

The Impact of Computer-Based Instructional Approaches on
Sixth-Grade Students' Achievement in Social Studies

By Jonathan Ryan

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Abstract

The purpose of this study is to determine the impact of computer-based instruction on sixth-grade social studies achievement as compared to traditional, nontechnology-based instruction. The measurement tools were unit assessments that students completed at the end of two separate units. This study involved use of a quasi-experimental design in order to measure how students performed using traditional nontechnology-based instruction and how they performed using a computer-based instructional approach. The achievement gains made by students when using the computer-based instructional approach were not statistically significant as compared to when they were taught using the traditional nontechnology-based approach. Research in this area should continue because using technology is an integral part of our society and becoming a large part of the way children are taught.

CHAPTER I

INTRODUCTION

Overview

Children growing up in the 21st century cannot recollect a time when they were not involved with technology. Most children spend at least some portion of every day using an electronic device, whether it be a television, computer, smart phone, or video game system (“Zero to Eight,” 2014). Due to students’ interest in and eagerness to use technology, there is an increasing trend in education for teachers to use more computer-based technology in their classroom instruction; however, the research concerning its use is actually relatively limited when it is compared to many of the other areas of education research. This comparative lack of research is somewhat concerning because teachers are unaware of what the best practices are concerning using technology in their classroom. It creates a situation where teachers are flying by the seat of their pants and are forced to make instructional decisions which have huge consequences without solid research to back it up. Teachers may have no idea of what specific technology is useful, whether there is a certain amount of usage that is too much, or which types of technology works best in different situations, according to research.

Research should drive educational decisions and, in this case, it seems that it may not always be the case. This lack of research has many causes but is mainly due to the recent and ever-changing nature of computer technology. Recently, more research has been and is being conducted to fill in our understanding of the impact of using technology in classroom instruction. As educators become more knowledgeable and comfortable enough to begin to use computer technology consistently in their instruction, this research will continue to increase (ChanLin,

2007).

Additionally, much of the research that has been conducted on the impact of computer-based technology in education is very specific and often focuses acutely on one particular variety of computer-based instructional methodology. This is certainly understandable as the goal is usually to examine the viability and success rate of a certain approach; however, such research does not lend itself to extrapolating that data to other computer-based instructional approaches.

Early research was fairly neutral and saw little impact to no impact with the use of computer-based technology in education. As the amount of research being conducted has increased, though, most of the more recent research has also shown neutral results. However, there has been a growing number of positive results when examining the use of computer-based instructional approaches in education (Sadik, 2008). More research being conducted in this field is vital as computer technology is here to stay and its use in classroom instruction will only increase in the future. Therefore, a better understanding of the best practices of using technology in the classroom is of the utmost importance.

Statement of the Problem

This study examines the impact of using computer technology for classroom instruction to improve sixth grade students' social studies achievement. More specifically, the study tries to determine the impact of computer-based instruction on sixth-grade social studies achievement as compared to traditional, nontechnology-based instruction.

Hypothesis

The use of computer technology in classroom instruction will have no impact on the achievement of sixth-grade social studies students as compared to traditional, non-technology

based instruction.

Operational Definitions

Computer-based instruction is a teaching approach that integrates the use of computer software programs with other teaching materials in the classroom

The term *one-to-one* (devices) is the ratio of students to computer devices. It is applied to programs that provide all students in a school, district, or state with their own laptop, netbook, tablet computer, or other mobile-computing device.

CHAPTER II

REVIEW OF THE LITERATURE

The use of technology in classroom education is increasing. Technology is central to many students' lives because they have lived completely immersed in technology from the day they were born. Over 70% of all children who are eight years of age in the United States of America have used mobile phone devices at some point in their lives ("Zero to Eight," 2014). Even young children typically use some sort of technology every day. "Nearly six out of 10 children [under age eight] watch TV at least once a day, compared with 17% who use mobile devices on an everyday basis, 14% who are daily computer users, and 6% who play video games every day" ("Zero to Eight," 2014). For many years, education—for a variety of reasons from a lack of resources to a lack of training—lagged behind this trend toward using more technology in classroom instruction. However, technology has seemed to gain a greater place in public education recently. Because students have grown accustomed to using technology in their daily lives, they seem to be motivated by its use in the classroom.

This review of the literature will focus on the use of technology in education. Section one will examine computer-based technology in education and will review the basics of what computer-based technology involves as well as how computers are used in classrooms. Section two will focus on integrating technology into the classroom. Section three further examines integrating technology into the classroom, particularly in the social studies content area. Finally, section four discusses the impact of using computer-based technology in education. It will examine the benefits and challenges associated with implementing technology into the classroom.

Computer-Based Technology in Education

Computer-based technology includes both computer hardware (i.e. a laptop) and software, such as the applications and programs on that laptop. As the use of both has become more prevalent culturally, computers themselves have become increasingly popular for use in education. Their engaging nature, supposed promise of increased achievement, and familiarity among many students are factors which motivate administrators and teachers to increase the amount of technology that is used in schools.

There is a wide-ranging variety when it comes to educational computer-based technology, but some of the most common examples include reading intervention technology to support students in improving reading comprehension and/or phonics skills. Technology is also used consistently in education as an accommodation for students with disabilities. In addition, students are simply using the Internet for resources such as electronic textbooks, and some classes even have in place a flipped classroom approach where teachers can assign videos and other sources for students' examination at home at their own pace and then be able to focus on examination and analysis of those sources in the classroom (Boone, 2006).

Another form of technology that some teachers have access to is a smart board. In 2009, 23% of all teachers surveyed had an interactive whiteboard in their classroom (U.S. Department of Education, 2010). These boards are versatile and can be used to complete a wide variety of educational tasks. Furthermore, many schools have laptops or computer labs. At this time, there is at minimum a one-to-five ratio of computers to students in public schools (Herold, 2016). Also, many teachers allow students to use their own mobile devices or other tablets for a variety of purposes (Wylie, 2016).

As our society advances technologically, we will certainly continue to see the increased use of technology in the classroom. Students, and young people in general, are often at the forefront of the use of these new technologies and as a result are often more apt to be motivated by their use and more engaged in their education by using them in their educational experience. Many teachers seeing this engagement are often inspired to then want to use more technology in the classroom in the hopes that it will translate to improved student achievement (Ying-Tien, 2013).

This stresses the need for further research into the use of computer-based technology in instruction to validate, or rescind, this rush to increased technology usage. In addition, computer technology is advancing at an unprecedented rate. Therefore, as the technology advances, approaches will change and advance with it, which will lead to the need for additional research to keep up and remain viable. It is one area of educational research that needs to be consistent and forward-looking to have any true implications worth examining.

Computer technology has been shown to be somewhat effective for use among students who are considered gifted and talented. These students benefit greatly from having experience beyond the classroom and need some level of enrichment. Computers can often provide the necessary motivation, open time frame and structure, and higher quality resources for those students to improve upon their educational experience, often independently (Periathiruvadi & Rinn, 2012).

The fact that most research shows a varying rate of success and failure for different types of computer technology depending on the students, their age, their cognitive abilities, and a number of other factors further highlights the need for more research to be completed in the field

of computer-based technology and its impact in education. Research into the impact of computer-based technology in education is an area of education research that does seem to be increasing, however.

Integrating Computer-Based Instruction into the Classroom

How computer-based instructional approaches are integrated into the classroom is a vital factor when determining the success of said instructional approach. There are many complex components related to the effective integration of technology in education, including proper training and professional development for teachers, adequate time for planning and implementation, quality structural support at the school such as computers and Internet access, and the quality and relevance of the technology approach itself. These complex and difficult issues are often cited as reasons for why teachers don't try to implement technology into their classrooms at all. There are often multiple possible ways to implement a specific piece of technology, and discovering the best plan can often determine the success or failure of that technology (RaFool, Sullivan, & Al-Bataineh, 2012).

Many teachers are often reluctant to use technology in the classroom. There are a variety of reasons for this, from a lack of proper training, to a lack of knowledge of allowable and quality technology to use, to the limited availability of computers, and the lack of quality research computer technology. As younger teachers enter the profession and as teacher training for more experienced teachers increases and improves, more and more technology will eventually be used in the classroom (RaFool et al., 2012).

There are many benefits to integrating different types of technology into the classroom. Technology allows students to create, explore, discover, problem solve, and innovate in ways not

always possible in a traditional classroom. Technology has the flexibility to be able to provide space for enrichment for some students and intervention for others, all while having the capability to provide immediate feedback for teachers, administrators, parents, and students. Using the data from this feedback could allow teachers to truly differentiate for every student and to “provide specific instructional plans based on individual student needs” (Bronson, 2016, p. #). In addition, enrichment opportunities such as virtual field trips and discussions with experts in different content areas that cannot be completed in the classroom can be made possible using technology. However, the necessary structures and planning need to be in place for these successes to occur. Technology can be costly if implemented poorly. If not structured well, it can be more of a distraction than a helpful tool. Technology that can be motivating and engaging is supported well and can be an effective tool in reaching some students (ChanLin, 2007).

Computer-Based Technology in the Social Studies Classroom

Using computer-based technology in social studies has been somewhat slow to gain traction. There are certainly a variety of reasons for this, but it probably stems from a lack of quality social studies software, a lack of funding, and an overall lack of teacher training. Although surprisingly, it is a relatively new concept, using computer-based technology in social studies has many helpful and seemingly logical benefits (Ying-Tien, 2013).

Technology allows for greater access to numerous valuable resources otherwise completely unavailable in a traditional social studies classroom such as museum artifacts, online discussions with experts, and access to primary and secondary sources through research databases. When implemented successfully, using computer-based technology in social studies instruction can provide almost unlimited access to these resources on a much more open time

frame, allowing for increased study, more rigorous analysis, and an open-ended pace when compared to the traditional social studies classroom. Technology can promote interaction with the learner and provide immediate feedback and enrichment or intervention. Social studies is an area of study where educational video games and videos could provide motivation for students of varying ability levels. For all of these reasons, and because of the overall increase in computer-based technology being used in many schools, one can expect to see an increase in the use of technology in social studies classrooms, as well.

The research concerning using computer-based technology in the social studies content area is scarce, especially when compared to research concerning the use of technology when teaching English, particularly reading and writing instruction, and mathematics. The research as mentioned above focuses on the possibilities and the resources technology can provide, but little has been done to examine the impact of technology in social studies instruction. As the use of technology in social studies classrooms increases, so will the amount of pertinent research.

Effects of Using Computer-Based Technology in Instruction

Although, as noted previously, there is a relative paucity of research concerning technology in education, this is even more pronounced in the area of social studies, particularly when compared to other content areas of education research. The research is increasing as more technology is created and used by different computer hardware and software developers.

Some recent research has had fairly positive results, although a majority of this research points to a fairly neutral impact, often explained with different extenuating circumstances. However, most research focuses on specific computer-based technology, and it isn't necessarily correct to state that all or even most computer-based instructional approaches are successful or

not. In general, most early research seemed fairly neutral on the use of technology, finding little to no improvement through its use (Ying-Tien, 2013).

One area where research has shown technology to have an impact is in the realm of motivation. Technology that incorporates student responses is one form of technology that has been studied and has shown to increase students' motivation (Abode, 2010). When using this type of technology, students can transmit their answers and the teacher can receive their answers through software on his or her computer. The teacher can ask a question, and then the students respond through the software application. The answers can be projected on the screen, and teachers can keep answers to collect achievement data about his or her students. In one study concerning this type of technology and its impact on motivation, two classes were taught the same content with one class using the technology and one class not. At the end of the study, the results suggest that student response technology was effective in increasing motivation (Abode, 2010).

In addition, many students play video games, and video games have been found to increase students' motivation. Students can play games on a variety of different sources of technology. One study concerning motivation, technology, and mathematics examined whether video games could increase students' motivation to do mathematics. The study's participants were third-grade students, and, for the purposes of the study, they played a math video game to help them learn multiplication facts. The students played the game each week for multiple weeks and took surveys about their level of motivation. The results of the study suggested that students were more motivated to learn math as a result of the use of the mathematics video game (Jones, 2011).

As technology use among teachers and students increases, in general, its use in education will increase, as well. Therefore, the need for additional research is increasingly necessary. In addition, when there were neutral or even negative results in the research, those results were often quickly explained with extenuating circumstances such as disruptions, poor implementation, or other issues that complicated the learning process. Continued use, better implementation, and continued research into technology use in the social studies classroom may begin to show more consistent, positive results.

Summary

In conclusion, computer-based technology use in education is only going to increase as time goes on. As more current teachers become comfortable with the technology and as the next generation of teachers begin their careers, technology will eventually become, if it hasn't already, a key component in the classroom. The overall neutral to positive results that have been shown about the use of computer-based technology in education are heartening; however, these results should be carefully considered. Even though research is increasing, there still isn't enough information yet to draw firm conclusions either way. Increased research into the viability and success of using technology in education is vitally necessary especially in different content areas and with a variety of age levels.

CHAPTER III

METHODS

Introduction

Technology has been an increasing part of our society for some time to the point of ubiquity, and as a result its role in education has grown, as well. However, there is limited research to back up this increased role. This study examines the extent, if any, that computer-based instruction proved to enhance sixth-grade students' social studies achievement as compared to traditional, nontechnology-based instruction.

Design

This study uses quasi-experimental design with the dependent variable, being student achievement, as measured by a mini-unit assessment grade, and the independent variable being the use of one-to-one technological devices during social studies instruction.

The study lasted six weeks. For the first three weeks (Greece mini-unit) in one class, class A, no one-to-one devices were used; in another class, class B, one-to-one technological devices were consistently used for 30 or more minutes during every session. During the second three weeks (Rome mini-unit), in class A where students had no devices, the one-to-one technological devices were used consistently for 30 or more minutes during every social studies class, and in class B students did not use any technology. The technological device used was a HP Revolve Laptop. These devices had been provided previously to all sixth-grade students in the study, and students were familiar with their capabilities. Laptops were used individually and collaboratively by students during lessons to watch videos, research, play games, complete historical investigations, explore related websites, complete projects and use Microsoft Office

tools.

Participants

The participants in this study were in two separate classes in the sixth grade at a public school in suburban central Maryland. The demographics of the school are 89% Black, 4% Hispanic, 3 % White, 2% Asian, 2% other races. Fifty-nine percent of the students participate in free and reduced meals (FARMS). The students in the study were enrolled in two separate sixth-grade standard level social studies classes. In class A, there were 16 students; of these, 15 are Black, one is Caucasian, nine are female, and seven are male. Class B consisted of 22 students; 19 are Black, three are Asian, and there are 15 female students and seven male students. This sample was a convenience sample because the students participating in the study were chosen based upon their enrollment in the researcher's class.

Instruments

The instrument used to measure student achievement were mini-unit quizzes administered at the end of each unit to two groups of students. These quizzes were created by the sixth-grade social studies team at the study school as part of a new sixth-grade social studies curriculum. The quizzes' goals are to assess student understanding of each section or mini-unit of the four main units of his curriculum. This study used two mini-unit assessments from the end of the Greek and Rome mini-units. The quizzes consist of ten multiple choice questions that gauge students' comprehension of the mini-unit of study.

Procedure

The researcher introduced the topic of the first mini-unit, Ancient Greece, to the students in two separate classes. During the subsequent three weeks, the researcher taught the lessons

using no one-to-one technological devices in class A and consistent device use in class B. At the end of the first mini-unit, the researcher gave the students an Ancient Greece mini-unit quiz.

The second mini-unit, which also lasted three weeks, began as soon as the first mini-unit ended. This mini-unit was on Ancient Rome. This time, the researcher taught class A using one-to-one technological devices consistently while class B used no one-to-one technological devices. At the end of the mini-unit, students completed an Ancient Rome quiz.

CHAPTER IV

RESULTS

This purpose of this study is to determine the impact of using technology-based instruction on sixth-grade students' social studies achievement as compared to traditional, nontechnology-based instruction. Unit score means can be seen in Table 1, with individual student assessment scores on both unit assessments seen in Table 2. Additionally, as shown in Table 3 and Table 4, two two-tailed independent samples *t*-test analyses were conducted to determine whether there were meaningful differences between students' scores on each unit assessment based on the type of instruction received. The significance level for each analysis was set at $p < .05$. The data analysis was then used to determine whether or not there is statistical evidence to support the rejecting of the null hypothesis.

In Table 1, both class A's and class B's unit scores for each assessment are shown out of a possible score of 10. Class A began without using computers during the Greece unit and finished using computers during the Rome unit, scoring 6.125 and 6.25 respectively out of 10. Class B began by using computers during the Greece unit and not using computers during the Rome unit, scoring 6.182 and 5.909, respectively.

Table 1

Unit Assessment Scores

	Unit I: Greece Average Assessment Score (out of 10)	Unit II: Rome Average Assessment Score (out of 10)
Class A	6.125 – No computer usage	6.25 – Computer usage
Class B	6.182 – Computer Usage	5.909 – No computer usage

Class A was first taught the Greece unit in the sixth grade Social Studies curriculum using no computer technology in instruction. Then they were taught the Rome unit consistently using computers in instruction. The average change in score for class A going from not using computers to using computer during classroom instruction was $+.125$ out of a possible score of 10. At the same time, class B was taught the Greece unit consistently using computers in instruction and then was taught the Rome unit using no computers in instruction. The average change in score for class B in going from using computers to not using computers during classroom instruction was $-.273$ out of a possible score of 10.

In Table 2, the assessment scores are shown for each of the individual students who participated in the research study. They are divided into classes A and B, class A beginning without computers and class B beginning with computers. Their overall change in score from the Greece assessment to the Rome assessment is shown in the last column.

Table 2

Individual Assessment Scores

Student	Greece Unit Assessment	Rome Unit Assessment	Score change
Class A	No computer usage	Computer Usage	
Student 1A	6	4	-2
Student 2A	8	6	+2
Student 3A	7	7	0
Student 4A	5	7	+2
Student 5A	7	6	-1
Student 6A	4	5	+1
Student 7A	8	7	-1
Student 8 A	9	8	-1
Student 9A	4	6	+2
Student 10A	3	5	+2
Student 11A	8	7	-1

Student 12A	7	9	+2
Student 13A	6	7	+1
Student 14A	6	6	0
Student 15A	3	4	+1
Student 16A	7	6	-1
Class B	Computer usage	No computer usage	
Student 1B	9	10	+1
Student 2B	7	6	-1
Student 3B	6	6	0
Student 4B	4	5	+1
Student 5B	5	5	0
Student 6B	3	4	+1
Student 7B	9	8	-1
Student 8B	7	6	-1
Student 9B	5	4	-1
Student 10B	10	9	-1
Student 11B	8	6	-2
Student 12B	7	7	0
Student 13B	2	4	+2
Student 14B	6	6	0
Student 15B	7	7	0
Student 16B	6	5	-1
Student 17B	5	4	-1
Student 18B	8	6	-2
Student 19B	5	5	0
Student 20B	6	5	-1
Student 21B	7	7	0
Student 22B	4	5	+1

As shown in Table 3, an independent samples *t* test was conducted to compare the differences between students who used technology-based instruction and students who did not use technology-based instruction (traditional) on the Greece unit assessment. The analysis revealed no significant differences between those receiving technology-based instruction ($M=6.26$, $SD=2.08$) and those not receiving technology-based instruction (traditional); ($M=6.13$, $SD=1.86$); $t(33)=.206$, $p=0.838$. The null hypothesis is retained.

Table 3

Independent Samples t-Test Analysis of Greece Unit Assessment Scores: Technology-Based Instruction vs. Nontechnology-Based Instruction (Traditional)

Group Name	N	Unit Assessment Mean Score	SD	T	df	P
Technology	19	6.26	2.08	.206	33	0.838
No Technology	16	6.13	1.86			

As shown in Table 4, an independent samples *t* test was conducted to compare the differences between students who used technology-based instruction and students who did not use technology-based instruction (traditional) on the Rome unit assessment. The analysis revealed no significant differences between those receiving technology-based instruction ($M=6.25$, $SD=1.34$) and those not receiving technology-based instruction (traditional); ($M=5.95$, $SD=1.68$); $t(33)=.580$, $p=0.566$. The null hypothesis is retained.

Table 4

Independent Samples t-Test Analysis of Rome Unit Assessment Scores: Technology-Based Instruction vs. Nontechnology-Based Instruction (Traditional)

Group Name	N	Unit Assessment Mean Score	SD	T	df	P
Technology	16	6.25	1.34	.580	33	0.566
No Technology	19	5.95	1.68			

Although the mean assessment score from the units where technology-based instruction

was used was higher than the mean assessment score from when no technology-based instruction was used, this increase was not statistically significant. A more detailed discussion of these findings and their implications will be discussed in chapter five.

CHAPTER V

DISCUSSION

The purpose of this study is to determine to what extent, if any, computer-based instruction improves sixth-grade students' social studies achievement as compared to traditional, nontechnology-based instruction. The null hypothesis was retained so there was no significant differences in social studies achievement between the computer-based group and the control group. The small overall improvements in mean assessment scores when comparing the use of technology-based instruction to nontechnology-based instruction can be attributed to other factors or normal sample fluctuations.

Implications of Results

One implication of the results of this research study is that, for this study, technology-based instruction as compared to nontechnology-based instruction did not have a statistically significant impact on assessment scores. In examining the data on whether student achievement in social studies would be impacted by technology-based instruction, this study showed no statistically significant change in the mean assessment scores when using technology-based instruction versus nontechnology-based instruction.

Throughout the research study the researcher noted that students generally showed more motivation and excitement when using the computers during daily instruction compared to when computers were not used.

Threats to Validity

There are some possible threats to validity that could be seen in this research that may have affected the fact that the study found no statistical significance. The small sample size used

threatens external validity. In addition, along with the small sample size, student attendance was not perfect, and any absences throughout each unit may have impacted students' unit assessment scores. In addition, the study is less generalizable because the participants in the study were a part of the researcher's class and not selected at random.

Another possible threat to validity is the change in content from Greece to Rome between units and assessments. The difference in content could explain a change in a students' achievement in that unit because of possible prior knowledge of or student interest in the content of that unit that could impact a students' comprehension and success on the assessment. In general, this research is not applicable to the general population until further research is conducted with a more varied and larger sample of participants.

Implications for Further Research

Although the study did not yield significant findings, it can help future research in the area of technology in education by providing suggestions for future research. Additional research into the field of using technology in education is important as the results of this study indicate that improvement in achievement in social studies is possible. Any further research conducted into the field of technology use in education should occur over a longer period of time, which would better show the impact of technology-based instruction on student achievement in social studies. With the use of a more improved scientific selection process of participants and including a larger amount of participants, further studies could expand upon the impact of using computers in classroom instruction on student achievement.

Conclusion

While this study sought to examine the impact of technology-based instruction on student

achievement, the results leave more questions than answers. The purpose of this study was to examine the impact of technology-based instruction on student achievement in social studies as compared to traditional, nontechnology-based instruction. No statistically significant differences were found between the two instructional approaches. This led to an acceptance of the null hypothesis. However, there remains potential for further research into the field of using computers in instruction to benefit students' social studies achievement.

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