

**COMPUTER APPLICATIONS AS A HIGH SCHOOL
GRADUATION REQUIREMENT**

By

Keith G. Stone

A Research Paper

**Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
With a Major in**

Education

Approved: 2 Semester Credits

Investigation Advisor

**The Graduate College
University of Wisconsin-Stout
July, 2001**

**The Graduate School
University of Wisconsin-Stout
Menomonie, WI 54751**

ABSTRACT

_____	Stone	Keith	G.
(Writer)	(Last Name)	(First Name)	(Initial)
<u>COMPUTER APPLICATION AS A HIGH SCHOOL GRADUATION REQUIREMENT</u>			
(Title)			
M.S. in Education	Dr. Ed Biggerstaff	July, 2001	33
(Graduate Major)	(Research Advisor)	(Month/Year)	(No. of Pages)
<u>American Psychological Association (APA) Format</u>			
(Name of Style Manual Used in this Study)			

Computer use in the educational setting is a topic of much research, teacher concern, and debate at the national, state, and district level. Topics of concern include, course requirements regarding computer applications, teacher training in computer use, the digital divide gap among high schools, and the uses of computer applications after graduation

The purpose of this study was to review, analyze and critique literature and statistics on the usefulness of computer knowledge for graduating high school seniors. The information found in this study was used to help determine if a computer applications course should be a

graduation requirement. This information was presented to the Site Based Decision Making Council at Bryan Station High School for the purpose of deciding future recommendations for the curriculum, involving computer courses. It was recommended that the Fayette County Public School district add a computer applications course to the existing graduation requirements; that the district become more involved in the training of teachers in the uses of computers in the classroom setting; that each high school employ an on-site technology coordinator to assist with the implementation of technology in the curriculum; and, that the each high school in the district possess the same computer systems.

Acknowledgements

Thank you to the Fayette County Public School District and Al Kennedy for allowing me to complete a Masters degree through the University of Wisconsin-Stout.

To Dr. Ed Biggerstaff, thank you for your excellent guidance and support in the completion of this project. Thanks to Jill Stanton for your patience and help with this entire process.

Finally, to David Aiken, a colleague at Bryan Station High School, thank you for your support, help, and encouragement. Without you the completion of this project would have never been possible.

Table of Contents

	<u>Page</u>
<u>Abstract.....</u>	<u>I-II</u>
<u>Acknowledgements.....</u>	<u>III</u>
Table of Contents.....	IV
<u>Chapter I Introduction.....</u>	<u>1-3</u>
Purpose of study.....	3
<u>Chapter II Review of Literature.....</u>	<u>4-24</u>
Data, Statistics and Views	4-6
Computer Applications and Uses in the Classroom	6-10
Criticism of Computer Use	10-13
The Digital Divide	13-16
Teacher Training.....	16-20
Future of Computers in Schools	20-22
Computer Uses after High School	22-23
Conclusion	23-24
<u>Chapter III Summary, Conclusions, and Recommendations.....</u>	<u>25-29</u>
Summary.....	25-26

Conclusions.....	26-27
Recommendations.....	27-29
Bibliography	30-33

CHAPTER 1

Introduction

Graduation and course requirements are a major issue facing education today. Many people believe the basics, math, science, social studies and language arts, should continue to be the only requirements for high school seniors graduation. High School educators' main objective is to prepare students to be successful, whether they choose to go on to higher education or enter the work force. Are schools preparing students for this by only requiring the basic classes that have been taught for many years? Should districts look at curriculum requirements and decide it is time for a change for the benefit of the students?

The world is rapidly changing and society is becoming more technologically complex. Due to this change, students will need to be introduced to "new" course requirements and be required to take different courses than in the past (Kurubacak 1998). Some research suggest that by the year 2000, 60% of the nations jobs will require computer skills and pay 10% to 15% more than jobs not requiring computer skills (Oppenheimer 1997). The Business community wants seniors to graduate with the technological skills needed to perform in today's Business World (Microsoft Press 2000). Could school districts help meet this objective by requiring students take a computer applications course?

Will students that take a course in computer applications have an easier time succeeding after high school? Will students who do not plan to work in the computer field benefit from

taking a computer applications course? Studies indicate that students choosing to go on to higher education will have the benefit of using a computer as a word processor to prepare documents, papers and reports. Second, research reveals, college student's time will be saved and research will be made easier for them with the use of the Internet. Computers can be used as a form of desktop publishing for college students. This allows students to venture into other areas such as advertisement and conducting a simple job search.

A question that must now be answered is "What benefit is computer applications to current high school students who are not seniors?" Eighty nine percent of teenagers use a computer at least three times a week. Today, more and more students have access to a computer at home. This does not make them experts; they will need instruction on how to use a computer as a tool and a resource. Will computer applications help show an improvement in student performance? Will the requirement of computer applications help develop a positive attitude for students about the world of technology? What about students who are not economically fortunate enough to have access to a computer at home? Is it fair to require these students to take a required course in which they are not able to work on at home? Or, is it an opportunity they have to acquire skills that they would not otherwise have a chance to? The answers to these questions will help determine the future of course requirements for graduation.

Other questions arise to requiring computer applications for graduation. Will putting students in computer courses distract them from other courses? With all the information

available, will introducing students to the Internet have a negative impact? What will the costs be to a district to stay upgraded with changing software? Software changes on the average every two to three years. Will teachers need to be retrained every two to three years to stay up to date with the rapid changing software? Although software is rapidly changing, today's upgrades make the transition to a new package very simple. Are students obtaining enough computer skills in elementary and middle school that they will not need a computer class in high school? These questions will need to be addressed before any recommendations are made to the Site Based Decision Making Council involving computer applications as part of the curriculum requirement.

As millions of dollars are spent on technology in the schools, major decisions need to be made about how students are to use it to become successful upon graduation. Districts need to look at the impact computers have on society and decide how much knowledge they want student leaving with. In the past, views concerning computers and the Internet have varied as either a luxury or a necessity. When looking at computer applications in the high school curriculum, societies expectations and economic conditions must be looked at. After the issues above have been addressed, will the needs of all students be met to prepare them to be successful citizens, either in the work force or pursuing a higher education?

Purpose of Study

The purpose of this study is two fold. First, review, analyze and critique literature and data on the usefulness of computer applications and knowledge for graduating high school seniors. Second, to use the information found in the literature and present it to the Site Based Decision Making Council at Bryan Station High School for the purpose of helping determine future recommendations for the curriculum involving computer courses.

CHAPTER 2

Review of Literature

The computer as an educational tool has grown in the last fifteen years. Computers that once took up a room are now available in laptop and palm versions. Information that was once punched out on index type cards can now be stored on even smaller floppy disk and CD-ROMs. Computers are now affordable to average income families and are commonplace with in all school districts. Now that computers are the norm in most schools, one needs to step back and study their use. It needs to be determined if they are aiding students in the educational process and preparing high school graduates for the next level of their life, either pursuing a higher education or entering the work force. It will be concluded in this paper that computer applications can benefit the educational process and are an essential skill for high school students upon graduation.

The first focus of this chapter will discuss data, statistics, and views of children concerning computers. Then computer applications and uses in the classroom, as well as, criticisms of computer use by students will be shared. The research on the "Digital Divide", which is the inability of parents/districts to provide equal access/training to students from lower socioeconomic backgrounds, will be discussed. Next teacher training in area of computer

technology and the future impact of computers in the educational setting will be explored.

Finally, the uses of computer applications for students, after graduating from high school will be discussed.

Data, Statistics, and Views

Computers have become a common component of today's society. Children today have grown up using computers in school and at home. About 42% of adults overall say there is a personal computer in their home (Hall, 1998). Not long ago computers were considered to be expensive and complicated machines, now even children are using computers more frequently than ever. A study of teens by Newsweek concluded "89% of teens use a computer at least 3 times a week" (Teenagers and Technology, 1997). The Internet has had a major influence on children's use of computers. More than 9.8 million children are using the Internet, a number that is expected to triple in the next four years (Stone, 1998). In a recent poll by CNN and USA Today, 28 % of teens said they could live without their TV, but only 23 % said they could get by without a computer (Stone, 1998). The number of children using computers is higher than ever, and that number will only continue to grow.

Children not only see computers as a means to surf the Internet, e-mail friends and play games, but also the impact they can have on their education and their life. Children are beginning to use computers for educational purposes more in the last fifteen years. According to the National Center For Education Statistics: In 1996, 96 % of high school juniors reported using

a computer at home to write stories or papers, this is up from only 19 % in 1984 (U.S. Department of Education, 1998). The study by Newsweek also found that "92% (of teens) think computers will improve their educational opportunities; almost as many think that technology will create better jobs in the future and help us live longer healthier lives" (Teenagers and Technology, 1997). Younger children are also having positive thoughts about using computers for educational purposes. According to Technology Counts 2001, 66 % of students said computers help them learn and 88 % believe computers are "extremely" or "very" important for career success (Doherty and Orlofsky, 2001). Students are also finding that computer skills are important to their success in the future. In 1995 the American Association of School Administrators published the results of a survey that ask students to rank skills they felt would be important upon graduating high school (Healy, 1998). Computer skills and media technology ranked third in a list of sixteen possibilities, outvoted only by "basic skills" (reading, writing, and math) and "good work habits", considerably down the list were "knowledge of history and geography" and "classic works" such as Shakespeare and Plato (Healy, 1998). Children today value a computer as a resource that can enhance their education and help them achieve success in the future. Research shows that children have positive views about using computers for educational purposes as well as leisure and implementation of computer use in school settings, is paramount to further this trend.

Computer Applications and Uses in the Classroom

As the development of the personal computer has evolved, arguments have been made about the potential of computers as educational tools. According to Derrick Walker, an educational researcher, "The potential of computers for improving education is greater than that of any prior invention, including books and writing" (Healy, 1998). The use of computers in schools has grown immensely in the last decade. Seymour Papert proposed, "...that computer environments can provide materials and subjects that develop and refine children's thinking skills" (Matos 2000). Thus the use of computers as educational tools for teachers and students is imperative in today's classroom.

Computers have become a very valuable tool in helping teachers perform day-to-day required tasks such as, test, homework assignments, and presentations for classroom instruction and discussion. Much of a teachers work today involves record keeping, looking for new information, providing classroom instruction, and designing teaching materials. Therefore most schools are networked with grade and attendance software programs such as intergrade pro, teacher classroom module and classXP. The software programs, relating to attendance, require teachers to record daily attendance on the computer, which is then made available to attendance clerks and administrators. The grade software requires teachers to enter student's scores on the computer and the software will calculate the average and assign a letter grade for each student. This saves time for teachers since they no longer have to calculate each student's grade on an individual basis. Desktop publishing programs, such as Microsoft Publisher, allow teachers to

create professional looking newsletters, flyers, brochures, and award certificates. Word processing programs, such as Microsoft Word and Word Perfect, provide the ability to easily create and modify tests, handouts, and worksheets. Web page design software such as Microsoft Frontpage helps to create and maintain web sites for students to access homework assignment and announcements. Presentation software such as Microsoft Powerpoint and Hyper Studio, are multimedia vehicles that may be modified for different classes or new school years. The Internet is a means by which teachers can quickly access information, opposed to using more traditional methods, which were more time consuming and difficult to locate. The increased use of e-mail to communicate has saved teachers valuable time. Teachers can now communicate with parents via e-mail on a daily basis, thus eliminating the effort it takes to contact parents by phone. E-mail has now become a primary source of communication between faculty and administration. In conclusion, computers have helped save time for teachers and enhanced them as professional educators.

While computers have helped teachers with day-to-day tasks; students are also able to use computers as a valuable educational tool. Computers have now replaced the typewriter and traditional "typing" classes are becoming extinct. Students now learn "keyboarding" skills in elementary school. However research has concluded that children do not have the eye-hand coordination to learn keyboarding earlier than grade 4 (Hopkins, 1998). Never the less, it is good for students to get familiar with the keyboard before this age. Younger students can

become familiar with typing commands using keyboarding simulation programs such as Microtype Pro and Mario Teaches Typing.

The most common computer applications used by students for educational purposes are word processing, spreadsheets, database, Internet, and multimedia (Kurubacak, 1998). Word processing programs are designed for students to create printable documents, with various formatting features, that can be saved and modified. Spreadsheets are computerized, numerical, record keeping systems that are general-purpose programs for processing numerical textual data (Kurubacak, 1998). Students can use spreadsheets to solve a variety of problems by filling in numbers and formulas. Databases are special purpose programs that are designed to meet the specific needs of a particular application or general-purpose program (Kurubacak, 1998). Database programs allow students to retrieve information in a rapid and independent manner. By using a database students can organize and reorganize information to answer specific questions.

The use of multimedia for instruction and learning is becoming increasingly popular. Multimedia is defined as, using basic elements such as the combination of text, sound, graphics, and video to present material (Kurubacak, 1998). The concept of multimedia has been around long before computers, it was originally designed to deliver instruction with aides such as a filmstrip or a VHS video. With today's technological advances, multimedia technology can bring authentic settings into classrooms, and only recently have these technologies been

integrated into desktop computers. Multimedia materials can be highly motivating, and interactively reinforce the learning process (McCarthy, 1999). Multimedia can help provide a rich environment for student / teacher interaction and learning. Both teachers and students in the classroom setting can use multimedia. Teachers can use it for presentations and to provide opportunities to bring real life scenario possibilities to the classroom. The use of multimedia in the classroom can be motivating and provide a comfortable interface for students to work and express themselves creatively (McCarthy, 1999). Multimedia technology has developed from the educational relic of a hard cover encyclopedia on a shelf to a perceptible version with sound, video clips, and an electronically searchable database. Both resources contain the same material the students may need, however with the use of multimedia the students have better opportunity for an authentic situation to be simulated.

The Internet is the world's largest computer based communication network and is especially useful in the classroom. This global communication system allows computers to share and exchange information and data. (Merrill, 1996, cited in Kurubacak, 1998). According to the National Center for Education Statistics, 35 % of public schools in the United States had access to the Internet in 1994, by the fall 2000, 98 % were connected to the Internet. In 1994, 3 % of all U.S. public school instructional rooms were connected to the Internet; by 2000 77 % were connected. The Internet can be used in a number of ways to enhance teaching and learning. Students can use the Internet to retrieve information online, especially for supporting research

papers. E-mail can provide an opportunity for students to communicate with others from various cultural and socio economic backgrounds. Bulletin and Message boards provide students the opportunity to read, reply and copy messages that focus on specific topics. Web sites allow users to obtain information, documents, and multimedia resources that are accessible from any Internet ready computer. The Internet is a network that students enjoy using, even as an educational device. Student value the tasks that computers allow them to complete for school assignments, particularly when it comes to doing research via the Internet (O'Riordan, 1999). According to David Warlick (2001), in the article "Raw Material for the Mind," the most common advantages teachers list for using the Internet are:

- Information from the Internet can be more current
- The Internet includes obscure information that is not always available in a school media center or public library.
- Information from the Internet comes from a variety of perspectives.
- Information from the Internet can be portrayed in a variety of formats: Text, images, animation, sound, video and others.

Additional teachers may use the Internet to find lessons from other educators, enhance and modify already existing lessons, and stay up-to-date in their area of expertise. Although teachers are using the Internet more frequently in the classroom, they do not see it as a replacement for traditional texts, but as an additional resource (Karchmer, 1998). The Internet

has only been in the classroom for a little over five years. In that time is, it has had a profound effect on teaching and learning throughout the world. What will the test of time bring?

Criticism of Computer Use

While the uses of computers in schools and in the classrooms continue to become more widespread, literature opposing the uses of computers also continues to expand. The criticism mainly focuses on the effects of computers on basic writing skills, the uses of the Internet, and their impact on social interaction and creativity skills.

Computer opponents often look at basic competencies such as spelling and writing. These opponents ask the question "...how much should we allow for electronics to substitute for basic competencies?" (Healy, 1998). Software tools that check spelling, grammar, and suggest replacements for both, are not helping children achieve these skills in the traditional manner. They simply look at the computer screen to see if any suggestions are made and click to replace a poorly structured sentence or misspelled word. A middle school student summed up how she uses the computer to write papers, "I love computers because for one thing I can get words down faster, but for another reason I have bad handwriting and lousy spelling and when I type on the computer I don't have to take a long time to work on them..."(Healy, 1998). A basic truth in education is that a child must be literate before he or she is computer literate (Learning in the Real World, 1999). Teachers are beginning to see the negative effects of computer use in the classroom. An English teacher, who could readily tell which of her students' essays were

conceived on a computer, complained, "They don't link ideas, they just write one thing and then they write another one, and they don't seem to see or develop a relationship between them" (Oppenheimer, 1997). The final adverse impact that computers have on the writing process is the students' lack of attention to content. Children are more concerned about the appearance of their work and not the content (Healy, 1998). Children are not being taught to think properly, as their writing priorities should be reversed.

Criticism of Internet use in schools is a major concern facing computers in the classroom. One concern is the amount of advertisements introduced to students using the Internet. According to Stoll, it is impossible to browse the web without seeing a steady flow of advertisements (Cited in Oppenheimer, 1997). One of the most insidious practices of Internet companies, is that of building personal, interactive relationships with children on-line to directly sell them products and gain personal information for future target marketing (Healy, 1998). This advertisement and solicitation occurs on most search engines that children use to locate information on the World Wide Web. Access to these ads only requires one click that will take the user directly to the site where the user's information is often stored on a database and used for future mailings.

Another criticism of Internet in the classroom concerns the information that is available. With all the free information that children use for educational purposes there is an equal amount of misleading information that confronts students with danger. According to Stephen Kerr, a

professor at the College of Education at the University of Washington, "The Net's beauty is that it is uncontrolled, it is information by anyone for anyone," (Cited in Oppenheimer, 1997). Kerr goes on to give examples of what can be found on the Internet; things such as hate-group information, bomb recipes, how to engage in various kinds of crimes, electronic or otherwise, as well as, scams and swindles. The Internet offers a wealth of information on almost any subject to the researcher. Kerr states that under close inspection much of the information proves to be ill informed or just superficial. That is the antithesis of what children should be exposed to (Kerr cited in Oppenheimer, 1997)

Proponents of computers in the classroom have concerns that they are affecting children's ability for creativity and social skills. In the classroom setting, educators teach, explore and learn patterns of connection to real world objects like people, plants, animals, and places (Learning in the Real World, 1999). According to the article, "Computers Role in Education," if educational software attempts to deal with these crucial concepts, the limitations on the media may make the presentation inflexible, superficial, and inadequate. No computer can simulate the feeling of a walk through a pine forest, as sensation has no substitute (Stoll, cited in Oppenheimer 1997). Teachers have expressed concern that computers are acting as substitutes for the real life experiences being taught in the traditional classroom. Students are learning to manipulate software instead of learning to solve actual problems. Simulations are built on assumptions, many of which are oversimplified (Turkle, cited in Oppenheimer, 1997). Turkle's

concern is that these simulations are dulling the students' sense of how and what they can change. Computers are also affecting children's social aspect. Stoll states that computers direct children away from social interaction and this could have a negative effect after leaving the school environment. Educators are concerned that children are being taught that exploring what is on a two-dimensional screen is more important than playing with real objects, or sitting down to an attentive conversation with a friend, parent or teacher (Oppenheimer, 1997).

In conclusion, computers in the classroom do have drawbacks. Educators must not assume that everything that employs technology is going to be successful (Mendels, 1999). Districts must decide if computers in the classroom are weakening today's students, by giving them help in areas where they should think for themselves, by attempting to simulate real world experiences on a monitor, and if the use of the Internet is distorting information and research. They must also ask, "Is the investment in technology helping children learn?" (Mendels, 1999) Richard Riley, the Secretary of Education, stated, "A critical part of using technology is the ability to measure its effectiveness" (Cited in Mendels, 1999). This ability is necessary for a school district to master, in order to ascertain, by the data, whether the use of technology is having a positive or negative effect on education as a whole.

The Digital Divide

The interaction between humans and computers is continuously growing today. The ability to access computers and the Internet has become increasingly important to the

enhancement of education. Computers and the Internet aide students in learning about economic, social, and political aspects of both the nation and the world. Computers also help students prepare documents, presentations, and reports. However, not everyone has access to these technologies. This gap is referred to as the "digital divide," which is defined by Stanford University students as: "The growing gap between the underprivileged members of society, especially the poor, rural, elderly and handicapped portion of the population who do not have access to computers of the Internet; and the wealthy, middle class, and young Americans living in urban and suburban areas who do" (Digital Divide, 1998). A concentration on the "digital divide" in schools and the socioeconomic / culture effect on the students' surroundings, and the steps being taken to close the gap will be discussed.

With computers becoming the norm in schools and in homes, the price is still something many feel is not normal and therefore still cannot afford them. Both families and school districts alike face such problems due to lack of finances. William L. Rukeyser, director of "Learning in the Real World", states, "In my experience, kids living in poverty tend to have less of everything that money can buy" (Cited in Trotter, 2001). This is also true of schools located in high poverty areas. The U.S. Department of Education found large gaps between the wealthiest and poorest public schools pertaining to computer access. Schools with less than 11% of its students qualifying for free or reduced lunches had an increase in Internet access of 4% in 1994 to 74% in 1999 (Johnston, 2001). Schools where 74% of students qualified for free or reduced lunches,

showed an Internet access increase from 2% in 1994 to 39% in 1999 (Johnston, 2001). Although the lower socioeconomic schools did have an increase, they still are well behind the other public schools. Disparities in the gap are even greater at the household level. In 2000, households with an income below \$15,000 a year reported 19% owned computers, while households with an annual income of \$75,000 or more reported 86% owned a computer (Johnston, 2001). There is also a pattern in the different uses of computers in the home based on socioeconomic status. Henry J. Becker, a professor at the University of California, found that half the children from high socioeconomic backgrounds, who had computers at home, used them for word processing, compared with only 24% of the children from low socioeconomic backgrounds (Johnston, 2001). Are the children from wealthier backgrounds getting better technical support than those that are less fortunate? Margaret Honey, director of the Center for Children and Technology, feels that technology is only as good as the programs that surround it and that just putting computers into schools will not make miracles happen (Technology counts, 2001). Students from lower income backgrounds must be given the same support as those from higher income backgrounds in order for these systems to work effectively in schools.

With technology continually advancing, the issue of the digital divide cannot be ignored. Recent literature suggests that steps are being taken to close this socioeconomic gap. The main resources for helping to close the gap include financial support from businesses, and public access to computers. The personal computer market is adequately providing computing

technologies to all Americans (Trotter, 2001). Free computers and other inexpensive technologies are helping to fill the digital divide (Theirer, cited in Trotter, 2001). In December 2000, the Microsoft Corporation contributed one hundred million dollars to help put technology into every Boys and Girls Club in the United States. There are some concerns about the business community and its generous donations. Kim Jones, Sun's vice president for educational marketing, feels that merely providing computers will not eliminate the digital divide (Trotter, 2001). Teachers need training and the computers need upgrading to stay up-to-date with the ever-changing world of technology. Others feel that computer companies are giving away computers only to establish their name for sales and marketing reasons.

The nation's best resources for spanning the digital divide, with the exception of public schools, are public libraries. Richard Cutler, a research associate at the Tomas Rivera Policy Institute feels that in many poor communities access to technology is available only in schools or public libraries (Trotter, 2001). In 2000, 95% of the nations 16,090 public library branches offered public Internet access, which has increased from 76% in 1998 (Trotter, 2001). Libraries have been able to move forward using the E-rate program and the more than two billion dollars worth of equipment and software donated by the Bill and Melinda Gates Foundation (Trotter, 2001). Nancy Karnich, president of the National Library Association, says that almost half of the public library branches are now providing technology training in the use of computers and

information (Trotter, 2001). Research indicates that libraries are making extraordinary efforts to help close the digital divide gap.

The digital divide gap does exist and it may never be solved, but efforts are being made to shorten the gap. The challenge is not to bridge the divide, but to offer opportunities for everyone to gain access to computers. The public must view computers as a crucial necessity, rather than perceiving them as a superfluous luxury (Digital Divide, 1998). The public must realize the power of technology and must embrace it as a tool for the future.

Teacher Training

While the future of computers in schools lies with integration across all areas of the curriculum, it is, however, unclear how to achieve this end. Teachers are expected to incorporate technology into their discipline and in many cases with little or no training. Teacher comments related to using computers in the curriculum, standards for teachers to integrate technology, and ideas and suggestions from professionals concerning teacher training in the use of computers are the main focuses found in the literature.

Many school districts are focusing too much on hardware and software purchases, thus ignoring the need for teachers to learn how to use the equipment (Mendels, 1999). Educators are being trained in, and feel comfortable with using technology for professional uses such as e-mail and word processing. However, teachers are not receiving the training necessary to integrate computers into their curriculum. According to a survey conducted by the National Center for

Education Statistics, 66% of teachers reported using computers "a lot" for classroom instruction, 39% frequently use computers to create instructional materials, and 7% use computers to communicate with students and/or parents (Starr, 2000). The two main factors that contribute to teacher's use of computers are: hours of professional development and years of teaching experience. The survey also revealed that, 20% of teachers with fewer than nine years of teaching experience compared to 11% with more than twenty years of experience, used computers for gathering information for lesson planning (Starr, 2000). Similarly, the survey found that 82% of teachers with more than 32 hours of professional development used computers for classroom instruction, compared to 41% who did not have any professional development (Starr, 2000). Additionally, only 10% of teachers feel "very well prepared" to use computers, while most, 66%, feel "somewhat prepared" or "not prepared at all" to use technology for classroom instruction (Starr, 2000). William L. Rukeyser, Director of Learning in the Real World, fears that districts are merely training teachers how to use computer-related products, when they should be learning the fine points of technology to help make intelligent decisions about when to use computers in the classroom (Rukeyser, cited in Starr, 2000).

A common assumption is that teachers recently graduating from college have an advantage by growing up in a technology rich educational environment. Although new teachers may have been exposed to more technology than experienced teachers, steps are being taken to

bring all teachers technological knowledge to the same level. The International Society for Technology in Education has created standards for all candidates seeking teaching certification. The technological related competencies the teachers will demonstrate include (Warner and Akins, 1999):

1. Explore, evaluate and use computer technology based materials.
2. Use computer for problem solving data collection, information management, communications, presentations and decision-making.
3. Design and develop student learning activities that integrate computing and technology for a variety of student grouping strategies and for diverse students populations.
4. Demonstrate skills in using productivity tools such as word processors, databases, spreadsheets, and print/graphic utilities.

These standards will provide teachers the opportunity to feel comfortable using technology in the classroom and provide students with the most recent tools available to assist them. A few workshops lasting a couple of hours on how to use new grade software or how to use the Internet to find lesson plans is not the answer. Teachers need more structured time to develop skills working with new technology-based educational tools (Warner and Akins, 1999). Such standards will be attained easily if teachers are convinced by their own successes that new technological components can have an every day application in their classroom. Some states are

taking steps to assure that graduates with teaching degrees are prepared to use technology in the classroom. For example, beginning in 2003, The Southern Regional Education Board reports that students entering teacher training programs in Virginia will have to show they know how to use technology before they receive an education degree. The same requirements apply to experienced teachers when they renew their teaching license (Cooper, 2000). This assures districts provide the training necessary for teachers to feel comfortable using technology.

Teacher training, in many cases, is designed by schools or districts on an individual basis. Developing a successful teacher technology-training program requires more than turning the faculty loose after conducting a few workshops (Tenbusch, 1998). According to Tenbusch, the first step to training teachers in computer use is to simply turn them on; thus helping teachers get excited about the prospect of using computers (Tenbusch, 1998). Second, as with students, teachers learn at different rates when it comes to acquiring new skills. Then they follow a basic sequence, learning general computer operations and the operating system. Third, the intermediate sequence of telecommunications and computer applications includes programs of general usefulness to all teachers. Tenbusch suggests that teachers should be encouraged to integrate technology into their daily lessons as early as possible. Next, Tenbusch suggest taking plenty of time, to learn the basic and intermediate sequences. Additionally, one must remember that technology training for adults takes much patience and great amounts of time. For adults, the learning curve for developing technology skills is like learning a new language, and it's a

very unforgiving learning curve (Tenbusch 1998). Districts should give teachers incentives to sustain a commitment to their continued training, by providing funds. Finally, Tenbusch suggests that schools need to adopt a "use it or lose it" policy for teachers resisting to use technology in their classroom (Tenbusch, 1998). This policy will include taking computers from teachers who are not using them, and placing them where they will be utilized. Teachers will need incentives and time to properly train for the integration of technology in the classroom, and this will not happen overnight.

In conclusion, education will not survive without technology (Oppenheimer, 1997). On the other hand teachers must have the proper training to utilize technology integration in the educational process. The goal of educational technology is not to throw a bunch of computers into classrooms, but to actually see effective uses of these tools (O'Riordan, 1999). Teachers must be prepared to instruct students on how to use technology and learn to teach with its assistance. Districts must put more effort, money, and time toward training teachers in technology, as computers will be a part of all educational settings in the foreseeable future.

Future of Computers in Schools

Today's students are growing up in an environment intricately infused with media including computers and the Internet (McCarthy, 1999). This leads many to believe that computers will become an essential ingredient in the recipe for an effective school of the future (Cromwell, 1998). According to Oppenheimer, many teachers are supporting classroom

technology (Oppenheimer, 1997). Literature focuses primarily on two areas concerning the future of computers in schools, distance learning and virtual schools.

Distance education is defined as: students taking a course in another place, where they do not have to physically be in attendance. This is made possible by using the Internet to access classrooms at another location. Distance learning brings democracy to education, it gives the student in East Los Angeles, Martha's Vineyard, Harlem, or Pakistan an equal opportunity to access content curriculum from people with many perspectives (Chaika, 1999). Until recently the biggest factor affecting a student's education was their place of residence. With distance education this factor can be eliminated. Further, students may listen to lectures a second time or think about a question longer without fearing that they will hold back the rest of the class. Students can repeat failed courses without the indignity of being in a class with younger students (Chaika, 1999). This could have a major impact on the goal to increase graduation rates. Students in small, rural, or poor school districts can take specialized courses that would not ordinarily be available at the schools they attend (Chaika, 1999). Home-schooled students can gain instruction in subjects their parents may not be able to teach such as foreign languages or computer skills. According to Chaika, distance learning can help meet the needs of school phobics such as: those in hospitals, or recovering at home, dropouts who would like to return to school, expelled students, single parents, and students in other states or countries looking for nontraditional educational solutions (Chaika, 1999). Finally distance learning can help schools

financially by providing quality distance education without the need for traditional brick and mortar classroom facilities.

Virtual schools, also referred to as schools of the future, although still in the infancy stage use the ideas of distance education. A virtual school, such as the Concord Consortium, started by the Hudson (Massachusetts) Public School System has more than 850 students from 13 states and 43 high schools registered. At the Virtual School an asynchronous (students not all on-line at the same time) interactive program, attendance is taken when students log on to their computers. This allows students from around the world to be in class together. According to Virtual High School Director, Bruce Droste: "Physics is still offered after the physics teacher left, and in Amman, Jordan, and Alaska students take a geometry course previously unavailable to them" (Droste cited in Chaika, 1999). Droste does not see this as a substitute for schools as we know them but as a powerful tool for enrichment. Students enrolled in Utah's Electronic High School complete coursework in the core content areas independently and submit assignments and receive teacher feedback through e-mail and on-line chat. In one year, 12,000 students earned at least one credit through Utah's statewide Electronic High School. Many states are introducing virtual schools, and each one has a unique setup which allows the teachers to learn within the teaching process. Tom Layton of Oregon's CyberSchool summed up how students are grasping the concept of a virtual school; "To me the big story is that all these kids are taking classes over the Internet and think it is not unusual...and it fits easily into their vision

of normal life as we head into the next century" (Layton, cited in Chaika, 1999). The literature is clear that virtual schools are an option that administrators and districts must explore as education moves towards more technological advances in the future.

The school days when computers meant only word processing or playing games are already in the past (Cromwell, 1998). Whatever the configuration of schools is to become, technology will be a large part of it. Distance learning and virtual schools are still in the early stages, however with the opportunities both provide it may become an avenue more traveled as the electronic age continues to expand. Districts need to assess the possibilities of using technology to make available quality educational opportunities for every student in the district.

Computer Uses after High School Graduation

As computers have become a fixture in the educational setting, they are now becoming common in the workplace. Computer skills are necessary for high school graduates to succeed in higher education and the work place. The technological expectations of high school graduates bears some discussion as it is still evolving at a rapid rate.

Today's society has become technologically oriented, and graduates must be prepared upon leaving high school. Computer classes are essential, even for students who do not plan to work in the computer field. Obviously they will benefit by learning how to access information, prepare papers, documents and reports while attending college (Kear, 2000). Students entering college will be expected to have skills in technology upon their arrival on campus. High school

students should be encouraged to take as many technology classes as possible, so they will be prepared to enter college on equal footing with their peers (Kear, 2000).

Technology skills are important for success in the work force, because higher education is not the route all high school graduates take as some choose to immediately enter the world of work. Delaware Governor, Thomas R. Caper summed up the need to provide students with computer technology skills upon graduation, at the National Governor's Associations Annual meeting by stating, " We need to make sure that our schools turn out students capable of performing in a high-speed, high-tech, information based jobs. The future economic strength of our nation depends directly on how we educate our children today" (Cited in O'Riordan, 1999). Oppenheimer states that technological skills must be learned in order to produce successful graduates "To make tomorrow's workforce competitive in an increasingly high tech world, learning computer skills must be a priority" (Oppenheimer, 1997). Computer use was expected to reach 75% of all workers in 2000 (Wolkomir, 1994). With today's technologically rich society, students must leave school ready to compete in a job market that will demand computer skills and knowledge. Districts and schools must prepare students for the day to day work world which they will face after graduation.

Computers have become an important aspect of society, whether in the work force or higher education. A survey conducted by Doherty and Orlosfky; found that generally students in high school felt that technology is important for learning and their success in the working world

(Doherty and Orlosfky, 2001). Students believe that technology skills are important, so districts and schools must decide how much emphasis needs to be placed on learning these skills and the level of expertise required for graduation.

Conclusion

This review of literature concludes that there has been significant progress in the area of computer use in schools in the last ten to fifteen years. Children have positive views about computers in the classroom and are well versed in their uses for learning. Districts must find ways to train teachers in implementing technology to enhance their curriculum, and also, how to operate computers for professional purposes. Finally the literature reveals, that graduates are expected to have computer technology skills if they want to compete in today's job market upon leaving high school. Therefore, in order to meet the technological needs of today's students, the proper steps must be taken by districts, administrators, and schools. For who knows what tomorrow will bring in the fast-paced, ever changing world of computer technology.

CHAPTER 3

Summary, Conclusions, and Recommendations

Summary

The review of literature clearly demonstrates the importance of computer skills in the educational progress of the future. The literature available proves that classroom computer use and technological knowledge are issues of debate. Before deciding how schools should use computers and what technological skills high school students should master, several issues must be addressed.

Most students portray positive views toward their need for computer skills and technology in the classroom. Teachers and schools have also noted how technology has continually enhanced both teaching and learning. Educators see the benefits of the Internet that allows students to explore numerous new options and to research subjects around the world. Opponents of the Internet believe that on-line companies prey on opportunities to solicit to uninformed children in an attempt to target them as a money making market. Opponents also feel that computer use in the classroom is weakening today's students by offering assistance in basic writing and creativity skills. The literature showed a gap in computer use among children from various socioeconomic backgrounds. Opportunities to gain computer access offer the only means of solving this problem.

The review of literature further expressed the lack of necessary technological training required for teachers to implement technology into their curriculum. Districts must allocate the time and money needed for teachers to become more comfortable with the uses of technology in the classroom. This research also revealed that computers are offering unique opportunities for students to learn about subjects that are unavailable at the school they attend.

Distance learning and virtual schools remain for the moment in the infant stages, however, districts must assess all possible educational opportunities. The literature determined that high school graduates need technology skills in order to successfully enter the work force or pursue a higher education. Only those schools that implement technology across their curriculum will ensure that every graduate readily pursues his or her next phase of life.

Conclusions

The research clearly concludes that districts need to properly alter their educational programs to produce technologically balanced students. First, teachers need better training on the implementation of computers for teaching and on the employment of computers in each subject area. Second, districts must strive to provide sufficient access to computers for all students. Finally, students should possess certain computer skills upon graduation so that they may successfully enter the work force or pursue a higher level of education.

To help students survive in today's technology rich society, districts must supply funding necessary to train all teachers in suitable fields of technology for the classroom. Many districts only train teachers whose subject matters require student computer use in their classroom. Others merely present workshops on the application of grade-averaging and attendance software. These techniques are no longer acceptable, as all teachers need to acquire the knowledge necessary to provide their students with effective instruction in various technologies. Adequate teacher training ensures that all students receive the best possible education through the use of the most recent equipment.

Narrowing the socioeconomic gap is crucial to providing all students with the same educational opportunities, regardless of their residence. Districts budgets should equally favor all schools when supplying technology equipment, without emphasis on any school's location or socioeconomic status. Many districts are not providing the same opportunities of computer access for students in low socioeconomic areas as for those in wealthier neighborhoods. Children in lower income areas often only have access to a computer at school, due to their economic situation at home, making technology budgets even more important. Through evaluation districts

should determine which schools need new technological equipment and then make it a priority to support the needs of those specific schools. This will help provide equal opportunities for all students in public education.

The research projects a rapid increase in the number of jobs requiring computer skills as the nation moves into the twenty first century. The expectations of students entering either the workforce or college include already mastered technological skills. However, many high school graduates do not possess the necessary skills and must take courses after graduation in order to gain them. Requiring high school students to complete a computer applications course eliminates this problem.

Recommendations

Bryan Station High School and the Fayette County Public School District need to find ways to reach their fullest potential as educators. To help meet this potential the following recommendations are suggested:

1. It is recommended that the Fayette County School District add a computer applications course, currently not a necessity for graduation, to the list of graduation requirements. Presently, the district states that students learn such skills at the elementary and middle school levels, before even entering high school. However, in elementary and middle schools, students only use computers in exploratory classes, and not as a tool to learn important skills needed to succeed later in their educational career. With the ever-changing world of technology and the frequent changes in software, students will enter high school without knowledge of current computer programs. Therefore, it is recommended that districts require all high school students complete a course in computer applications prior to graduating.

2. It is recommended that to help improve teachers technological skills, the district involve itself in the training of all teachers in the uses of technology for the classroom setting. Currently teachers are only required to attend two workshops that cover the basics of certain software used solely by the teachers themselves. Teachers

who wish to enhance their technological skills must sign up for extra professional development where they receive the training on their own time. It is recommended that professional development focusing on technological uses in the classroom should take place prior to the beginning of each new school year. The Fayette County Central Office staff, which already provides training to teachers who are willing to learn on their own time, should offer such courses as a requirement. Finally, follow up sessions throughout the school year will help teachers stay up to date with the quickly changing technology world.

3. It is recommended that the district provide an on-site technology expert to assist teachers with the implementation of technology in the curriculum. Currently, each school employs a technology resource teacher, a position whose responsibility consists mainly of fixing individual problems and maintaining the school's computer labs and network. With a new resource teacher, educators would more willingly to seek assistance with technology in their classroom.

4. It is recommended that the Fayette County Public School District employ the same computer systems for all five high schools. Bryan Station High School has the largest enrollment of students receiving free or reduced lunch, approximately 55%, a number far greater than any other high school in the district. The digital divide gap, which has been discussed earlier in the review of literature, is very obviously present in the Fayette County Public School System. In the Fayette County Public School District not all high schools are created equally. At Bryan Station High School, the lowest socio-economic high school in the district, it is clear when looking at what others have technologically the gap is broad. One of the best indicators of the digital divide gap at Bryan Station High School is that currently the number of computers available per student does not match up with student computer access at other area high schools. The district must budget properly to bring an optimum ratio between students and computers in all high schools. This will allow all students in Fayette County Public Schools the same technological opportunities regardless of the school attended.

It will take a major commitment from Fayette County Public Schools to help Bryan Station High School reach its fullest potential. Administrators, staff, and parents alike must acknowledge such a commitment in order to provide students with the most effective education, one that will prepare them for the future.

REFERENCES

- Chakia, G. (1999, March, 1). Virtual High Schools: The high schools of the future? *Education World* [On-Line].
Available: http://www.education-world.com/a_curr/curr119.shtml. [2001, May 30].
- Cooper, K. (2000, December,20). In Classroom, Widening the Web [On-Line]. *The Washington Post On-line* [On-Line].
Available: <http://www.washingtonpost.com/wp-dyn/articles/AZ77362000Dec19.html>
[2001, May 30].
- Cromwell, S. (1998, January, 12). The School of the Future. *Education World* [On-Line].
Available: http://www.education-world.com/a_curr/curr046.shtml. [2001, May 30].
- Digital Divide (1998). [On-line]. Available:
<http://cse.stanford.edu/classes/cs2...-99-00/digital-divide/overview/html>. [2001, May 14].
- Dockstader, J. (1999, January). Teachers of the 21st Century Know the What, Why, and How of Technology Integration. *T.H.E. Journal* [On-Line]. Available:
<http://www.thejournal.com/magazine/vault/A2084.cfm>. [2001, June 8].
- Doherty, K. and Oflosksy, G. (2001, May 10). Student Survey Says. *Education Week* [On-Line].
Available: http://www.edweek.org/sreports/tc01/tc01article.cfm?=35student_survey.h20.

[2001, June 11].

Hall, C. and Visgaitis, G. (1998, October 20). PC Homes by Income. *USA Today*. p. D1.

Healy, J.M. (1998). *Failure to Connect: How computers affect our children's minds--for better or worse*. New York: Simon & Schuster.

Hopkins, G. (1998). Keyboarding Skills: When Should They Be Taught? *Education World* [On-line]. Available: http://www.education-world.com/a_curr/curr076.shtml. [2001, May 30].

Johnston, R. (2001, May 10). Money Matters. *Education Week* [On-Line]. Available: <http://www.edweek.org/sreports/tc01/tc01article.cfm?slug=35money.h20>. [2001, June 11].

Karchmer, R. (2000, Jan.-March). Understanding teacher's perspectives of internet use in the classroom: Implications for teacher education and staff development. *Reading and Writing Quarterly*. 16 (1) p. 81 -85.

Kear, K. (2000). Looking to the future requires proper guidance. *The Knoxville News-Sentinel* [On-Line]. Available: <http://www.knoxnews.com/careerfair/guidance.html>. [2001, May 15].

Kurubacak, G. (1998). Critical Thinking and Educational Applications. *The University of*

Cincinnati [On-Line]. Available:

http://www.coe.uh.edu/insite/elec_pub/HTML1998/th_kuru.htm. [2001, May 21].

Learning in the Real World (1999). Computers Role in Education [On-Line].

Available: <http://www.realworld.org/>. [2001, June 6].

Matos, C. (1999). Computers and the thinking curriculum: Partners in educational revolution?

[On-Line]. Available: <http://computed.coe.wayne.edu/vol1/matos.html>. [2001, June 6].

McCarthy, C. (1999). Using Technology in Support of Curriculum and Learning Activities

[On-Line]. Available: <http://207.73.196.251/macui/integration00.pdf>. [2001, June 6].

Mendels, P. (1999, July 14). Focus Shifts to Effectiveness of Education Technology. *The New York Times on the Web* [On-Line].

Available:<http://www.nytimes.com/library/tech/99/07/cyber/education/14education.html>
[2001, June 6].

Mendels, P. (2000, February 9). Making the Most of the Internets Potential for Education *The New York Times on the Web* [On-Line].

Available:<http://www.nytimes.com/library/tech/00/02/cyber/education/09education.html>
[2001, June 6].

Microsoft Press. (2000, June 27). Microsoft Recognizes 48 High School Teachers through

- Curriculum Grant Program 2000 [On-Line]. Available:
<http://www.microsoft.com/press/2000/Jun00/curriculumpr.asp>. [2001, March 22].
- Oppenheimer, T. (1997, July). The Computer Delusion. *The Atlantic Monthly* 280 (1) p. 45 - 62
- O'Riordan, K. (1999). Students Lead Computer Generation From the Comfort of Their Own Homes. *Milken Family Foundation* [On-Line]. Available:
http://www.mmf.org/edtech/article.taf?_function=detail&Content_uid=257.
[2001, June 6].
- Starr, L. (2001, March 3). Same Time This Year. *Education World* [On-Line]. Available:
http://www.education-world.com/a_tech/tech075.shtml. [2001, May 30].
- Starr, L. (2000, May 18). Does Computer Access=Computer Use? An NCES Report on Teachers and Computers. *Education World* [On-Line]. Available:
http://www.education-world.com/a_tech/tech026.shtml. [2001, June 4].
- Stone, B. (1998, June 8). The Keyboard Kids. *Newsweek*. p. 72
- Technology Counts 2001. (2001, May 10). *Education Week* [On-Line]. Available:
<http://www.edweek.org/sreports/tc01/tc01article.cfm?slug=35execsum.h20>.
[2001, June 11].
- Teenagers and Technology. (1997, April 28). *Newsweek*. p. 86
- Tenbusch, J. (1998, March). Teaching the Teachers. *Electronic School On-Line* [On-Line].

Available: <http://www.electronic-school.com/0398f1.html>. [2001, May 21].

Trotter, A. (2001, May 10). Closing the Digital Divide. *Education Week* [On-Line].

Available: <http://www.edweek.org/sreports/tc01/tc01article.cfm?slug=35solutions.h20>
[2001, June 11].

U.S. Department of Education, National Center for Education Statistics. [On-Line]. Available:
<http://nces.ed.gov/fastfacts/display.asp?id=46>. [2001, June 4].

Warlick, D. (2001, March 1). Raw Materials for the Mind. *Educators Outlook* [On-Line].

Available: <http://www.techlearning.com/archives/WCE/archives/dwarlick.htm>. [2001,
May 23].

Warner, M. and Atkins, M. (1999, October). Training Today's Teachers for Tomorrow's
Classrooms. *T.H.E. Journal* [On-Line]. Available:

<http://www.thejournal.com/magazine/vault/a2293.cfm>. [2001, June 6].

Wolkomir, R. (1994, May). When the Work you do ends up costing you an arm and a leg. *The
Smithsonian Magazine* p 90 - 102.