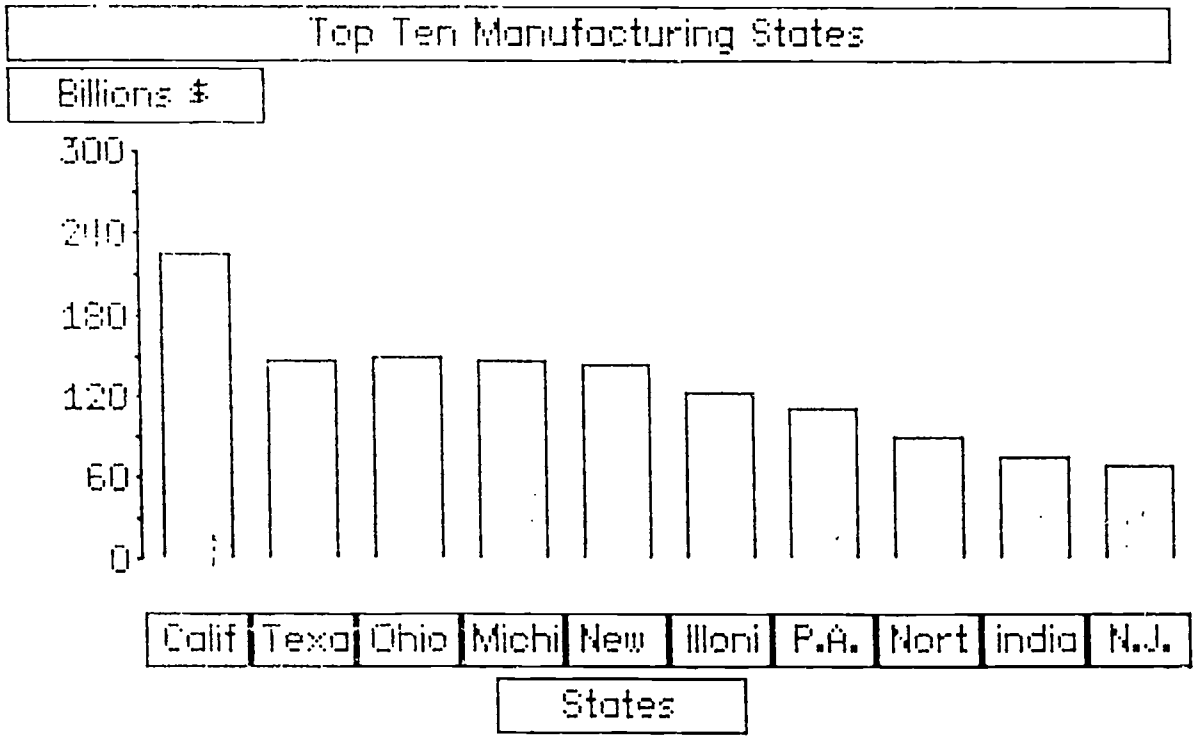
MONTHLY RAINFALL OF MANAUS,BRAZIL AND ILLINOIS-IN

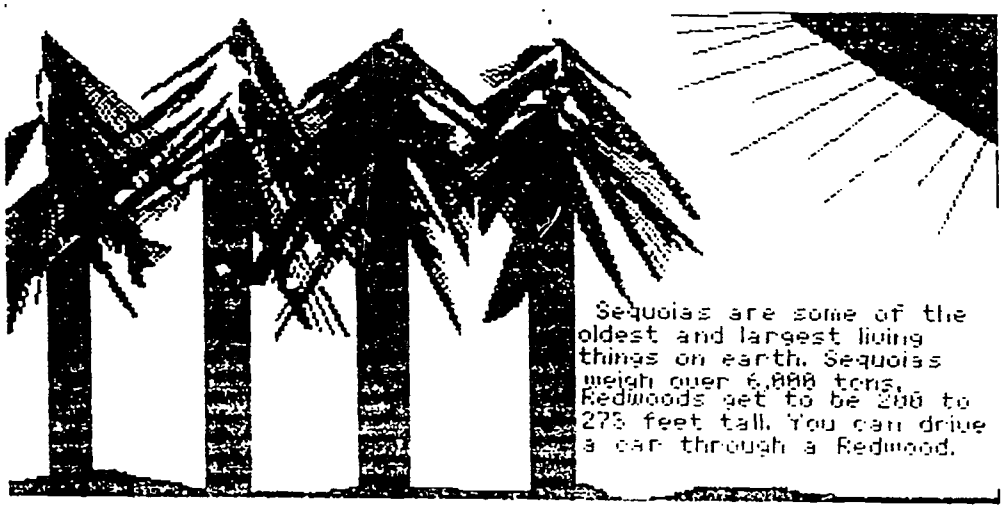
	RAINFALL	MANAUS	ILLINOIS
1	JAN	8.0	1.6
2	FEB	8.0	1.3
3	MAR	8.0	2.6
4	APR	8.0	3.7
5	MAY	7.0	3.2
6	JUNE	4.0	4.1
7	JULY	2.0	3.6
8	AUG	1.0	3.5
9	SEP/OCT	3.0	2.8
10	NOV/DEC	7.0	2.1



Top Ten Manufacturing States

	States	Billions $	
1	California	225	
2	Texas	148	
3	Ohio	149	
4	Michigan	147	
5	New York	145	
6	Illonios	123	
7	P.A.	110	
8	North C	90	
9	indiana	75	
10	N.J.	68	

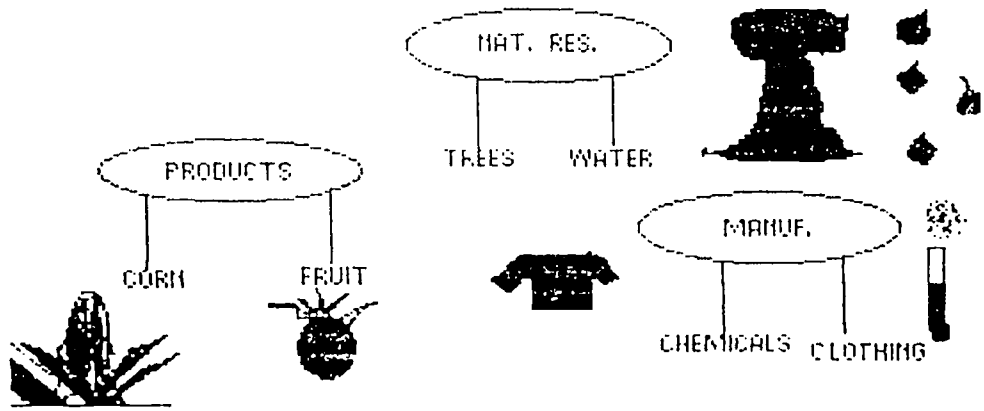




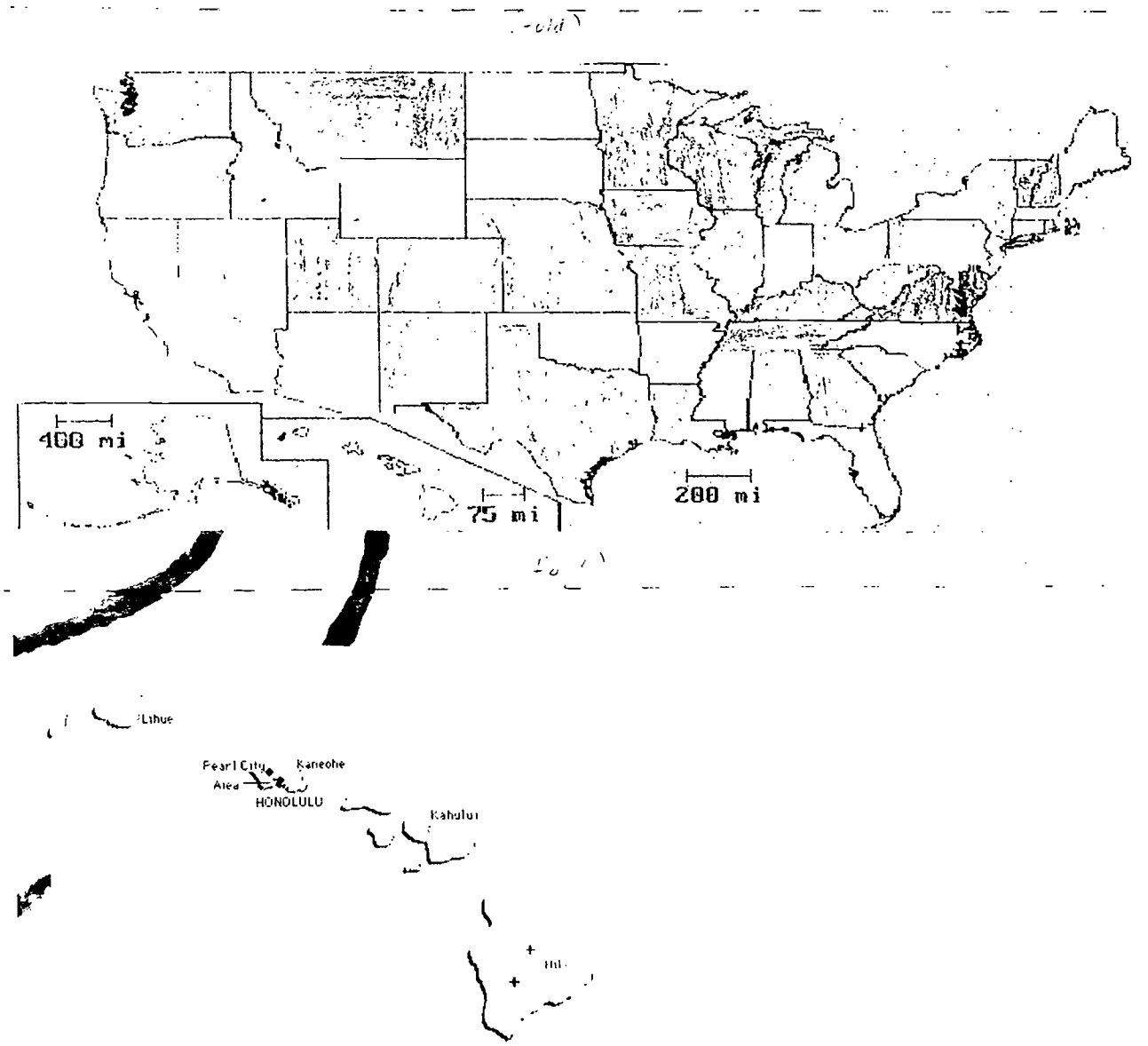
Sequoias are some of the oldest and largest living things on earth. Sequoias weigh over 6,000 tons. Redwoods get to be 200 to 275 feet tall. You can drive a car through a Redwood.

Eleven million gallons of gas were spilled at Valdez shore. Lots of people tried to clean it up. It took a long time to clean the gas up.

HAWAII



Travel Brochure

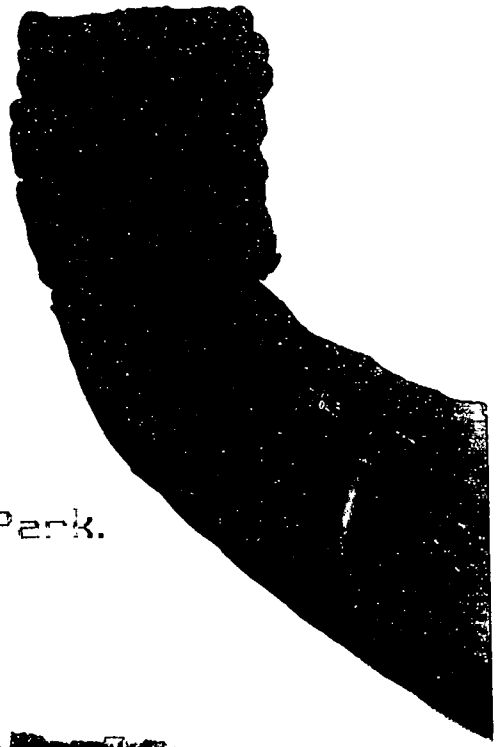


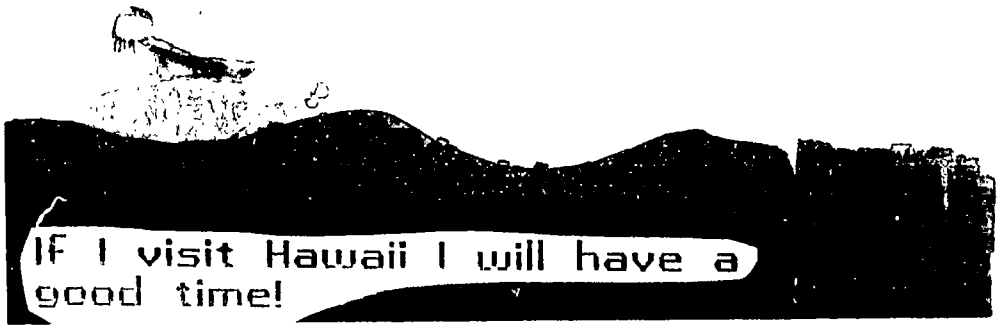
icrosoft Map

I have to decide where to go on vacation.

The place I go to should have waterfalls because I like peaceful places. There should be beaches so I can swim. It should have volcanos because I like how they are shaped. There should be a place to go surfing so I can surf. There should be a place I can see whales because I like animals. There should be a place to go swimming because I like to swim.

I chose to visit Hawaii. This would be a good place because I could visit Akaka Falls. I could swim at Barking Sands. I could see a volcano at Kapiolani Park. I could go surfing at Malboo Shore. I could see whales at Sea Life Park.





IF I visit Hawaii I will have a good time!

Appendix C

Lesson Plans

LESSON PLANS FOR STATIONS

DATES Week of April 1st

UNIT Pacific Northwest

WHOLE GROUP INSTRUCTION: Use index cards to take notes for vacation brochure. Use encyclopedias and state books. 1st column - write down places to visit. 2nd column - write standards.

		ROTATIONS Mon. Mon. Mon. Tues. Tues.				
COMPUTER STATION #1	Writing-to-Write "Dream Vacation" Brochure	Red	Yellow	Green	Blue	Purple
STATION #2	Game - "Guess That State"	Purple	Red	Yellow	Green	Blue
STATION #3	Shoe box Dioramas + Publishing	Blue	Purple	Red	Yellow	Green
STATION #4	Daily Oral Language Daily Oral Geography	Green	Blue	Purple	Red	Yellow
STATION #5	Text book - Read ch. 9 silently "Pacific Northwest"	Yellow	Green	Blue	Purple	Red

LESSON PLANS FOR STATIONS

DATES _____

UNIT _____

WHOLE GROUP INSTRUCTION:

		ROTATIONS				
COMPUTER STATION #1						
STATION #2						
STATION #3						
STATION #4						
STATION #5						

Choose a state: Complete the Song

She'll be coming from _____ (capital)
when she comes.

She'll be coming from _____ (large city)
when she comes.

She'll bring _____ (products), _____, and _____.

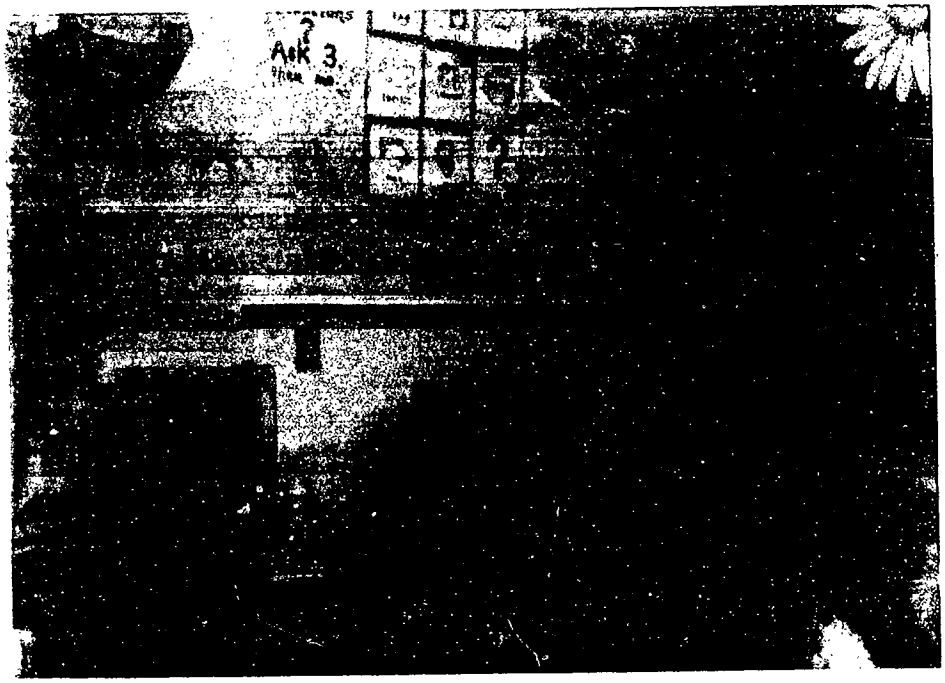
She'll bring _____ (crops), _____, and _____.

She'll be coming from _____ (state)
when she comes.

Appendix D

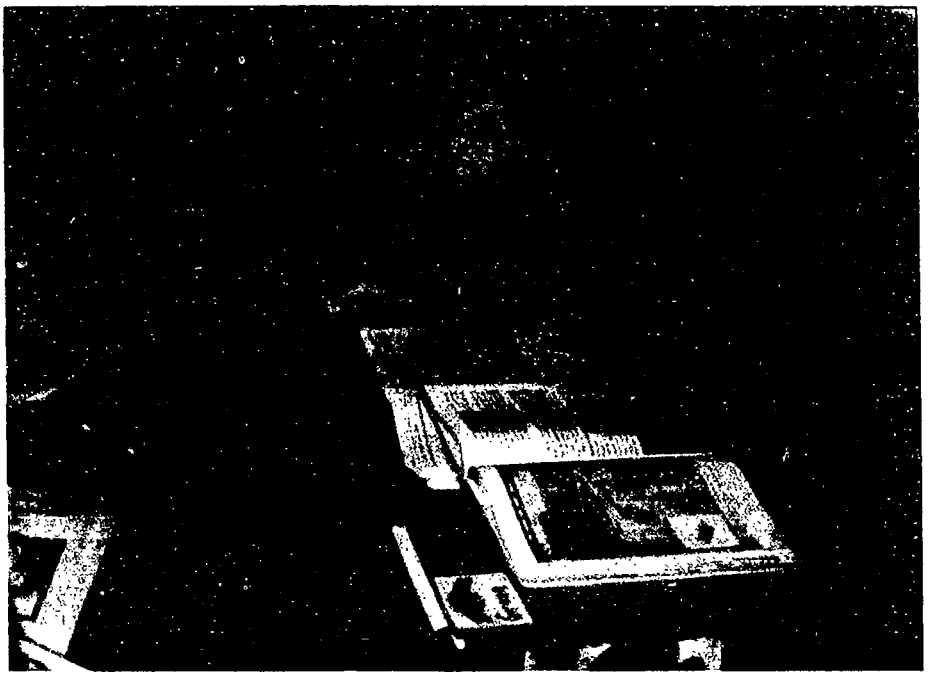
Photos of Activities

Sharing Social Studies Pacific Northwest Concept Maps

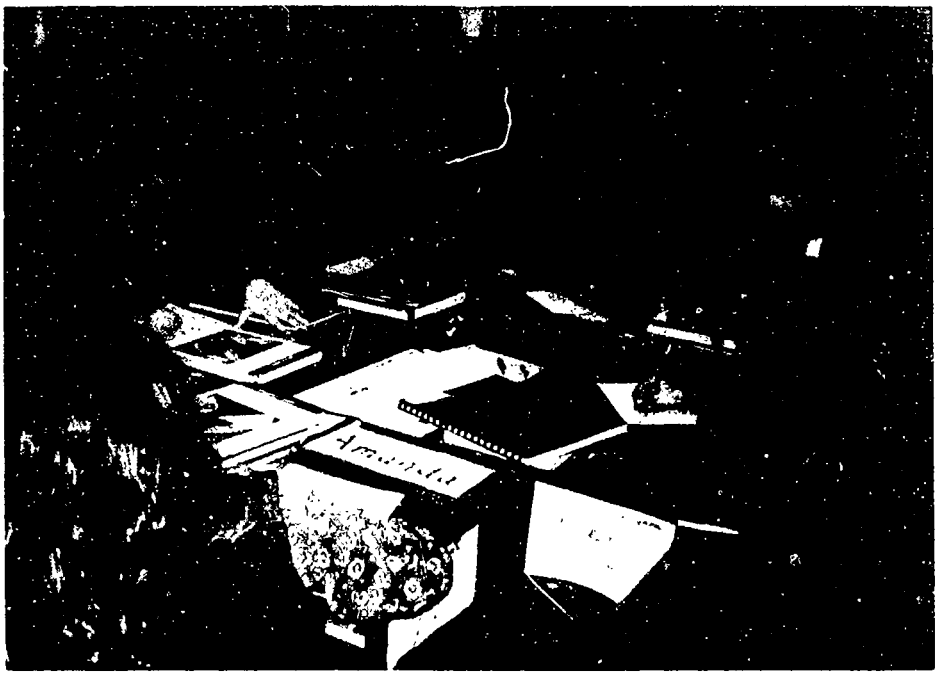


Sharing Socical Studies Maps of Pacific Northwest States

Workbook Station



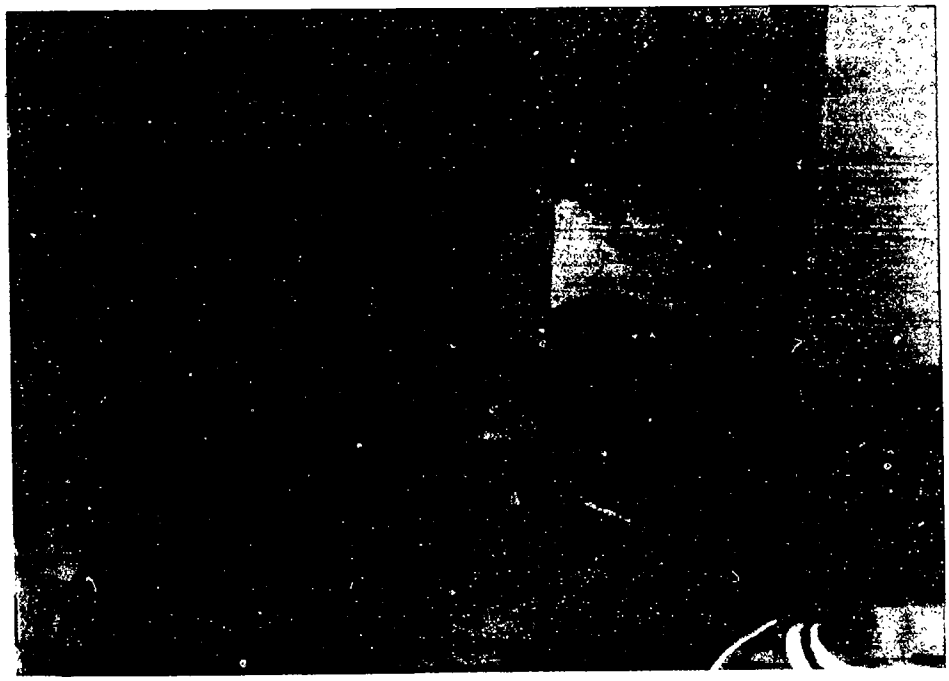
On-Task at the Daily Oral Language Station



Pul ..shing Station

Daily Oral Geography Station

Getting and Giving Help



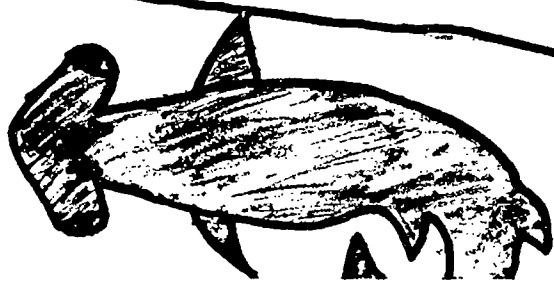
Getting and Giving Help

Appendix E

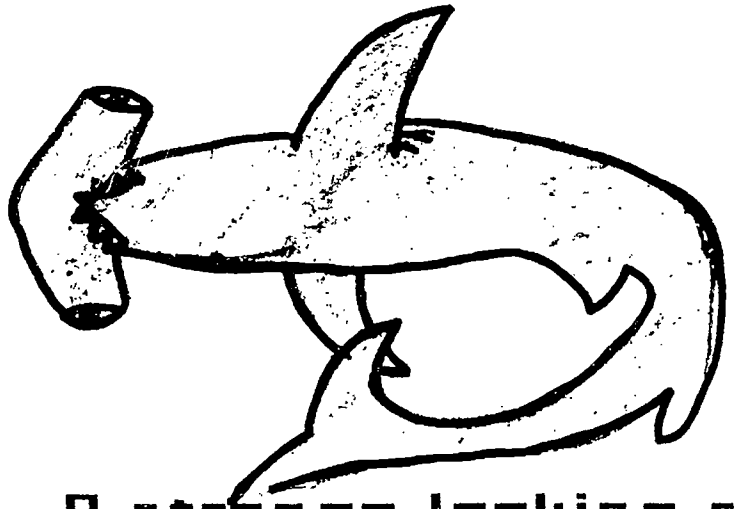
Samples of Computer Work in Other Content Areas

Brandon

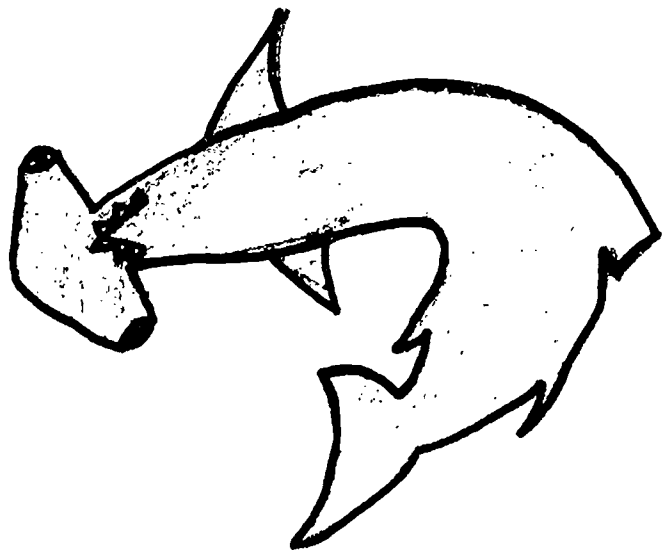
MOST SHARKS AND HAMMERHEADS



Most sharks have a boneless skeleton called cartilage. Most sharks have a rounded body. Sharks live near ocean bottom. The parents may eat the young. Sharks are shaped like a torpedo.



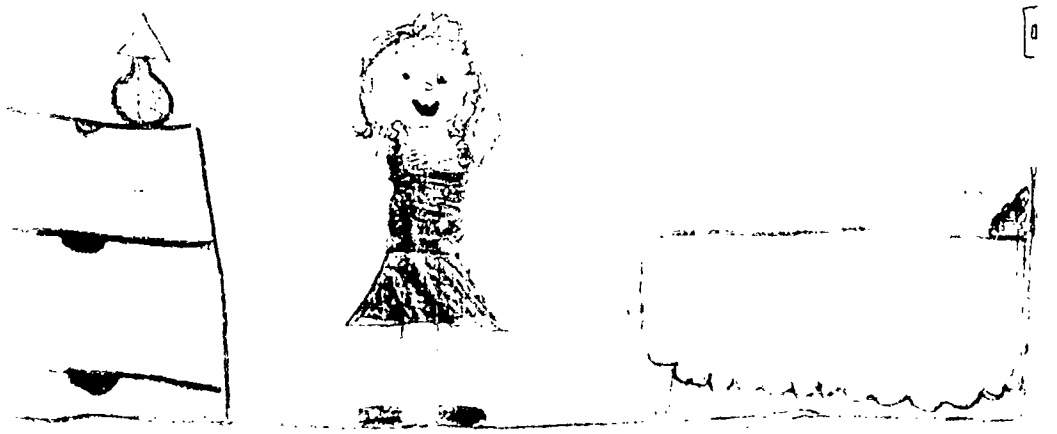
A strange looking shark is a hammerhead. This shark has a flat head. This shark has nostrils at the end of the hammer. Hammerhead sharks can get up to twenty feet long. Hammerhead sharks live in shallow water. This special shark lives in warm water and eats people.



I like hammerhead sharks the most.

Young Author Story

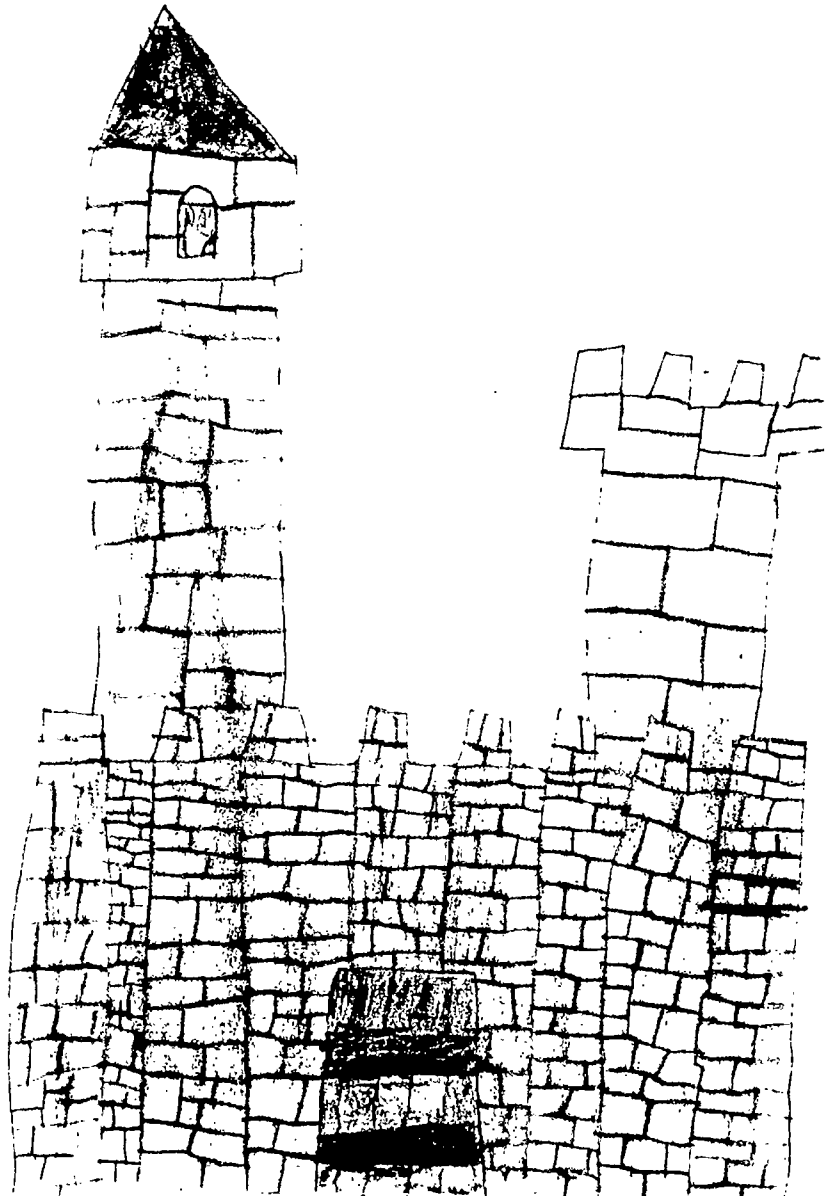
Alligator Surprise



Hi! I'm Jessica. I'm going to tell you about what happened to my brother. My brother was about nine. I was three. Now my brother is thirteen and I'm seven. Here's the story.

Snowflake

N B.



Once upon a sunny day in a small meadow lived a little princess in a very large castle. She lived with her parents Hillary and Arthur. Her name was Heidi.