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A Study to Determine How Teacher Training and Computer Availability Affected Technology Integration at Manteo Middle School

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A STUDY TO DETERMINE HOW TEACHER TRAINING
AND COMPUTER AVAILABILITY
AFFECTED TECHNOLOGY INTEGRATION
AT MANTEO MIDDLE SCHOOL

A Research Paper Presented to the Graduate Faculty of
the Department of Occupational and Technical Studies
at Old Dominion University

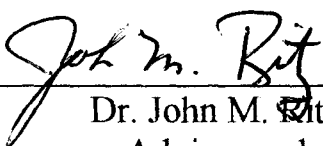
In Partial Fulfillment
of the Requirements for
the Master of Science in Secondary Education Degree

By
Laura Johnson Hummell

August 1998

APPROVAL PAGE

This research paper was prepared by Laura Johnson Hummell under the direction of Dr. John M. Ritz in OTED 636, Problems in Education. It was submitted to the Graduate Program Director in partial fulfillment of the requirements for the Degree of Master of Science in Secondary Education.

APPROVAL BY:  7-28-98
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Laura Johnson Hummell

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CHAPTER I

Introduction

One of the pervasive problems in using technology in education is that most people consider technology an inherently separate part of education. Technology is something that many people do not know how to integrate into their classes. Integrating technology could be a simple part of lesson planning, if everyone could consider it as an integral part of education, much like textbooks are. Often with the introduction of new technology, staff development falls into the hands of those people who are already using technology. The computer teacher or the vocational teacher must find a way to show reluctant teachers how to apply the knowledge obtained from computer classes. This is what many school districts have been prompted to do by the upper echelons of the administration and this is one of the problems. Educational institutions need working models of other districts that have integrated technology successfully in all areas of the curriculum—not just those classes in which it is expected.

Teachers must expect it to be used everywhere and use it in all of their classes as well. With these expectations must come some realistic goals. Technology in any form cannot transform a school overnight.

Social and educational problems cannot be fixed with the purchase of a new type of software or computer system. Nor can teachers be expected to begin using these tools without the proper training and focus.

Often education falls into the trap of “jumping on the bandwagon” with every new and improved means of getting the highest test scores or least discipline problems. Unfortunately, all too often we can “walk into any classroom in most any school in America today and walk into a time warp where the basic tools of learning have not changed in decades.”

(Rogers, 1997) Educators must avoid using computers the same ways in which textbooks or the blackboard are used. They are not something that can replace the teacher, but they must be used in conjunction with appropriate instruction to supplement and enrich the curriculum.

To avoid using the new technology in the old ways, proper and constant training must occur. This training should include: 1. The Basic Uses of the Hardware and Software Available, 2. Using Technology Morally and Ethically, and 3. Integrating Technology into the Curriculum. Many school districts in southeastern Virginia and northeastern North Carolina lack staff and student training in one or more of these areas. These gaps in training are where many problems can begin.

Technology use across the curriculum has become an important part of education. Investigating how well the integration of technology was working at Manteo Middle School became a way to help the faculty better serve a variety of students in using technology effectively. Integrating technology into the curriculum has interested many people because of the vast resources that are needed to successfully operate a technology program. The opportunity to conduct this investigation was encouraged by Dare County administrators and faculty.

Statement of the Problem

The problem of evaluating how often and effectively faculty and staff members were using existing technology at Manteo Middle School arose. This study analyzes how teacher training and computer availability can affect the frequency of technology use and how technology is being integrated at Manteo Middle School.

Research Goals

Staff training included basic introductions to word-processing, databases, spreadsheets, desktop publishing, local area networks (L.A.N.), wide area networks (W.A.N.), and Internet use. Before the staff's initial excitement wore off, the technology committee in the school searched for ways to get all the teachers to integrate these same technologies into every

subject and grade level. Since they had the basic knowledge, now they had to be taught the application of this knowledge in the classroom with students.

At the end of the first three-year technology plan, many faculty and staff members, despite their successful hands-on technology training, felt unable or unwilling to integrate technology fully into their classes. The new technology was being used in the same old ways, for keyboarding, word-processing, and playing games. How to get technology integrated into all classes in innovative and educational ways was the challenge. The technology coordinators and any other interested staff members were asked to teach training seminars about how to integrate technology effectively.

Integrating the technology had several underlying problems that few could pinpoint. This research explores many factors that have profound effects on using technology across the curriculum. These factors are:

1. The students' and staff members' training in the uses of several types of computer technology,
2. The strengths and weaknesses of Manteo Middle School's integration of technology, and
3. Why certain types of technology were not being utilized as much as was expected.

Background and Significance of the Study

Manteo Middle School (M.M.S.), a sixth through eighth grade facility in the Dare County School system, is located in northeastern North Carolina. Three and a half years ago the Dare County Commissioners accepted a proposal to fund the updating of existing technology programs in the Dare County Public School system. A three-year plan was put into effect and the placing of hardware, wiring, software, and network servers took place.

After the technology was functional, training began. Training consisted of learning the basic functions of word-processing, databases, spreadsheets, desktop publishing, E-mail, and the Internet. The main problem of introducing new technology into an existing educational institution is how to motivate people to use the technology consistently. Because of the major expense involved in purchasing the hardware and software, the leaders of the community, who are responsible to taxpayers, insisted that the technology be used effectively. However, these demands were subjective and created new problems within the system. One way to improve the use of technology at Manteo Middle School was to ensure that proper teacher training occurred and computers were available whenever needed.

Limitations

While this study was conducted in good faith, several limitations must be considered when discussing the findings and suggestions. These limitations are that:

1. This study was limited to Manteo Middle School.
2. This research did not include observations of every class and teacher at Manteo Middle School.
3. The school is one of three middle schools in Dare County Public Schools integrating technology into similar classes with an identical curriculum.
4. The standard courses of study and curriculums for all classes are mandated by the state of North Carolina's Department of Public Instruction.

Assumptions

Assuming several factors are in place, the researcher can then suggest several alternatives in studying course work and observing various groups using technology. These assumptions included:

1. The teacher was trained in the proper use of the type of technology he/she was attempting to use with a class.
2. The curriculum was designed in specific vocational-technical classes to include an extensive integration of technology.
3. The classes were primarily using personal computer systems with the appropriate software.
4. The Internet was accessible on the computers.

Procedures

Research data was collected from teachers who instruct middle school classes in all subject areas, grades sixth through eighth at Manteo Middle School. The data was collected through the use of a survey that was distributed to thirty-one Manteo Middle School staff members. The respondents answered questions concerning what technology training they had and how they were using technology in a regular classroom setting. The survey also questioned certain opinions about the respondents' general perceptions about technology use in schools. This survey data provided an examination of the major differences in how teacher training and computer availability affected technology use. A review of the technology integration process also included informal observations of technology education, computer applications, language arts, science, mathematics, reading remediation, journalism, and social studies classes during the second semester of the 1997-98 school year at Manteo Middle School.

Definitions

For the purposes of this research, key terms and concepts are defined to assist in the understanding and use of this study.

1. **Technology** refers to the computer systems and their software.

2. **Integration** refers to the process of including technology in the other materials used in a classroom, such as textbooks, paper, etc.
3. The **Internet** refers to a worldwide system of computers through which information can be accessed if the computer being used has the correct system software, a modem, and proper accessibility via a commercial account.
4. A **lecturer** is a teacher who uses whole group lectures as his/her primary means of delivering instruction.
5. A **facilitator** is a teacher who facilitates learning through a variety of learning activities, such as hands-on (kinesthetic) projects or auditory-visual lessons, rather than lecturing to a whole group simultaneously.
6. **Staff development** is defined as teacher training in various areas of technology, including word processing, L.A.N. and W.A.N. use.
7. **L.A.N.** is an abbreviation for local area network in which a system of interconnected computers are located within one building or a series of adjacent buildings. Manteo Middle School has a L.A.N. in its adjacent buildings.
8. **W.A.N.** is one or more LANs that are connected, but over a large area. Dare County Schools operates a W.A.N. connecting all of its schools. The L.A.N. at Manteo Middle School is a part of the larger Dare County Schools W.A.N.

Overview

Chapter I addresses how teacher training and computer availability affected Manteo Middle School teachers' use of technology in the regular classroom. The survey response and observation data were compared to illustrate how technology use in individual classes was affected by teacher training and computer availability.

In Chapter II, other research on integration and perceptions about technology are reviewed. Since opinions can greatly alter how a topic is viewed, the review of existing literature in this field was essential.

Chapter III ventures into covering the procedures used to accumulate data, while Chapter IV interprets the new information and data discovered.

Finally, Chapter V considers recommendations and summarizes the research study.

CHAPTER II

Review of Literature

There is a wealth of information available about integrating technology into instruction. Other school districts and states, which were slightly ahead of Dare County, helped this researcher by posting curriculum ideas and suggestions on the Internet. Realizing what a valuable resource the Internet can be was significant.

The main suggestion of all of these sites and literature was instruct teachers how to change their classroom delivery from the “lecturer” to the “facilitator.” Of course, this solution is much easier stated than completed. Teachers who have been constantly expected to change what and how they teach were reluctant to accept and use the technology integration suggestions.

The problem of this study was to determine how teacher training and computer availability affected technology integration at Manteo Middle School. The literature reviewed for this chapter includes: (1) Interpretations of Educational Computer Technology Integration, (2) Teacher Training and Support, (3) Technology Location and Access, and (4) Summary.

Educational Computer Technology Integration

“While it is true that students in countless schools have computer experiences of varying degrees, the fact is that those experiences are usually not wed to the “normal” academic life of the rest of the school.” (Roger, 1997) According to the Office of Technology Assessment report of 1995, “about twenty-five percent of the states actually mandate the integration of computer technology across the curriculum.” Yet, rather than teaching all teachers to use various forms of technology in their regular classrooms, many states are only prescribing that vocational and technical educators teach computer classes. Since this is one form for the integration of technology, most state legislatures are satisfied and most teachers do not have the full scope of available technology to use in their own classrooms.

Changing state and local interpretations of technology integration usually comes from the regular classroom teachers’ requests for computers or training. For example, after extensive lobbying by local teachers’ organizations in 1993, the Iowa Legislature changed their interpretation of integrating technology when they established an Educational Technology Consortium to ensure equity of access. Instead of limiting technology integration to certain specific vocational-technical

classes, they set out to expand educational technology use to all subjects. (OTA, 1995) Yet, it seems according to many articles and reviews, that “there are indications that many teachers are still not using the potential of information technology in their classrooms.” (Robinson, 1997)

Teacher Training

Often, in states where technology integration has been embraced across the curriculum, teachers are expected to integrate technology practices in their classrooms to help students learn more information better, faster, and more economically. Unfortunately, most of the time, teachers have not been provided training on how to successfully teach these technologies. “It is no secret, of course, that one of the biggest failures is the lack of appropriate staff development.” (Rogers, 1997)

If teachers are not trained in technology integration, they cannot be expected to teach what they do not know. “The main difficulty underlying the use of technology to solve social problems is that these problems are fundamentally different from technical problems.” (Volti, 1995) According to Cheryl Williams of the Institute for the Transfer of Technology to Education,

“Educators are not techies. Educators in large measure are people people. So those folks who are interested in learning about the technology, tend to be those folks who are interested in learning how to do things better. And so, to get all tied up with talking about

the computer, when what we are really talking about is changing the communications and management infrastructure of an institution that has not really moved to the 50s much less into the 80s or 90s is ludicrous.”

Changing people’s perceptions and attitudes about technology should be an important component of any technology integration teacher training.

As Michael Fullan (1992) indicates in his work *Successful School Improvement*, information technology innovation in schools requires changes in practices, materials, skills, and beliefs. If educational practices in the area of technology use are to change, educational philosophies must change. Students can no longer be considered “receivers” of knowledge from a “lecturer,” or teacher who dispenses knowledge. Rather than requiring students to be sponges soaking up the teacher’s knowledge, students need to become active participants in their own learning. When this occurs, a teacher’s delivery style must change to that of a facilitator.

Basic technology applications are easily taught by someone already on a school’s staff. However, changing attitudes and changing teaching styles requires a group of well-trained, enthusiastic, and committed educators. Paraphrasing Al Rogers from “The Failure and the Promise of Technology in Education,” teachers can no longer wait for the government and educational leadership to fix the problems associated

with integrating technology. Teachers must realize that knowing the technology and using it will allow them to fix the problems themselves.

Technology Location and Access

“Another key factor that affects how teachers use computers is the location of the computers within the school building.” (OTA, 1995) All too often, schools are afraid that the expensive computer systems they have installed will be misused, damaged, or destroyed, if not closely monitored in a computer lab. However, locating computers in one remote location, such as a computer lab, makes it harder for teachers to integrate technology with other class assignments during the school day. Having the computers in one location only allows one group at a time to have simultaneous access to the computers. This allows only a very limited amount of students to have access, depending on the daily and weekly computer lab schedule.

Thus, technology access and location are major factors that have profound effects on how teachers and students integrate and use technology daily. Most of the articles, reviews, and books referring to this topic agree that, in addition to locating a group of computers in a lab, schools need to have several computer stations accessible in each

teacher's classroom. Increasing and improving access will allow more freedom to use technology during any lesson in any subject.

Benefits

There are numerous benefits to integrating technology successfully. Students using technology become proactive, rather than, reactive participants in their own education. Critical thinking skills can be applied to real world situations using technology. No longer limited geographically because of Internet use, a student can access information from millions of sources instead of being limited to those he/she can find in the local library. Distance learning can allow a student to take a course, such as Japanese, that might not otherwise be offered by the local school the student attends.

Expanding teaching skills to reach students' various learning styles is made easier by using technology with its combination of visual, spatial, auditory, and kinesthetic elements. Technology in various forms is used throughout society and can no longer be avoided. Everyone needs to learn how technology affects his/her daily life and how to easily adapt to using many forms of technology properly.

Consequences

While there are many benefits to integrating technology in education, consequences should also be carefully considered.

Consequences, such as high levels of frustration and anger, caused by forcing educators and students to change and use new technology must be foreseen. Few people feel comfortable with change, unless proper planning and training has taken place. This training and preparation is a valuable and unavoidable part of any technology integration. Sustained support for teachers and students using technology must be considered in terms of the cost and manpower required. Often, teachers and students are taught the basics of computer use without allowing time for application of this basic knowledge. "...in order to change classroom practice, a course must not only demonstrate possibilities but allow teachers time to practice and develop new skills in a sustained, supportive environment..."

(Robinson, 1997) This type of course demands more time and more money—things that most educational institutions do not have in great supply.

Summary

As shown in the literature reviewed, extensive debate and concern about integrating technology in education has occurred nationwide. "As

educators, our challenge is to draw classroom implications from all available sources in order to help our students become better learners.” (Cornett, 1983) With the daily use of technology increasing in every aspect of life, the problems of how to best include it in education continue to be investigated.

Teacher training, easy computer access, location of the available technology, and appropriate use must be considered to avoid frustration, misunderstanding, anger, and avoidance. “Today, more than ever, we need teachers who are able and willing to become side-by-side learners with their students.” (Rogers, 1997) With good planning and guidance, technology can become one more way to enrich education for many students and teachers.

CHAPTER III

Methods and Procedures

Chapter III contains a description of the methods and procedures used to obtain the needed information in this study. It describes the population of this study and the statistical data to be obtained from Manteo Middle School in Dare County, North Carolina. The way the data will be analyzed and synthesized is also outlined.

Population

The students observed in this study are sixth through eighth grade children in a wide variety of classrooms, including computer vocational-technical classes and regular core classes of language arts and mathematics. Approximately one hundred students were observed in technology education, computer applications, language arts, science, mathematics, reading remediation, journalism, and social studies classes using technology in the forms of computer-based training (Academy of Reading), word processing (Microsoft Works), desktop publishing (Microsoft Publisher), multimedia training (HyperStudio), Internet searches, on-line library and encyclopedia searches, and instructional games (GeoBee).

The thirty-one staff members surveyed and observed in this study include tenured and non-tenured male and female adults, ranging in age from twenty-three years old to sixty. These staff members teach all subject areas from sixth through eighth grade.

Data Collection

A survey that questioned the availability of computer equipment, the length of technology training, and perceptions about how technology is and should be used was distributed to the entire faculty at Manteo Middle School. At the top of the letter and in oral directions, instructions were given about how to complete and return the survey to the researcher's mailbox located in the teachers' lounge at Manteo Middle School. The survey had fourteen multiple-choice questions and one open-ended question. A copy of the cover letter and survey are in Appendix A and the survey's graphed results are provided in Appendix B.

In addition to the survey, data for this study was obtained from informal observations (see Appendix C for example of observation form and Appendix D for observation summaries). The observations occurred during the sixth grade's second and fifth class periods. The date, skill levels of the learners, correction by the teacher, self-correction, and learners' comments were recorded on a form exactly like the one in

Appendix C and summarized in Appendix D. In addition to these items, the researcher also recorded what technology-based activities, equipment, and software were being used.

Statistical Analysis

To organize the results of the survey for analysis, the data was compiled manually. Each survey's responses were tabulated, question by question, on a check sheet. The mean for each of the survey items was calculated and recorded according to the respondent's choices.

Summary

Chapter III discussed the design and procedures used for collection and treatment of this study's data. After the population had been instructed on how to complete the survey, each teacher was asked to complete the two-page survey and return it to the researcher's mailbox within ten days. Chapter IV describes the findings and analyzes the statistical data.

CHAPTER IV

Findings

The purpose of this chapter was to present the information obtained from the survey conducted during this research project. The problem of this study was to determine how teacher training affected technology integration at Manteo Middle School. The first section of this survey will describe the respondents' demographic information.

Demographic Information of the Respondents

The entire faculty population at Manteo Middle School was surveyed, 35 staff members. Of the 35 staff members surveyed, 31 responded by the established deadline. The thirty-one teachers who returned the survey represented a usable return percentage representing 89 percent of the population. Seventy-one percent, or 22 of the 31 respondents, were female. Twenty-nine percent, or 9 of the 31, were male. See Table 1 for the overall survey demographic percentages.

Table 1			
Survey Demographics			
Gender of Respondents	Number Surveyed	Number Responded	Response Percentage
Male	9	9	100%
Female	26	22	85%
Total	35	31	89%

Survey Results

In the survey, the researcher received information from a series of fourteen multiple-choice questions and one open-ended question. These questions referred to aspects of teacher computer training and computer availability. Also, several questions focus on the respondents' attitudes toward technology's instructional uses.

Question one: How many computers are available to you in your classroom? At Manteo Middle School, twenty teachers, or 65 percent, answered that they have access to 2-4 computers in their classrooms with the next largest group of eight teachers, 26 percent, having access to 0-1.

Question two: How much technology training have you had? Twenty-one teachers or 68 percent responded that they had 4-6 years of technology training. Five teachers or 16 percent had 7-10 years of technology education/training.

Question three: Should Internet content for children be regulated by the sponsoring institution (i.e. schools, government, churches)? Twenty-nine teachers or 94 percent responded "yes." Six percent or two teachers responded "no."

Question four: Are you using the Internet for instructional purposes? Fifteen teachers or 48 percent said that they were using the Internet some for instructional purposes. Six percent or two teachers said they were using it a great deal. Fourteen teachers or 46 percent said they were not using the Internet at all.

Question five: If you have had training, what computer training did you enjoy the least? Twenty-six teachers or 85 percent responded that databases and spreadsheets were what they liked the least. Three teachers chose word-processing training as the type they liked the least.

Question six: If you have had training, what computer training did you enjoy the most? Internet use was the choice of 65 percent of the respondents or 20 teachers. Desktop publishing was the second most popular type of training with 13 percent of the teachers surveyed responding that they liked it.

Question seven: I integrate computer technology, such as research, word-processing, or desktop publishing, into my classes: Eighteen teachers or 58 percent responded that they integrated technology some. Four teachers or 13 percent said they integrate technology a great deal. Nine teachers or 29 percent said they did not integrate technology into their classes at all.

Question eight: I feel that to best use the technology available, we need: Eighteen teachers or 58 percent responded that we need more computers. Nine teachers or 29 percent said we need more software. Four teachers or 13 percent said we need more teacher training.

Question nine: The major problem that prevents my students from using the computers regularly is: Twenty-two teachers or 71 percent said that there were not enough computers. Nine teachers or 29 percent said there is not enough software.

Question ten: In my opinion, it's easiest to integrate technology into the: Ten teachers or 32 percent said it is easiest to integrate into the sciences. Sixteen teachers or 52 percent said it is easiest in the humanities. Five teachers or 16 percent said integrating technology is easiest in the exploratories, such as vocational-technical classes. None believed technology was easiest to integrate into mathematics.

Question eleven: What area of technology is the biggest problem for you? Seven teachers or 23 percent said that funding was the biggest problem. Twenty-four teachers or 77 percent said that scheduling user time on the available computers was their biggest problem. No one chose proper student and teacher training as the biggest problem.

Question twelve: Students use computers in my class: Nineteen teachers or 61 percent said that students use computers some. Ten teachers or 32 percent said students use computers a great deal. Two teachers or seven percent said that students do not use computers at all.

Question thirteen: My students use the computer most for: Fourteen teachers or 45 percent said that their students use word-processing the most. Two teachers or seven percent responded that their students use the computers for either research, desktop publishing, or Accelerated Reader/Academy of Reading. Ten teachers or 32 percent chose two or more of the answers.

Question fourteen: I use the computers most for: Eleven teachers or 35 percent answered that they used the computers most for grading. Seven teachers responded by choosing two or more of the item. Six teachers or 19 percent used e-mail the most, while five teachers or 16 percent used them for lesson planning. Seven percent used the computers for research.

Table 2 provides specific responses and statistical tabulations for each question in the survey.

Table 2 Survey Statistical Data			
Question	Responses	Percentage of Teachers	Number of Teachers
1. How many computers are available to you in your classroom?	a. 0-1 b. 2-4 c. 5-7 d. 8 or more	26 65 3 6	8 20 1 2
2. How much technology training have you had?	a. 0-3 years b. 4-6 years c. 7-10 years d. 11 or more years	16 68 16 0	5 21 5 0
3. Should the Internet for children be regulated by the sponsoring institution?	a. yes b. no	94 6	29 2
4. Are you using the Internet for instructional purposes?	a. some b. a great deal c. not at all	48 6 46	15 2 14
5. If you have had training, what computer training did you enjoy the least?	a. word processing b. database and spreadsheet c. e-mail d. Internet use e. desktop publishing	9 85 0 3 3	3 26 0 1 1
6. If you have had training, what computer training did you enjoy the most?	a. word processing b. database and spreadsheet c. e-mail d. Internet use e. desktop publishing	9 0 13 65 13	3 0 4 20 4
7. I integrate computer technology, such as research, word-processing, or desktop publishing, into my classes:	a. some b. a great deal c. not at all	55 29 16	17 9 5
8. I feel that to best use the technology available, we need:	a. more computers b. more teacher training c. more software	58 13 29	18 4 9
9. The major problem that prevents my students from using the computers regularly is:	a. not enough computers b. not enough software c. not enough teacher training	71 29 0	22 9 0

Table 2 Survey Statistical Data (continued)			
Question	Responses	Percentage of Teachers	Number of Teachers
10. In my opinion, it's easiest to integrate technology into the:	a. Sciences b. Humanities c. Exploratories d. Mathematics	32 52 16 0	10 16 5 0
11. What area of technology is the biggest problem for you?	a. funding b. scheduling user time on the available computers c. proper student and teacher training	23 77 0	7 24 0
12. Students use computers in my class:	a. some b. a great deal c. not at all	61 32 7	19 20 2
13. My students use the computers the most for:	a. research b. word-processing c. games d. desktop publishing e. Accelerated Reader/Academy of Reading other = two or more choices were chosen	7 45 2 7 7 32	2 14 1 2 2 10
14. I use the computers the most for:	a. grading b. research c. lesson planning d. e-mail e. games other = two or more choices were chosen	35 7 16 19 0 23	11 2 5 6 0 7

Observations' Results

Twenty classes were also observed to evaluate and interpret exactly how technology was being used and integrated. In the context of these observations, several factors were observed. The type of technology being used, the learners' reactions and self-correction techniques, the teacher's

delivery style, the teacher's correction of the learners, the date, the class subject, and the number of students were noted. Appendix C contains an example of the data sheet used to record this information.

Out of the twenty classes, differing forms of computer technology (i.e., word-processing, instructional games, desktop publishing, computer-based training, and Internet research) were used in seventeen of the twenty observed classes. Of the technology used, in the seventeen classes in which it was used, seven classes were exploratories, seven were reading remediation, one was a science class, and two were language arts. In the three classes in which technology was not used, two were mathematics and one was a science class.

In each of the classes in which technology was used, the entire period was devoted to rotating students on and off the available computers. The students not on the computers were working in other center-based activities during the rest of the class period. In the classes in which technology was used, the average number of students per class was sixteen. In the classes in which technology was not use, the average number of students increased to twenty-six. A student's time on the computer averaged to fifteen minutes during a rotation and thirty minutes if all the students were in the computer lab and on the computers

simultaneously. See Table 3 for specific number of students per observed class.

Table 3 Observed Classes' Statistical Data		
Class/Subject	Number of Students	Type of Technology Used
1. Language arts	25	Word-processing
2. Science	24	Research with on-line encyclopedia
3. Language arts	26	Word-processing
4.-6. Keyboarding	15	UltraKey computer-based training, word-processing
7.-10. Technology education	15	Instructional games, computer-aided drafting, bridge building software, other design programs
11.-17. Reading remediation (Title I)	12	Academy of Reading computer-based training
18. Mathematics	26	None
19. Mathematics	28	None
20. Science	22	None

Since the lower number of students seemed to prompt more usage of the computer technology available, it can be assumed from the data in the survey and the observations that a major problem is that scheduling user time on the available computers is difficult for a large class. With many classes containing above the average of twenty-six students, it may

be difficult for these classes to schedule enough time for each student to use the computers.

Summary

The data collected from the study of how teacher training and computer availability affected technology integration was presented in Chapter IV. After the data was tabulated, an overall choice for each answer was examined. Then, all of this information was transferred into tables to assist with interpretation, evaluation, and synthesis. Information from the observations was also evaluated, then compared to the survey data. Results from the survey and observations indicate that computer availability and scheduling user time are the main problems, or weaknesses, for integrating technology at Manteo Middle School. Results for teacher and student training indicated that training and classes in technology at Manteo Middle School are strengths.

CHAPTER V

Summary

The problem of this study was to determine how computer availability and teacher training affected technology integration at Manteo Middle School. This chapter summarizes the study, concludes the findings and goals, and recommends changes and additions for future studies based on the findings.

Educational technology initiatives are expanding rapidly and understanding the strengths and weaknesses associated with the process of integrating technology successfully is imperative. This study was conducted to discover how teacher training and computer availability affected technology integration at Manteo Middle School. The success of technology integration depends primarily on the regular classroom teachers who see the largest percentage of the student population. By providing integration of technology in all classes, students are more likely to spend a higher amount of time using computers than if the computer time is available in only a limited group of classes. This study focused its observations and surveys on a majority of teachers at Manteo Middle School.

In order to complete this study several goals were established. This study explored research in three areas. These goals were to determine:

1. The students' and staff members' training in the uses of several types of computer technology,
2. The strengths and weaknesses of Manteo Middle School's integration of technology, and
3. Why certain types of technology were not being utilized as much as was expected.

A survey consisting of fourteen multiple-choice questions and one open-ended question was compiled and distributed to the staff at Manteo Middle School. To organize the results for analysis, the researcher tabulated the results manually and analyzed the average percentages for each of the multiple-choice questions. Of the 35 staff members at Manteo Middle School, 31 responded establishing an 89 percent return rate.

Since this study was limited to the technology integration at Manteo Middle School, a review of other literature concerning this study was necessary. Factors encountered in this study were found to be consistent with what other schools around the United States were experiencing.

Conclusions

From observing a middle school population and surveying the faculty at this school, several conclusions can be drawn. The findings about class size and amount of computers available can radically alter

how effectively technology is integrated in a school. The observations and surveys indicated that technology was integrated into the humanities the most and mathematics the least. Through adequate and appropriate staff development, teachers can be taught how to use the available computers for a variety of subjects. The following factors need to be carefully considered when discussing successful technology integration:

1. Amount of Teacher Training
2. Class Size
3. Type of Software and Hardware Available
4. Scheduling of User Computer Time

These factors were discovered in tabulating the survey responses and observing classes in which technology was being integrated successfully.

In conclusion, more computer availability in regular classrooms and careful scheduling of user time on the computers will help teachers integrate technology more. Having teachers from other districts conduct staff development in how they have successfully integrated technology would be one way of showing teachers how to effectively use scheduling through rotation techniques. Looking for ways to integrate technology and showing others how to do it is something every educator needs to do.

The first goal of the study was to determine how teacher and student training affected technology integration. According to the survey questions (numbers two, eight, nine, and eleven), teacher and student training were not considered to be negative factors in determining the success of technology integration at Manteo Middle School because training was superior.

Goal two was to determine the strengths and weaknesses of the technology integration at Manteo Middle School. Factors most affecting technology use were having enough computers available and easily accessible, scheduling user time on the computer, and having the appropriate software available and properly installed. The strengths of the program were the willingness of staff and students to use the various forms of available technology whenever possible and the staff and student technology training.

The study's third goal was to determine why certain types of technology were not utilized as much as was expected. From the surveys and observations, the statistical findings about technology integration determined that Internet use and technology use in math and science was affected negatively by large class sizes, lack of appropriate software for these courses, and computer availability problems.

Focusing on those classes in which little to no technology use is occurring should be the focus of staff development for next year. Teacher technology training is a strength, but getting all students in a large class working on the computers is not. Software should be purchased to help integrate areas, such as science and mathematics, which are not currently integrating computer technology.

Recommendations

Based on the findings, observations, and conclusions in this study, recommendations are made to improve Manteo Middle School's technology integration. For future studies of how to integrate technology successfully, the findings indicate that:

1. More informal and formal observations should be conducted.
2. A different type of survey may get more realistic results, such as one with a Likert Scale divided into specific problem sections because using a Likert Scale survey is easier to statistically analyze. Also, it may yield a more accurate picture of how people feel.
3. More observations and surveys should have been conducted in a larger sample of classes and teachers across the school district and state.

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Appendices

- Appendix A. Sample Cover Letter and Survey**
- Appendix B. Graphs of Survey Data by Question**
- Appendix C. Sample Observation Sheet**
- Appendix D. Observation Summaries**

Appendix A

Sample Cover Letter and Survey

April 20, 1998

Dear Manteo Middle School Staff Member,

You are being asked to complete a fifteen-question survey concerning technology integration at Manteo Middle School. Because my research is focusing on just Manteo Middle School, your prompt response to this survey is critical for the survey's validity. I am pursuing my Masters degree in technology education and need to know what factors affect the integration of technology at Manteo Middle School.

Please take a few minutes today to complete the survey given to you by your team leader. When you have finished it, place it in my mailbox in the teachers' lounge. Thank you very much for your participation!

Sincerely,

Laura J. Hummell
Manteo Middle School Teacher
ODU Graduate Student

Technology Integration Survey

**Please complete the following survey and return it to Laura Hummell's mailbox by
April 30, 1998. Thank you!**

1. How many computers are available to you in your classroom?
 - a. 0-1
 - b. 2-4
 - c. 5-7
 - d. 8 or more

2. How much technology training have you had?
 - a. 0-3 years
 - b. 4-6 years
 - c. 7-10 years
 - d. 11 or more years

3. Should Internet content for children be regulated by the government?
 - a. Yes
 - b. No

4. Are you using the Internet for instructional purposes?
 - a. Some
 - b. A great deal
 - c. Not at all

5. If you have had training, what computer training did you enjoy the least?
 - a. word processing
 - b. database and spreadsheet
 - c. e-mail
 - d. Internet use
 - e. desktop publishing

6. If you have had training, what computer training did you enjoy the most?
 - a. word processing
 - b. database and spreadsheet
 - c. e-mail
 - d. Internet use
 - e. desktop publishing

7. I integrate computer technology, such as research, word-processing, or desktop publishing, into my classes:
 - a. Some
 - b. A great deal
 - c. Not at all

8. I feel that to best use the technology available, we need:
- a. more computers
 - b. more teacher training
 - c. more software
9. The major problem that prevents my students from using the computers regularly is:
- a. not enough computers
 - b. not enough software
 - c. not enough teacher training
10. In my opinion it's easiest to integrate technology into the:
- a. sciences
 - b. humanities
 - c. exploratories
 - d. mathematics
11. What area of technology is the biggest problem for you?
- a. funding
 - b. scheduling user time on the available computers
 - c. proper student and teacher training
12. Students use computers in my class:
- a. Some
 - b. A great deal
 - c. Not at all
13. My students use the computers the most for:
- a. research
 - b. word-processing
 - c. games
 - d. desktop publishing
 - e. Accelerated Reader/Academy of Reading
14. I use the computers the most for:
- a. grading
 - b. research
 - c. lesson planning
 - d. e-mail
 - e. games
15. What would you like to learn about technology? (optional)

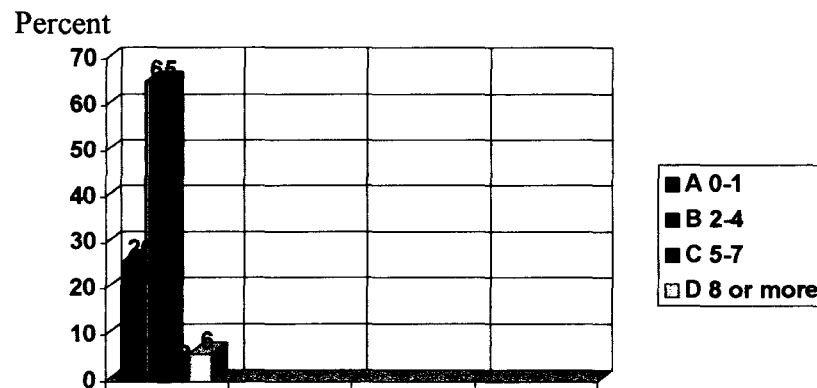
Other Comments or Suggestions:

Appendix B

Graphs of Survey Data by Question

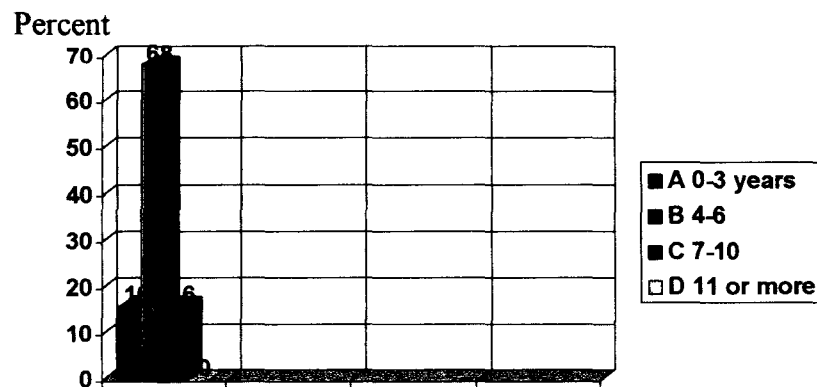
Question 1

How many computers are available to you in your classroom?



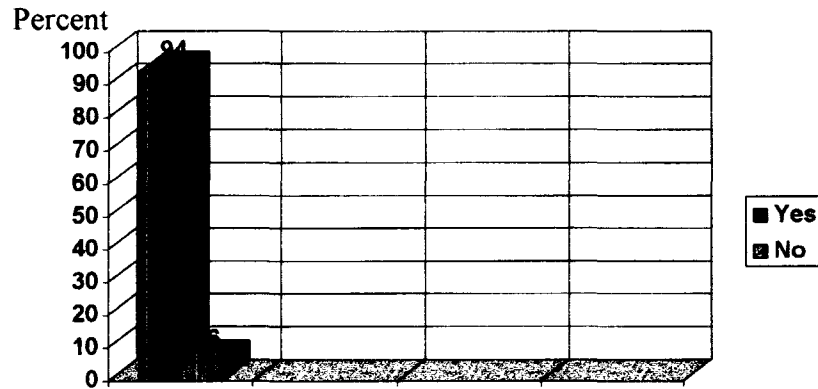
Question 2

How much technology training have you had?



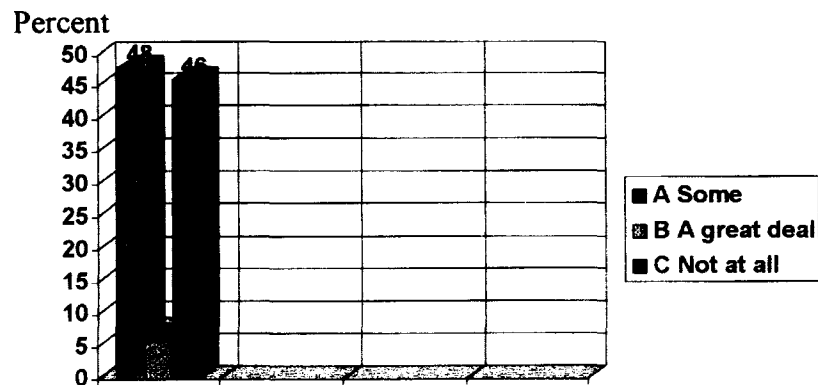
Question 3

Should Internet content for children be regulated by the sponsoring institution (i.e. schools, government, churches)?



Question 4

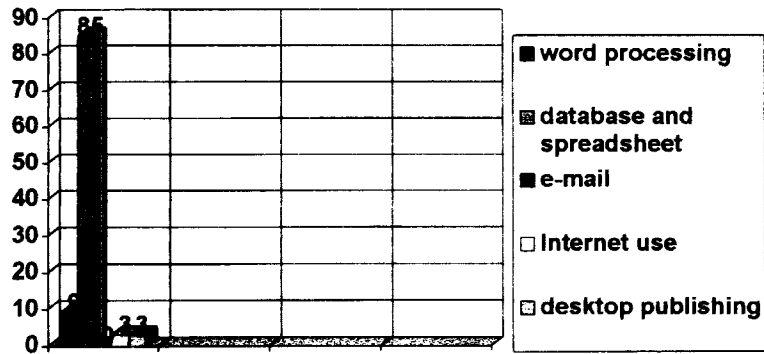
Are you using the Internet for instructional purposes?



Question 5

If you have had training, what computer training did you enjoy the least?

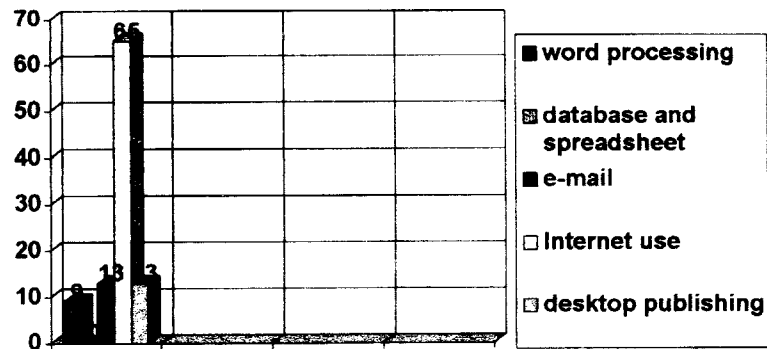
Percent



Question 6

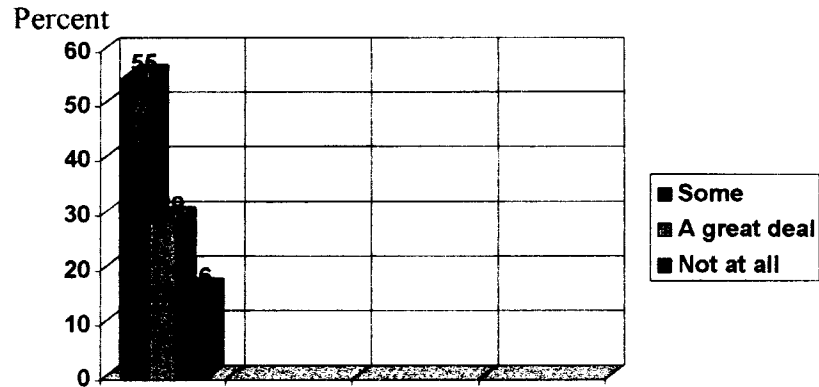
If you have had training, what computer training did you enjoy the most?

Percent



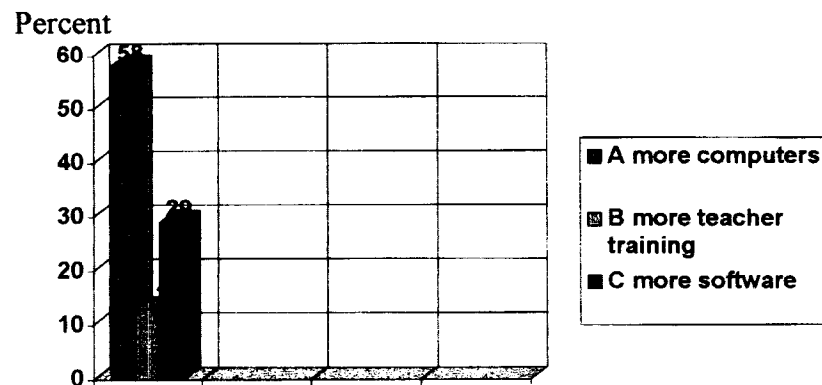
Question 7

I integrate computer technology, such as research, word-processing, or desktop publishing, into my classes:



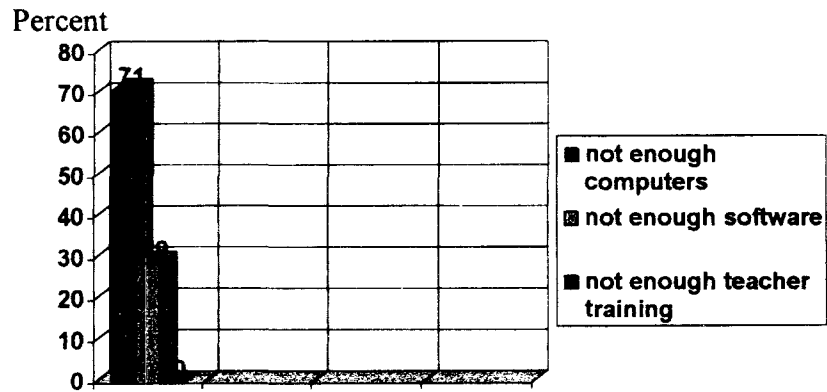
Question 8

I feel that to best use the technology available, we need:



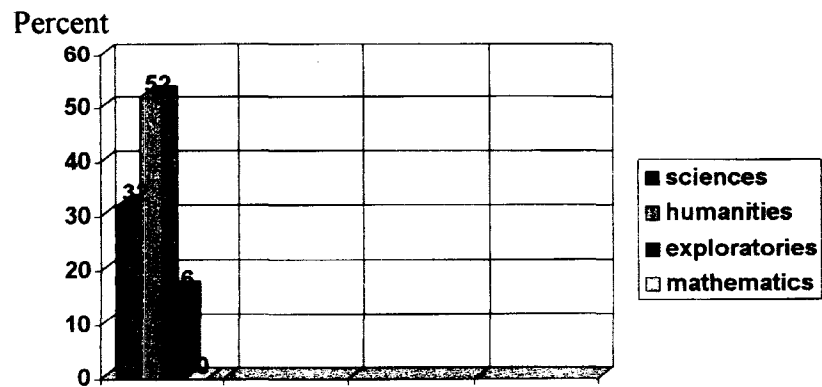
Question 9

The major problem that prevents my students from using the computers regularly is:



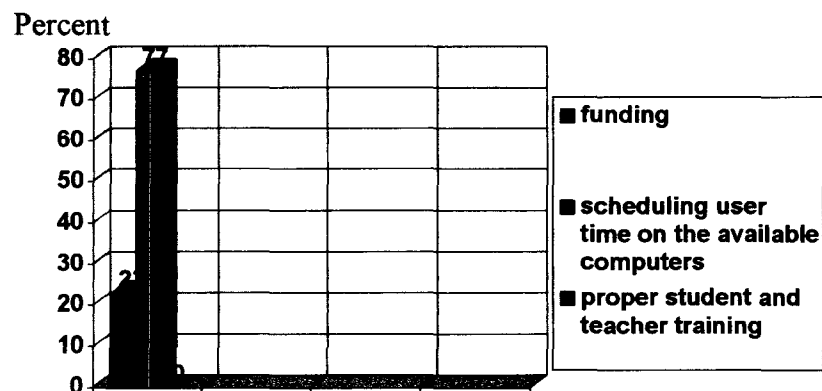
Question 10

In my opinion it's easiest to integrate technology into the:



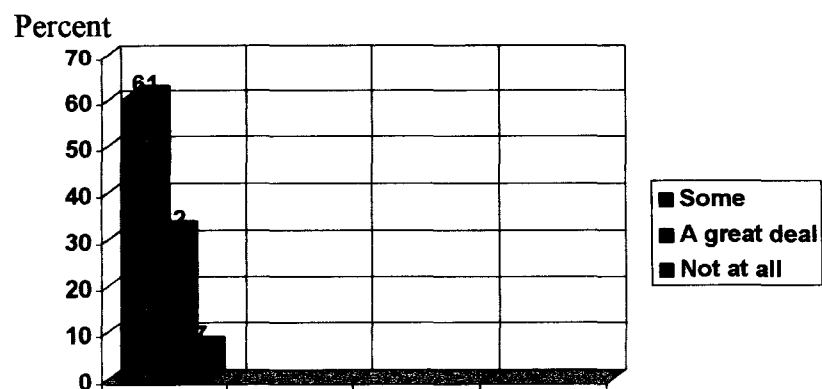
Question 11

What area of technology is the biggest problem for you?



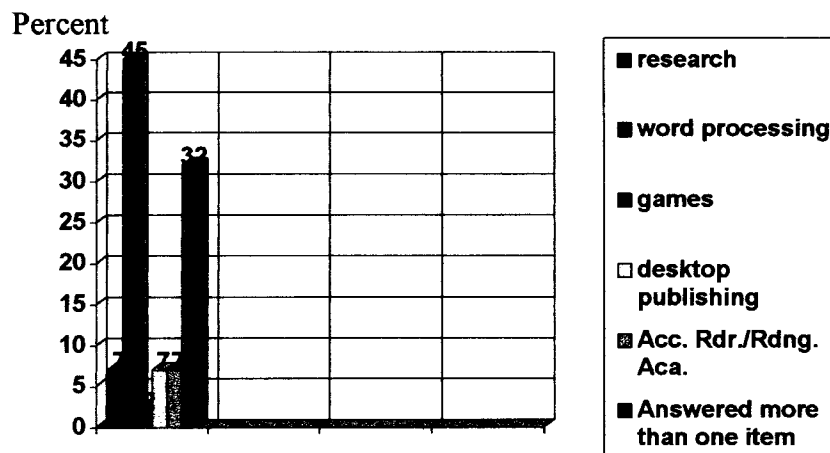
Question 12

Students use computers in my class:



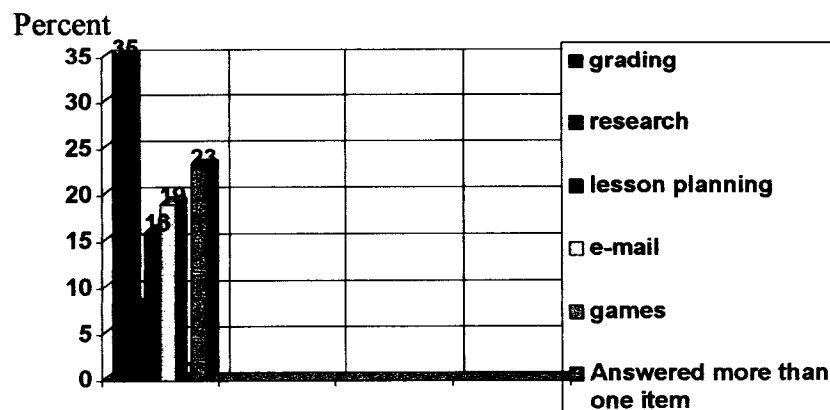
Question 13

My students use the computers most for:



Question 14

I use the computers most for:



Appendix C

Sample Observation Sheet

[illegible]

Appendix D

Observation Summaries

Observation Summaries

Class	Subject	Observed Integration of Technology
#1	Language Arts 7	Twenty-five students rotating on four computers in regular classroom using word-processing software. Self-correction primarily.
#2	Science 8	Students using <i>World Book</i> on-line encyclopedia for research. Twenty-four students rotating on four computers. Self-correction only.
#3	Language Arts 6	Twenty-six students rotating on four computers in regular classroom using word-processing software and Accelerated Reader testing software. Self-correction primarily, some teacher correction when requested by the individual student.
#4	Keyboarding 6	Exploratory class with 15 students all on classroom computers simultaneously. Word-processing and UltraKey software used. Teacher correction mostly, some self-correction by students of proper typing techniques.
#5	Keyboarding 6	Exploratory class with 15 students all on classroom computers simultaneously. Word-processing and UltraKey software used. Teacher correction mostly, some self-correction by students of proper typing techniques.
#6	Keyboarding 6	Exploratory class with 15 students all on 15 classroom computers simultaneously. Word-processing and UltraKey software used. Teacher correction mostly, some self-correction by students of proper typing techniques.

#7	Technology Education 6	Fifteen students rotating on four classroom computer stations. Using Computer Aided Drafting (CAD) software, Bridge Builder, or other design programs. Teacher correction primarily.
#8	Technology Education 6	Fifteen students rotating on four classroom computer stations. Using Computer Aided Drafting (CAD) software, Bridge Builder, or other design programs. Teacher correction primarily.
#9	Technology Education 6	Fifteen students rotating on four classroom computer stations. Using Computer Aided Drafting (CAD) software, Bridge Builder, or other design programs. Teacher correction primarily.
#10	Technology Education 6	Fifteen students rotating on four classroom computer stations. Using Computer Aided Drafting (CAD) software, Bridge Builder, or other design programs. Teacher correction primarily.
#11	Reading Remediation 6 (Title I program)	Twelve students rotating on four classroom computer stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.
#12	Reading Remediation 6 (Title I program)	Twelve students rotating on four classroom computer stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.

#13	Reading Remediation 6 (Title I program)	Twelve students rotating on four classroom computer stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.
#14	Reading Remediation 6 (Title I program)	Twelve students on twelve computer lab stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.
#15	Reading Remediation 6 (Title I program)	Twelve students on twelve computer lab stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.
#16	Reading Remediation 6 (Title I program)	Twelve students on twelve computer lab stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.
#17	Reading Remediation 6 (Title I program)	Twelve students on twelve computer lab stations using computer based training software (Academy of Reading). Computer based correction and teacher correction primarily.
#18	Math 8	No technology integration observed. 26 students.
#19	Math 7	No technology integration observed. 28 students.
#20	Science 7	No technology integration observed. 22 students.