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# Effects of Computer Application Courses on Students at Menchville High School

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# THE EFFECTS OF COMPUTER APPLICATION COURSES ON STUDENTS AT MENCHVILLE HIGH SCHOOL

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**By**

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## SIGNATURE PAGE

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Wardell Boyle

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# CHAPTER I

## INTRODUCTION

Parents and community businesses have encouraged the administrators of the Newport News School Board to put computers in the public schools because they are great instructional tools and help all students, including poor students and students with disabilities, master basic and advanced skills required for the world of work. Schools have made significant commitments to the purchasing of computers with the expectation that student performance would improve. Some schools have cut programs such as music and art to fund computer labs in school. Apparently, the public school system believes that computer application courses will positively affect the academic outcome of their students.

Children prefer an interactive participatory role to a passive one (Becker, 1998). As a result students enjoy using computers and like coming to classes where computers are being used. Therefore courses that teach computer usage are a good thing to have in schools. When they learn how to use computers, improved learning skills and sharpened minds are developed. Effective computer software programs engage students and provide considerable learner control. Children's attitudes improve toward writing, reading, Mathematics, and science as a result of using computers. These attitudinal changes are particularly important in all subjects where anxiety often distracts from learning basic concepts and skills.

Students who are in control of more of their learning begin to feel better about their ability to do the work. The use of computers in the classroom improves students' motivation and attitudes about themselves and about learning. Students are found to be

challenged, engaged, and more independent when using computers. The researcher noticed, during a high school observation of a computer applications class, that the teacher encouraged experimentation and exploration of knowledge on their own. The students gained a greater sense of responsibility for their work and produced quality assignments, which reflected the depth of their knowledge and talents. The computers energized the students, because some of them knew more about the operations than the teacher.

## Statement of the Problem

The problem of this study was to determine the effects of computer application courses on student academic achievement at Menchville High School in Newport News, Virginia.

## Research Goals

The goals of this study were to answer the following questions:

1. Do students that take computer application courses perform higher academically?
2. In what specific subject areas do computer application students perform academically higher?

## Background and Significance

Educators have used computers and other information technologies as tools to increase student learning in America's elementary and secondary schools for over 30 years. The 1960s brought computer-assisted instruction (CAI) to schools. CAI was developed to help students acquire basic skills, practice them, and measure learning gains (Glennan & Melmed, 1996).

With the development and increased availability of lower-cost personal computers, the use of technology in schools broadened in the early 1980s to incorporate the use of general-purpose tools such as word processors and spreadsheets (Glennan & Melmed, 1996). The explosion of computer usage in the 1990s caused the popularity of computer application software such as *Microsoft Works, Microsoft Office Word, Microsoft Office Excel, Microsoft Office Access,* and *Microsoft Office Power Point.* Today, basic knowledge of the above mentioned computer applications are indispensable in our society, because these applications have become mandatory in the way we communicate with each other.

Sixty percent of all jobs in the nation require skills in computer and network use (National Academy, 2002). This means that any student who does not know the fundamentals of using computers, word processors, spreadsheets, databases, networks, and operating systems will be at a distinct disadvantage. This reason, combined with the fact that the above mentioned computer applications have become the avenue of communications, is why the majority of school systems include computer application courses in their curriculum.

Today's school administrators are in a search for determining factors that contribute to academic success of all students. This is why several studies have been done to uncover these important factors. One study determined that technology enriched schools report higher attendance and lower dropout rates than in the past (Becker, 1998). This research study is vital to discovering whether another determinant is present for academic success in the high school arena.

## Limitations

After cautiously studying data accessible for review, the following limitations were established:

1. The study was limited to Menchville High School in Newport News, Virginia.
2. The study was limited to the computer application course which included *Keyboarding, Microsoft Office Word, Microsoft Office Excel, and Microsoft Office Power Point.*
3. The study was limited to the academic achievement data of students attending Menchville from fall, 2008, to the spring, 2009.

## Assumptions

The following assumptions are presented:

1. Students at Menchville High School that have successfully completed of computer application courses have higher academic achievement than students that did not complete or enroll in the above mentioned courses.
2. Student participation in computer application courses has a direct relationship to academic success in the core subjects.
3. Computer application courses improve students written communication skills.

## Procedures

The computer applications relationship to academic achievement study at Menchville High School was completed in the following steps. A thorough review of current literature was completed to determine the availability of data, both written and statistical, and research methods used. Detailed interviews with Menchville High School administrators, computer application teachers, and core subject teachers were conducted.

Data of academic achievement for students for a two-year period were attained from school administrators. Collection of all required data and literature was organized, studied, and analyzed to determine whether computer application courses increased student's academic achievement.

## Definitions of Terms

The following terms are defined for clarification:

1. CAI: Computer Assisted Instruction.
2. Core Subjects: Mathematics, English, Science, History, and Social Studies.
3. Keyboarding: The knowledge and skills associated with using a computer keyboard.
4. Microsoft Office Excel: A computerized spreadsheet.
5. Microsoft Office Power Point: A presentation graphics program.
6. Microsoft Office Word: A word processor program.
7. SOL: Standards of Learning.

## Overview of Chapters

Chapter I discussed the history of computer application programs and how they have become a major way to communicate in today's society. It was also mentioned that students need computer application skills to be successful in the future. The emphasis of this research study was placed on the relationship between student academic achievement and completion of computer application courses. Chapter II will focus on a Review of Literature, Chapter III will focus on Methods and Procedures, Chapter IV will address Findings, and Chapter V will discuss the Summary, Conclusions, and Recommendations of this study.

# CHAPTER II

# REVIEW OF LITERATURE

The literature search at Old Dominion University Library and Newport News Grissom Public Library yielded numerous journal articles, periodicals, abstracts, and books on computer application courses in the public school systems. The use of the Internet produced additional documents on computers in the classroom. The wide scope of the above sources provided a review of the following topics: History of Computers, Benefits of Computer Use, A New Model for Education, How Computers Are Used in the Classroom, Computer Application Courses Competencies, and Summary.

## History of Computers

Computers date back in history as far back as 1944, where these early computers were monsters generally intended for military and scientific use, and were often loud, large, and sluggish (World Book Encyclopedia, 1992). The first computer was an electromechanical one that operated on a series of switches with the capability to compute limited to adding three 8-digit numbers per second (World Book Encyclopedia, 1992). The next computer used vacuum tubes and allowed for calculations and operations to be made without the use of moving parts increasing its speed. This computer version used almost 2,000 vacuum tubes, which required enormous amounts of energy and frequent maintenance leading to a very high operating cost (World Book Encyclopedia, 1992). Computers were introduced to the commercial business world with new technologies such as binary numbers, internal instruction storage, and stored programs. This first generation of computers also saw the development of programming languages, which made the computers perform specific tasks. The second generation of computers

spanned from 1956 to 1963 and was best known for the introduction of transistor technology (World Book Encyclopedia, 1992). The transistors used semiconductor materials and performed the same tasks as vacuum tubes, but took up far less space thus decreasing the distance between operating parts. The transistors caused an increase in operating speeds (World Book Encyclopedia, 1992). The third generation computers were able to be smaller because they were comprised of integrated circuits and semiconductors. These new computers contained operating systems, which acted as the brains behind the performance of a computer.

## Benefits of Computer Use

Educators have used computers and other information technologies as tools to increase student learning in America's elementary and secondary schools for over 30 years. The 1960s brought computer-assisted instruction (CAI) to schools. CAI was developed to help students acquire basic skills, practice them, and measure learning gains (Glennan & Melmed, 1996).

With the development and increased availability of lower-cost personal computers, the use of technology in schools broadened in the early 1980s to encompass the use of general-purpose tools such as word processors and spreadsheets. Technology that allowed classes to be given by remote teachers via two-way audio and video, known as "distance learning", also first appeared in schools in the early 1980s and has become widespread (Glennan & Melmed, 1996). Distance learning programming, transmitted via cables, fiber optics, and satellites, expands access to instruction for students, and improves student achievement at least as much as traditional methods of instruction

(World Book Encyclopedia, 1992). In addition, students in rural or remote schools can take classes not typically offered at their locations.

Now that we have entered a new century, several new, more powerful technologies are just beginning to make their way into classrooms across the nation. For example, new personal computers support multimedia educational software that employs both sound and video to teach students facts and concepts. Students must have basic computer application skills in order to benefit from these technologies. New ways of obtaining and presenting information have given students powerful new ways of analyzing and understanding the world around them.

During the researcher's experience performing a teaching internship at Syms Middle School in Hampton, Virginia, many aspects of using the computer in the classroom were observed. As an instructional tool, computers help all students, including poor students and students with disabilities, master basic and advanced skills required for the world of work. Modified keyboards, joysticks, and head pointers allow students with physical disabilities to use computers. Synthesized speech lets those with speech impairments talk by typing their words into a computer. And speech-to-text translators transfer the spoken word into written text, facilitating communication for those who cannot type, or choose not to (Middleton & Means, 1996).

The process of learning in the classroom can become significantly richer as students have access to new and different types of information. They can manipulate this information on the computer through graphic displays or controlled experiments in ways never before possible. They can communicate their results and conclusions in a variety of media to their teacher, students in the next classroom, or students around the world.

For example, using technology, students can collect and graph real-time weather, environmental, and population data from their community, use that data to create color maps and graphs, and then compare these maps to others created by students in other communities (Gordin & Pea, 1995). Instead of reading about the human circulatory system and seeing textbook pictures depicting blood flow, students can use technology to see blood moving through veins and arteries, watch the process of oxygen entering the bloodstream, and experiment to understand the effects of increased pulse or cholesterol-filled arteries on blood flow. Again, it is noted that students need basic computer application skills to take advantage of these technologies.

## A New Model for Education

Since its earliest classroom applications, computers have served as a very successful and efficient tutor for students learning basic reading and mathematics skills. Teachers who employ CAI, for example, can drill students on specific topics for which they need extra help, such as with long division or spelling. Among the attractions of CAI is its ability to individualize instruction and to provide instant feedback. Many CAI applications not only mark student answers as right or wrong, but also explain the correct answer. Since students are able to control the pace at which they proceed through their exercises, they are neither held back nor left behind by their peers. The instant feedback motivates them to continue (Becker, 1998).

Schools have also turned to multimedia software, which can store and play back extensive collections of multimedia images to strengthen students' basic skills. By incorporating pictures, sound, and animation in classroom activities, multimedia significantly enhances students' recall of basic facts, as well as their understanding of

complex systems (National Academy, 2002). Sixty percent of all jobs in the nation require skills in computer and network use (National Academy, 2002). This means that any student who does not know the essentials of using computers, word processors, spreadsheets, databases, networks, and operating systems will be at a distinct disadvantage.

Access to computer-generated simulations, videodiscs, the Internet, and software on CD-ROM give students a variety of experiences. Students using computers learn how to organize complex information, recognize patterns, draw inferences, and communicate findings (National Academy, 2002).

One simulation software package, for example, allows students to assume the role of mayor of a large city. By governing the imaginary city, students learn about the interconnections and tradeoffs of modern society. Another program allows students to assume the role of a 19th century Irish immigrant in Boston. Students experience the trip to the New World on a whaling vessel, practice writing by keeping journals of their life in their new homes, and strengthen mathematics skills as they struggle to live within their budgets. Multimedia presentations help bring the period to life for the students, and word processors and spreadsheets give them the tools they need to complete their assignments (Pearson Education Technologies, 2009). The description of the software and the educational targets are explained in the software company's catalog.

The researcher's major is Technology Education and is currently teaching at one of the local high schools, with a classroom and drafting/CAD lab. Technology Education has replaced the old industrial arts class, which was equivalent to a wood or metal shop. Since technology education teaches criteria in communications, construction,

manufacturing, and transportation, the technology educators had to incorporate something different breaking all the industrial arts paradigms; therefore, the invention of synergistic labs and drafting/CAD labs. All the labs have about 15-20 computers on a local area network (LAN), and the students will need basic computer application skills to operate these computers. The lab is outfitted with computer-assisted design (CAD) software, a computer numerically controlled (CNC) flexible manufacturing system, pneumatic equipment, and a satellite dish. The Synergistic Lab is set up into individual modules designed to make students familiar with the technology present in the modern workplace. The drafting/CAD labs have 20-24 drafting tables and computer stations with AutoCAD, Inventor, and Architectural Desktop software installed. Also each lab is equipped with a file server and special software to give the teacher maximum control over classroom dynamics. With this software, students can all be working on the same project, or there can be a variety of things going on in the classroom at the same time (researcher's experiences student teaching).

## How Computers Are Used in the Classroom

Some people believe that the misuses of computers are the result of society's willingness to embrace it blindly (Healy, 1998). Questions have been generated about the impact that computers may have on children's health, creativity, brain development, and social and emotional growth. The American Academy of Pediatrics has expressed concern about the amount of time children spend in front of various types of screens, and several experts in eye development have stated that computer use is creating problems in children's developing visual systems (Healy, 1998).

"I have recently come to believe that computers, at least as they are currently being used, are not necessary or even desirable in the lives of most children under age seven (with the exception, of course, of children suffering from certain handicaps)" (Healy, 1998, p. 205-206). During the first six years of life, misuses of technology may adversely affect brain maturation and development. Given that possibility, young children would be better served if they manipulated and interacted with their physical environment rather than a computer (Healy, 1998). In contrast, a Net-Generation preschooler who learned to read using a computer can conduct advanced science experiments with the direction of educational software (Tapscott, 1998). Tapscott, (1998) finds that "when children control their media, rather than passively observe, they develop faster" (p.7).

"Successful integration of classroom technology implies changes to huge magnitude in educational philosophy, classroom management, and curricular goals" (Healy, 1998, p. 68). The researcher agrees with Healy (1998) when she argues that "we must make sure that computer use included the important step of requiring children to elaborate their knowledge, thinking aloud, questioning, communicating ideas, or creating some kind of original representation about what they are learning" (p. 141). Healy is not against using computers in the classroom. She just feels that they are being misused. According to Healy (1998), alien-zapping in place of quality mathematics investigation, draw-and-paint programs instead of finger-painting, and programs that reinforce random clicking rather than skills of problem solving, communication, and investigation are all too common. After acquiring some experience using computers in the classroom, the

researcher can only agree with Healy on some points, however she does present some interesting disadvantages.

Computers offer several advantages over using traditional methods of student assessment. For example, multimedia technology expands the possibilities for more comprehensive student assessments that require students' active participation and application of knowledge (Becker, 1998). The large storage capacity enabled by computer tools such as CD-ROMS and USB Flash drives allow schools to develop electronic portfolios of students' work. A single CD or 1G Flash drive can hold exact copies of students' drawings and written work, recordings of the student reading aloud, and video images of plays, recitals, or class presentations. By saving work samples on different subjects at different times during the year, teachers can display them in rapid succession to demonstrate and assess growth (Becker, 1998). The Graduate Record Examination (GRE) uses computer-adaptive testing to administer the test more efficiently. The level of difficulty of the questions is automatically adjusted until it correctly ascertains a student's level of proficiency. The equivalent of this software is also available at the K – 12 grade levels.

The use of computers in the classroom improves students' motivation and attitudes about themselves and about learning. Technology enriched schools report higher attendance and lower dropout rates than in the past (Becker, 1998). Students are found to be challenged, engaged, and more independent when using computers. It was noticed, during a high school observation of a computer applications class, that the teacher encouraged experimentation and exploration of knowledge on their own. The students gained a greater sense of responsibility for their work and produced quality

assignments, which reflected the depth of their knowledge and talents. The computers energized the students, because some of them knew more about the operations than the teacher.

## Computer Application Courses Competencies

Computers offer an advantage that allows us to edit and print text, sort information, manipulate numbers, exchange written messages, and in some instances, locate information much more quickly and efficiently than we could do so using other means. The following is a list of computer application competencies.

### Mastering Keyboarding Skills

1. Key alphabetic, numeric, and symbol information using a touch system and correct techniques.
2. Manipulate data/software/operating system using function keys, icons, touch screens, bars, and pull-down menus.
3. Improve keyboarding techniques.
4. Increase keyboarding speed and accuracy.
5. Proofread copy.
6. Edit copy.
7. Describe ergonomic guidelines related to safe computer use (Virginia CTE Resource Center, 2009).

### Mastering Basic Computer Operations

1. Explain the functions of computer system components.
2. Boot, access, and exit operating system and software.

3. Input data and commands using peripherals (e.g., keyboard, light pen, mouse, scanner, and voice recognition).
4. Use file and disk management techniques, such as copy, move, store, rename, retrieve, save, delete, and create/manipulate directories.
5. Access and exit software.
6. Determine available memory and disk space.
7. Create backup.
8. Obtain assistance for preparing documents via electronic and hard copy references and documentation (e.g., help screen, spell check, user's manual, dictionary, grammar check, thesaurus, Internet search) (Virginia CTE Resource Center, 2009).

Using Word Processing Applications

1. Identify a variety of word processing programs.
2. Key and format letters, memoranda, reports, outlines, and tables.
3. Compose and format letters, memoranda, reports, outlines, and tables, using the English writing process steps.
4. Edit documents using techniques such as delete, insert, type over, block, move, and copy.
5. Enhance documents by using different fonts and features such as bold, italics, and bullets.
6. Enhance layout of documents by using features such as leader tabs, shading, lines, and boxes.
7. Use features such as headers, footers, justification, and pagination.

8. Set printer specifications (e.g., choose printer, online, top-of-form, font).
9. Integrate databases, graphics, and spreadsheets into a word-processed document (Virginia CTE Resource Center, 2009).

## Communicating with Databases

1. Identify a variety of database programs.
2. Create a database by defining fields and designing formats.
3. Enter, move, and edit alphanumeric data.
4. Process material using database features such as sort and merge.
5. Access data through search procedures.
6. Design and produce reports in various formats.
7. Integrate information in word processing and spreadsheet applications (Virginia CTE Resource Center, 2009).

## Communicating with Spreadsheets

1. Identify a variety of spreadsheet programs.
2. Enter data and formulas.
3. Edit data within the spreadsheet (e.g., retrieve, update, move, and save).
4. Analyze data.
5. Create graphs and charts to visually represent data.
6. Integrate word processing and database information (Virginia CTE Resource Center, 2009).

## Incorporating Graphic Features

1. Identify graphic features incorporated in a variety of media.
2. Enhance word processing documents by incorporating graphic elements.

3. Enhance spreadsheet documents by incorporating graphic elements.
4. Create visual communications involving art work (e.g., freehand drawing applications, clip art, digitized images).
5. Create visual communications involving text and graphic data (e.g., brochures, pamphlets, flyers, newsletters).
6. Use advanced publishing software features, graphics programs, and scanners to produce page layouts (Virginia CTE Resource Center, 2009).

## Summary

Chapter II discussed five computer application issues which included: History of Computers, Benefits of Computer Use, A New Model for Education, How Computers Are Used in the Classroom, and Computer Application Courses Competencies. Research studies and our educators' experiences using computers in the classroom demonstrate that current technologies are powerful tools for improving our schools and producing better students. We must remain poised to take advantage of these new and exciting opportunities, and not abuse them. Today, we can see that the infusion of computers offers our children a brighter future.

Chapter III describes the Methods and Procedures used in this study. It will explain how data were gathered to find a solution to the problem outlined in this study.

# CHAPTER III

# METHODS AND PROCEDURES

This chapter explains the methods and procedures used to collect information considered necessary to accomplish this study. This chapter discusses the population, research variables, instrument design, methods of data collection, statistical analysis, and summary.

## Population

The population utilized in this study included two groups of 2009 seniors at Menchville High School in Newport News, Virginia. One group of 26 seniors completed any computer application course for the second semester. The other group of 26 randomly selected seniors did not complete any computer application courses.

## Research Variables

The research variables that were included in this study are the students completing computer application courses as the independent variable and the second semester grades as the dependent variable.

## Instrument Design

Newport News Public Schools District uses a standardized grading system for each of the four marking periods. The school year is divided into two semesters, each containing two marking periods. The grading system is based on a four point scale: A – 92 – 100, B – 83 - 91, C – 74 – 82, and D – 65 – 73, and F – below 65. When computing the grade point average, an A is 4, B is 3, C is 2, D is 1, and F is 0 points. Honors courses

add .5 to the point equivalent and advanced placement courses add 1 to the point equivalent. Final semester grades are calculated by evaluating the performance of pupils in a given subject area; teachers take into account both oral and written work. In addition, a student evaluation includes unit and/or activity tests, daily written/oral work, homework, projects and/or outside assignments, and final semester examinations in specified courses.

## Methods of Data Collection

The data for this research study were collected through Menchville High School for the second semester grades for the seniors of 2009. The guidance department at Menchville compiled the data after graduation. After receiving the data for Group 1 and Group 2 for all 2009 seniors in all courses, their grades were organized for analysis.

## Statistical Analysis

The data gathered from the second semester from Group 1 and Group 2 were analyzed to determine if students that take computer application courses perform higher academically. The mean of Group 1 and Group 2 on English, Mathematics, Social Studies, Science, and GPA (grade point average) was calculated. T-tests were performed on all grades to determine if there was a significant difference in the grades between Group 1 that completed a computer applications course and Group 2 who did not complete any computer application courses.

## Summary

Chapter III described the methods and procedures used to conduct data for this study. The topics covered in this chapter were population, research variables, instrument design, methods of data collection, and statistical analysis. The results of the study's research will be presented in Chapter IV, Findings.

# CHAPTER IV

# FINDINGS

The problem of this study was to determine the effects of computer application courses on student academic achievement at Menchville High School in Newport News, Virginia. The second semester grades were compared for the 2009 seniors. This chapter contains the results of the data collected. The data were used to determine if there was a significant difference in the second semester grades for the four core subjects (Mathematics, English, Social Studies, and Science) and GPA (grade point average) of the seniors that completed a computer application courses, and the seniors who did not complete a computer application course.

## Report of Findings

The experimental group, Group 1, contained twenty-six twelfth grade students from Menchville High School who completed a computer application course for the second semester in 2009. The control group, Group 2, contained a random sample of twenty-six twelfth grade students from Menchville High School who had not completed a computer application course during the second semester in 2009. This provided a total of fifty-two students used in this research.

T-tests were used to determine if there was a significant difference in the English, Mathematics, Social Studies, and Science grades received in the second semester of twelfth grade students who completed a computer application course, with twelfth grade students that did not complete a computer application course. T-tests were also used to determine if there was a significant difference in the second semester GPA of twelfth

grade students that completed a computer application course, with twelfth grade students who had not completed a computer application course. The grades have been converted to points using the four point scale for the experimental and control group are included in the Appendix.

**English Grades for Second Semester**

Group 1 consisted of twenty-six twelfth grade students and Group 2 consisted of twenty-six randomly selected twelfth grade students. Group 1, the experimental group, had a mean of 2.423, and Group 2, the control group, had a mean of 2.865. A t-test was conducted and found on a one-tailed test at the $p>.05$ level of significance was 0.1748 and the t-value was 1.3764 and the degree of freedom was 50. Table 1 shows the results of the t-test on the English grades for second semester.

Table 1 t-test results for the English Grades for Second Semester

| | Group 1 | Group 2 |
|---|---|---|
| Sample Size | N=26 | N=26 |
| Mean | $M_1$=2.423 | $M_2$=2.865 |
| Degree of Freedom | Df=50 | |
| t-value | t=1.3764<br>p>.05=0.1748 | |

**Mathematics Grades for Second Semester**

Group 1 consisted of twenty-six twelfth grade students and Group 2 consisted of twenty-six randomly selected twelfth grade students. Group 1, the experimental group, had a mean of 1.808, and Group 2, the control group, had a mean of 1.750. A t-test was

conducted and found on a one-tailed test at the p>.05 level of significance was 0.8804 and the t-value was 0.1512 and the degree of freedom was 50. Table 2 shows the results of the t-test on the Mathematics grades for second semester.

| Table 2 t-test results for the Mathematics Grades for Second Semester | | |
|---|---|---|
| | Group 1 | Group 2 |
| Sample Size | N=26 | N=26 |
| Mean | $M_1$=1.808 | $M_2$=1.750 |
| Degree of Freedom | Df=50 | |
| t-value | t=0.1512<br>p>.05=0.8804 | |

**Social Studies Grades for Second Semester**

Group 1 consisted of twenty-six twelfth grade students and Group 2 consisted of twenty-six randomly selected twelfth grade students. Group 1, the experimental group, had a mean of 2.231, and Group 2, the control group, had a mean of 2.288. A t-test was conducted and found on a one-tailed test at the p>.05 level of significance was 0.8556 and the t-value was 0.1829 and the degree of freedom was 50. Table 3 shows the results of the t-test on the Social Studies grades for second semester.

| Table 3 t-test results for the Social Studies Grades for Second Semester | | |
|---|---|---|
| | Group 1 | Group 2 |
| Sample Size | N=26 | N=26 |
| Mean | $M_1$=2.231 | $M_2$=2.288 |
| Degree of Freedom | Df=50 | |

| | |
|---|---|
| t-value | t=0.1829<br>p>.05=0.8556 |

**Science Grades for Second Semester**

Group 1 consisted of twenty-six twelfth grade students and Group 2 consisted of twenty-six randomly selected twelfth grade students. Group 1, the experimental group, had a mean of 2.269, and Group 2, the control group, had a mean of 1.962. A t-test was conducted and found on a one-tailed test at the p>.05 level of significance was 0.4124 and the t-value was 0.8265 and the degree of freedom was 50. Table 4 shows the results of the t-test on the Science grades for second semester.

Table 4 t-test results for the Science Grades for Second Semester

| | Group 1 | Group 2 |
|---|---|---|
| Sample Size | N=26 | N=26 |
| Mean | $M_1$=2.269 | $M_2$=1.962 |
| Degree of Freedom | Df=50 | |
| t-value | t=0.8265<br>p>.05=0.4124 | |

**GPA For Second Semester**

Group 1 consisted of twenty-six twelfth grade students and Group 2 consisted of twenty-six randomly selected twelfth grade students. Group 1, the experimental group, had a mean of 2.3508, and Group 2, the control group, had a mean of 2.5054. A t-test was conducted and found on a one-tailed test at the p>.05 level of significance was 0.5746

and the t-value was 0.5662 and the degree of freedom was 50. Table 5 shows the results of the t-test on the GPA for second semester.

| Table 5 t-test results for the GPA for Second Semester | | |
|---|---|---|
| | Group 1 | Group 2 |
| Sample Size | N=26 | N=26 |
| Mean | $M_1$=2.423 | $M_2$=2.865 |
| Degree of Freedom | Df=50 | |
| t-value | t=1.3764<br>p>.05=0.5746 | |

## Summary

This chapter included the data that were collected from the English, Mathematics, Social Studies, Science, and GPA second semester grades for twelfth grade students who completed a computer application course, Group 1, and the twelfth grade students who did not complete a computer application course, Group 2. T-tests were performed on the English, Mathematics, Social Studies, Science, and GPA second semester grades for twelfth grade students who completed a computer application course, Group 1, and the twelfth grade students who did not complete a computer application course, Group 2. This chapter collected and reported the results from the t-tests. Chapter V will give a brief

description of the research study, and include the conclusions from the study and recommendations for future research studies.

# CHAPTER V

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

In this chapter the study will be summarized and the results from the data will be interpreted. The conclusions from the data will be made for the study and recommendations for further study in the area of computer applications in high schools will be presented.

## Summary

The problem of this study was to determine the effects of computer application courses on student academic achievement at Menchville High School in Newport News, Virginia. The research goals of this study were:

1. Do students that take computer application courses perform higher academically?
2. In what specific subject areas do computer application students perform academically higher?

Educators have used computers as tools to increase student learning in America's elementary and secondary schools for over 30 years. With the development and increased availability of lower-cost personal computers, the use of computers in schools and homes have greatly increased, and includes the use of general-purpose tools such as word processors and spreadsheets. New personal computers support multimedia educational software that employs both sound and video to teach students facts and concepts.

Students must have basic computer application skills in order to benefit from these technologies.

In this study, the following limitations were considered:

1. The study was limited to Menchville High School in Newport News, Virginia.
2. The study was limited to the computer application course which included *Keyboarding, Microsoft Office Word, Microsoft Office Excel, and Microsoft Office Power Point.*
3. The study was limited to the academic achievement data of students attending Menchville from fall, 2008, to the spring, 2009.

The study consisted of two groups of students. Group 1, the experimental group, contained twenty-six twelfth grade students that completed a computer application course. Group 2, the control group, contained twenty-six twelfth grade students that did not complete a computer application course. The computer application courses lasted for 18 weeks and consisted of instruction in basic computer skills, word processing, desktop publishing, databases, and spreadsheets. The second semester data were organized and t-tests were preformed to determine if there was a significant difference between the students in Group 1, students who completed a computer application course, and Group 2, students who did not complete a computer application course.

## Conclusions

To solve this problem, the following hypotheses were tested:

$RQ_1$: Students at Menchville High School that have successfully completed computer application courses have higher academic achievement than students that did

not complete computer application courses. The findings of this study indicated that there was not a statically significant difference in the second semester GPA between students who completed computer application courses, Group 1, and students that did not complete computer application courses, Group 2, at a t-value of 0.5662 and p>.05=0.5738. Based on the results of the one-tailed t-test conducted, we must reject the research question that students that completed computer application courses have higher academic achievement than students that did not complete computer application courses. In fact, the mean for Group 2 was 2.5054, which was higher than the 2.3508 mean for Group 1.

RQ2 Student participation in computer application courses have a direct relationship to academic success in the core subjects to include improving students written communication skills. The English, Mathematics, Social Studies, and Science second semester grades t-test indicated that there was not a statically insignificant difference in the grades between students who completed computer application courses, Group 1, and students that did not complete computer application courses, Group 2. English indicated a t-value of 1.3764 and p>.05=0.1748; Mathematics indicated a t-value of 0.1512 and p>.05=0.8804; Social Studies indicated a t-value of 0.1829 and p>05=0.8556; and Science indicated a t-value of 0.8265 and p>.05=0.4123. Based on the results of the one-tailed t-tests conducted, we must reject the research question that student participation in computer application courses have a direct relationship to academic success in the core subjects to include improving students written communication skills. Although students that completed computer application courses did have a higher mean in Mathematics and Science than students that did not complete

computer application courses. The mean for Group1 in Mathematics was 1.808 and the mean in Mathematics for Group 2 was 1.750. The mean for Group 1 in Science was 2.269 and the mean in Science for Group 2 was 1.962.

## Recommendations

This study was preformed to determine the effects of computer application courses on student academic achievement at Menchville High School in Newport News, Virginia. Based on the results and conclusions of this study, the following recommendations were made:

- Newport News Public Schools should continue to provide computer application courses based on the needs for students to maintain computer skills throughout high school and beyond. Many classes require these skills through assignments and activities.
- Newport News Public Schools should increase the number of computer application courses, because the applications are in direct proportion to technology which is always changing.
- Further study on the effects of computer application courses on student academic achievement should be performed and include what specific computer application courses enhance learning.
- A study on future computer skills required in the world's workforce and what computer application courses offered in high schools would provide these skills.

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# APPENDICES

**Appendix A**

| Group 1 | English | Mathematics | Social Studies | Science | GPA |
|---|---|---|---|---|---|
| a | 1 | 1 | 2 | 1 | 1.28 |
| b | 2.5 | 2 | 2.5 | 3 | 2.64 |
| c | 2 | 3 | 1 | 1 | 1.5 |
| d | 3 | 3 | 3 | 2 | 3.28 |
| e | 2.5 | 4 | 4.5 | 4 | 3.86 |
| f | 2 | 2 | 3 | 2 | 2.43 |
| g | 2 | 0 | 1 | 1 | 1.43 |
| h | 3 | 2 | 1 | 3 | 2.57 |
| i | 3 | 1 | 3 | 1 | 2.14 |
| j | 2 | 1 | 1 | 1 | 1.43 |
| k | 1.5 | 1 | 1 | 1 | 1.35 |
| l | 4 | 3 | 3 | 4 | 3.17 |
| m | 1.5 | 0 | 2.5 | 3 | 1.86 |
| n | 2 | 2 | 2 | 1 | 2.28 |
| o | 2 | 1 | 1 | 1 | 1.5 |
| p | 2 | 1 | 2.5 | 4 | 2.36 |
| q | 2 | 1 | 1 | 1 | 1.67 |
| r | 3 | 1 | 2 | 4 | 2.29 |
| s | 4 | 1 | 2.5 | 2.5 | 2.93 |
| t | 4 | 4 | 5 | 5 | 4.21 |
| u | 1 | 2 | 1.5 | 0 | 1.25 |
| v | 2 | 1 | 2 | 2 | 2.29 |
| w | 1 | 1 | 0 | 1 | 0.71 |
| x | 1.5 | 0 | 2.5 | 2 | 2.33 |
| y | 4 | 4 | 3 | 4 | 3.86 |
| z | 5 | 5 | 4.5 | 4.5 | 4.5 |
| Mean | 2.442308 | 1.807692 | 2.230769231 | 2.269231 | 2.350769 |

## Appendix B

| Group 2 | English | Mathematics | Social Studies | Science | GPA |
|---|---|---|---|---|---|
| a | 4.5 | 3 | 3.5 | 3 | 3.64 |
| b | 3.5 | 3 | 3.5 | 4 | 3.93 |
| c | 3.5 | 2 | 3.5 | 4 | 3.35 |
| d | 1 | 1 | 1 | 1 | 1 |
| e | 4 | 4 | 3 | 1 | 3.3 |
| f | 5 | 5 | 4 | 4.5 | 4.35 |
| g | 4 | 3 | 3 | 4 | 3.57 |
| h | 4 | 2 | 2 | 2 | 3.28 |
| i | 1 | 1 | 1 | 1 | 1 |
| j | 2 | 1 | 3.5 | 0 | 2.42 |
| k | 4 | 1.5 | 1.5 | 1.5 | 1.64 |
| l | 4 | 4 | 2 | 1 | 2.85 |
| m | 1 | 0 | 1 | 2 | 1.17 |
| n | 1.5 | 2 | 2 | 3 | 2.75 |
| o | 1 | 2 | 1 | 1 | 2.28 |
| p | 4 | 0 | 4 | 2 | 3 |
| q | 1 | 0 | 1 | 1 | 1 |
| r | 3 | 0 | 3 | 1 | 2.43 |
| s | 3 | 4 | 3 | 2 | 3.43 |
| t | 3 | 1 | 3 | 1 | 2.5 |
| u | 3 | 1 | 2 | 2 | 1.71 |
| v | 2 | 1 | 2 | 1 | 2.14 |
| w | 4 | 1 | 1 | 1 | 2 |
| x | 3 | 1 | 1 | 1 | 1 |
| y | 2 | 1 | 2 | 4 | 2.57 |
| z | 2.5 | 1 | 2 | 2 | 2.83 |
| Mean | 2.865385 | 1.75 | 2.288461538 | 1.961538 | 2.505385 |