

The Impact of Technology on Academic Achievement
in Seventh Grade Social Studies

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Abstract

The purpose of this study is to determine whether the use of technology will have an impact on the academic achievement in seventh grade social studies. Participants in the study included twenty-five students who met after school for forty minutes of technology-centered instruction. The study used curriculum-based assessments developed by the school district's office of social studies. The first instrument was a midterm assessment (pre-test) and the second was the final exam (post-test). Data gathered included student attendance in the after school enrichment class as well as pre- and post-test data on the objectives covered by both instruments. Student attendance and pre-test data and post-test data were combined across the two instruments into a composite score entered into an Analysis of Variance (ANOVA). The findings on the locally developed curriculum-based assessments were not statistically different. While there is much research into the impact of technology on student achievement there is no research that examines the effectiveness of the specific Internet-based technologies utilized in this study.

CHAPTER I

INTRODUCTION

The purpose of this study is to examine the impact of technology on achievement in seventh grade social studies.

The investigator, a seventh grade social studies teacher, has witnessed increased student engagement during social studies lessons that use technology as an instructional method. Students will encounter a variety of technology in the future and must be skilled at using it in order to be successful in their careers and as members of a competitive global economy.

Technology use in education is one of the most researched topics of the last 30 years but there is little undeniable support of its efficacy (Hannafin & Vermillion, 2008). Nevertheless, educators are being encouraged to integrate technology into instruction as an effort to increase higher order thinking skills (Devlin-Scherer & Sardone, 2010). Another reason for technology in education is the popularity of laptop and tablet computers as a part of 21st century daily life in the United States (Maninger & Holden, 2009). Moreover, researchers Maninger et al., cite No Child Left Behind legislation as mandating the use of technology in schools (2009). This study will explore the use of three specific types of technology to improve academic achievement in seventh grade social studies: the ELMO, Brain Pop, and Scribble Maps.

Statement of the Problem

The purpose of this study is to determine whether the use of technology will have a significant impact on the academic achievement in seventh grade social studies.

Hypothesis

The use of technology will not demonstrate a significant improvement in the academic achievement of seventh grade social studies students.

Operational Definitions

Academic Achievement: Students take locally developed benchmark assessments in social studies twice a year: at midyear and at the end of the year. The difference in the two scores will be used to analyze student achievement in social studies.

Technology: The application of knowledge, equipment, machines, tools, techniques, and methods to solve problems.

Brain Pop: An animated curriculum-based Internet website used to teach social studies among many other educational subjects.

ELMO: A high definition document camera used for classroom presentations and as an interactive tool.

Scribble Maps: An Internet-enabled geographic information system (GIS) and customizable map tool which allows students to add place marks, comments, make measurements of distance and area, draw shapes, lines, and labels.

Social Studies: Social studies is the integrated study of the social sciences and humanities to promote civic competence. Within this program, social studies provides coordinated, systematic study drawing upon such disciplines as economics, geography, history, law, philosophy, political science, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences. The primary purpose of social studies is to help young people develop the ability to make informed and logical decisions for the public good as citizens of a pluralistic and democratic society in an interdependent world (National Council for the Social Studies, 1993).

CHAPTER II

REVIEW OF THE LITERATURE

Since the enactment of No Child Left Behind (NCLB), there has been an increased effort by schools of integrating technology into education (Maninger et al., 2009). This increased effort is a result of the law mandating an improvement in student academic achievement by using technology in elementary and secondary schools (U.S. Department of Education, 2001). This literature review examines the use of technology to improve achievement in social studies. The first section will explore the importance of technology in social studies. The second section will define social studies achievement and what it looks like in the classroom. The third part of the review will look at the challenges to social studies achievement. The final section of this literature review will address technology-based interventions to improve social studies achievement.

Importance of Technology in Social Studies

Social studies is a discipline in which students need to develop critical thinking skills like decision-making, problem solving, and developing attitudinal perspectives toward change and citizenship in a democratic and pluralistic society (Okobia, 2012). In the twenty-first century, with the expansion of the Internet into the classroom education research has shown the benefit of integrating technology into classrooms, whether it is having a student develop their own website, or wiki, (Friedman & Heafner, 2008) or work collaboratively in roles of reader, writer, and editor (O'Bannon & Britt 2012), the use of web-based applications in schools has increased because of the benefits to achievement. Moreover, web-based technology can motivate students and enhance their writing skills (Olthouse & Miller, 2012). A Pew survey of 935 teens, found 93% use the Internet, and 64% engage in some form of creative blogging, or web-based journal or log

(Lenhart, Madden, Macgill, & Smith, 2007). Therefore, not incorporating some form of technology into a social studies classroom is counterintuitive.

Ignoring another form web-based application like Google Earth is also shortsighted with today's tech-savvy students. Students react positively to using Google Earth enhancing their connection to geography (Guertin, Stubbs, Millet, Tsan-Kuan, & Bodek, 2012). Google Earth, which is a form of geographic information system (GIS), when used in an educational setting, can improve student achievement (Songer, 2010). Aladag (2010) cites several studies that conclude GIS can motivate and improve academic achievement in social studies. GIS acts as a framework for the collection and organization of spatial data that can be displayed and analyzed by students (Wade & Sommer, 2006). Additionally, GIS improves computer literacy, analytical thinking, and problem solving skills as well as geographic skills like mapping (Aladag, 2010).

Studying real world events is an frequently used instructional strategy to make education meaningful (Virtue, 2007) and it is easier than ever with the proliferation of the Internet in classrooms. For example, examining the 2004 East Asian/Indian Ocean Tsunami or Hurricane Katrina in 2005 in a social studies class is an excellent opportunity to make connections between the physical and human environment (Mitchell, Borden, & Schmidlein, 2008). It is important to think spatially in order to understand these events (Gershmehl & Gershmehl, 2006) and using GSI is a method which not only promotes the use of technology but also aids student understanding of “economic, political, and environmental issues at the local, national, and global scale” (Mitchell et al., 2008, p.173).

Social Studies Achievement

Not long ago, there was a call in education to have all teachers be reading teacher making the use of literacy instruction vital in all secondary content areas (Vacca & Vacca, 2005). Social studies did not dodge this mandate. A large part of social studies education is history. Under the old model the study of history was merely “what happened in the past.” Under the new paradigm, history is much more than the study of people, places, and events of the past, it encourages thinking critically, and like historians do make understanding history by part of learning how it is constructed (Snyder & Hammond, 2012). Therefore, students do not merely learn history, they apply it. When teaching history, social studies teachers should explicitly incorporate instructional reading strategies that require students to think critically about evidence found in historical documents (Stahl & Shanahan, 2005).

This new approach to social studies requires the examination of texts (primary and secondary source material) as well as interpreting maps to explain history and events (Snyder et al., 2012). Research has shown using maps can help students in geography-based decision-making and real-world problem solving (Songer, 2010).

The focus on geography was temporarily blurred by NCLB but has now taken a more prominent position in social studies education. The District of Columbia, along with states of South Dakota, Texas, Utah, and Virginia require stand-alone geography courses. California, New Mexico, and Rhode Island require a combined history and geography course. The National Council for Geographic Education is attempting to revise standards for geography that will be included in the Common Core State Standards for social studies (Schachter, 2012).

Social studies is a course in which students need to engage in critical thinking, analytical and problem-solving strategies in a multidisciplinary approach which incorporates

socioeconomic, political, religious, geographic and technological characteristics (Okobia, 2012). In order for students in social studies to be critical thinkers they need to move from a teacher instructional approach to a more active role. Kingsley and Boone (2008) cited two studies which showed technology-supported learning is vital in moving social studies education from teacher-centered rote memorization of dates and information to a more student-centered hands-on learning which is considered more authentic (Bitter & Pierson, 2005; Trinkle & Merriman, 2000). Using technology in social studies can also foster creativity and flexibility with teaching new knowledge (Guertin et al, 2012). Therefore, social studies is a content area in which students develop the resourcefulness necessary to confront the realities of the twenty-first century.

Challenges to Social Studies Achievement

The roadblocks to achievement are often a result of the incongruity between the instructional approach and students' ability to process the material. Kingsley et al., (2008) identify numerous studies that reveal students find history and social studies to be boring, unimportant, and they have difficulty retaining information. Another obstacle to achievement in social studies is the negative attitude of middle school students' toward the subject.

Today's students live in an economically interdependent world and they will be competing in a global society where they will face many challenges understanding social studies content especially geographic and geopolitical concepts. A survey by the Asia Society found 80% of college-bound high school students are unaware India is the world's largest democracy and 25% did not know what ocean separates the United States and Asia (Sanders & Stewart, 2004). U.S. students are rated among the worst in the world regarding geographic knowledge (Coyle, 2004). A study done for the National Geographic Society revealed equally startling

results apply for national geography: of the 510 students surveyed, 33% of respondents could not locate Louisiana on a map of the country six months after Hurricane Katrina and 50% could not locate the state of New York on a similar map (Roper, 2006).

The traditional way of teaching geography, especially in the younger grades, is an object-oriented approach. Consequently, students merely learn the names of landforms such as mountains or valleys, bodies of water such as rivers and oceans, or capital cities, states, and countries (Golledge, Marsh, Battersby, 2008). Students not asked to think critically about the geographic questions of how and why they are only asked to recall or identify its location.

The findings of these studies suggest that motivating students to compete globally is a problem not limited to geographic concepts alone; the study of history can be equally problematic. Increasing student engagement and learning is a concern among teachers (Linnenbrink & Pintrich, 2003). Part of the problem is a lack of sophisticated reading strategies in middle and high school history classes (Nokes, 2011, p.379). Failure to engage in complicated reading activities is the result of the following factors: analysis of historical documents is difficult for secondary students who have a limited historical background and a simplistic view of the world (Nokes, 2011). Engagement and thinking critically are some of the problems to achievement in social studies and this research shows action is necessary to make improvements for our students to thrive in our rapidly evolving world.

Technology-Based Interventions to Improve Student Achievement in Social Studies

Research shows issues of motivation and critical thinking in terms of social studies concepts can be addressed via technology-based interventions in the classroom. There are a wide-range of different types of technology which can be easily integrated into instruction in social studies classes.

As stated earlier, the Internet is ubiquitous and not utilizing its power in a social studies classroom to engage and motivate students is a mistake. Using an Internet connection and browser students can use websites called wikis which are highly engaging and allow students to express themselves creatively. Wiki sites are simple to use, allow for sharing original content and open editing, and are collaborative in nature (O'Bannon et al., 2012). Wikis are a way for students to use the web the way the inventor of the World Wide Web, Tim Berners-Lee, intended it to be used. Students' work collaboratively using websites such as, Glogster and Twitter. In an age of social media, wikis are a way to educationally motivate students.

When it comes to helping students, whether it is using technology or thinking critically, it is important for the teacher to provide temporary support known as "scaffolding." The teacher designs activities where the support or scaffold is gradually removed until the student acquires the ability to work independently (Nokes, 2011). One approach to integrating a scaffold direct-instruction form of technology is a WebQuest. WebQuests are an example of how to use the Internet for a wide range of activities from fact-finding recall tasks to inquiry-based learning. WebQuests allow the teacher to provide the necessary support while students create their own multimedia project. This study found WebQuests increased students' motivation and learning (Barbour, Rieber, Thomas, & Rauscher, 2009).

Using GIS technology is a way of addressing geography education beyond the framework of location and identity and to see the world in a geospatial perspective. GIS exposes students to geospatial concepts and moves students past primitive and simple geographic concepts (like location and direction) to more difficult (e.g. growth), complicated (e.g. scale) and even complex (e.g. projection) concepts of geography (Barbour et al, 2009). A GIS activity can even be applied in history class to analyze the movement of armies, or in a political science class to examine census data that might influence an election; GIS can support learning in powerful ways (Snyder et al., 2012). Furthermore, findings in the Aladag (2010) study conclude academic achievement and motivation of students who used GIS were statistically higher than the control group that did not use GIS.

There is little debate on the popularity of video/computer games with youth, and, using digital simulation games is another method to integrating technology into social studies classes. A simulation is a form of modeling and models have been used to in science to teach a wide range of topics. For example, astronomical models have been to teach a subject as infinite as the universe in addition to using a microscopic model to teach infinitesimal subject matter. When used in a history class, digital historical simulation games can engage the student in disparate roles such as a farmer, trader, ruler, or military commander (McCall, 2012). This researcher concludes role-playing simulation games allow students to retain more information over time. There are many kinds of digital simulation games such as *Discover Babylon*, which provides historical and cultural information on the ancient world of Mesopotamia, *Renaissance Florence* provides economic, religious, and social information on the artists and scientific advancements of the Renaissance Age (Devlin-Scherer & Sardone. 2010).

Technology can be a useful resource to modify curriculum and since most social studies classes include all types of learners, it is important to be able to differentiate instruction to meet the needs of students with disabilities. Technology-based interventions like multimedia programs, verbatim audio recordings, and computer/video-based assessments are three approaches that offer promise to students who have learning disabilities (Maccini, Gagnon, & Hughes, 2002).

Summary

Achievement in social studies is necessary to produce citizens who can be productive contributors in a democratic society. In order to produce students who can think critically, make well-informed, and reasoned decisions, and compete in a global world which is fast-changing and increasingly interdependent achievement in social studies is vital. The review of the literature has demonstrated the importance of social studies and the necessity to integrate technology to make it engaging, relevant, and meaningful to the twenty-first century secondary student.

CHAPTER III

METHODS

The purpose of this study was to examine whether the use of technology would have a statistically significant impact on students' academic achievement in seventh grade social studies. The independent variable was technology (e.g., ELMO, *BrainPop.com*, and *ScribbleMaps.com*) and the dependent variable was the difference between students' scores from the first Benchmark Assessment (BMA 1, or the midterm) to the second Benchmark Assessment (BMA 2, or the final exam).

Design

A quasi-experimental design involving a convenience sample was used to determine whether the use of technology would have a significant statistical impact on the academic achievement in seventh grade social studies.

Participants

Participation in this convenience sample study was based on student volunteers of one social studies teacher at a suburban school in the mid-Atlantic. For students at this school, the total enrollment for the 2012-13 school year was 1,336 students. The seventh grade population consisted of approximately 420 students. The students participated in an after school enrichment class with technology as the focus to improve achievement from BMA 1 to BMA 2. The study included twenty-five students who met after school for thirty minutes of technology-centered instruction. The study included 13 female (54%) and 12 male (48%) students. The students' demographic identification included 54% African-American, 44% Caucasian, and 4% Hispanic. The sample's female population was identified as approximately 54% Caucasian, approximately 46% African-American, and 0% Hispanic. The sample's male population was identified as

approximately 58% African-American, approximately 33% Caucasian, and approximately 8% Hispanic. In the study there were two male special education students and one female special education student, all of whom possess Individualized Education Programs in reading. There were no Asian students in the study.

Instrument

The study used curriculum-based assessments developed by the school district's office of social studies for the 2012-13 school year. The first instrument was a midterm assessment consisting of 10 selected response (multiple choice) questions and one brief constructed response (essay) question. The first instrument was given in mid-January 2013.

The study's second instrument was the final exam. The assessment consisted of twenty-five selected response questions and one brief constructed response question. The second instrument was given the last week of May, 2013. All students in the school system were required to take both assessments.

Both instruments covered objectives from the state curriculum (SC) and, while six of the objectives were assessed in both BMA 1 and BMA 2, the format of the items used to assess these objectives (i.e. selected response versus brief constructed response questions) differed from BMA 1 to BMA 2. After the students took the second instrument, the researcher analyzed the items on both assessments that assessed the same SC Objectives. It should also be noted that the items differed significantly in the number of points awarded. Thus, a constructed response item which covered a certain SC objective on BMA1 might be worth more than a selected response item covering the same on BMA 2. The selected response items were worth 1 point (~8% on BMA 1, ~3.5% on BMA 2) while the brief constructed response item was worth three points (~23% on BMA 1, ~3.5% on BMA 2). In two cases, similar but not identical objectives were

counted among the data from BMA 1 to BMA 2. SC Objective 4.A.1. and 5.A.2. covers the social studies concept of scarcity yet one state curriculum objective refers to it as limited resources (SC 4.A.1.). In the second example, SC Objective 5.B. both covers the concept of how civilizations emerge with SC 5.B.1. being an analysis of the emergence of river valley civilizations (BMA 1 item) as opposed to SC 5.B.2. that is an analysis of the emergence of civilizations in the Aegean region (BMA 2 item). Since there were many examples of common SC objectives, in the opinion of this researcher, there was content validity between the two instruments.

Procedure

The independent variable utilized technology that was made available to students as part of an after school enrichment class (AKA coach class) which began in early February, 2013. The stated goal of after school enrichment class was to improve scores from the midterm (BMA 1) to the final exam (BMA 2). Since the researcher did not know what information would be covered on the final exam other than what information was covered on the midterm, the coach class covered concepts related to the themes of the social studies course as identified under the school system's essential curriculum.

The coach class was a weekly scheduled event that met for forty minutes from approximately 2:20-3:10. Most often students watch a short animated video from *BrainPop.com* which covered geographic themes, map skills, latitude and longitude, economic concepts such as taxes and trade, and political concepts as imperialism. After the video, students would complete an independent activity and the teacher would go over students' answers using a document camera called an ELMO. The duration of the coach class lasted 12 weeks at which point the second instrument, a summative assessment, was given to all students.

Data from the two assessments were compiled and analyzed in order to measure improvement from the first instrument to the second. The data from each instrument was collected at the beginning of June 2013 from *AssessTrax*, an educational assessment program, used by the school system. Data was collected from all participants.

CHAPTER IV

RESULTS

Analysis of the Data

This study examines the impact of technology on achievement in seventh grade social studies. Data were gathered on several objectives associated with achievement in social studies in the Baltimore County Curriculum by utilizing the pre- and post-measures developed by Baltimore County that are associated with those curriculum objectives.

Data gathered included student attendance in the after school enrichment class as well as pre- and post-test data on the objectives. The pre-test data and post-test data were combined across the various tests into a composite score for pre-tests and post-tests and thus the variables for analysis were attendance, pre-test combined scores and post test combined scores. These data were entered into an Analysis of Variance (ANOVA) where attendance and pre-test were the independent variables and post-test the dependent variable. Data are displayed in the table below.

ANOVA Findings

ANOVA Table

	Sum of Squares	df	Mean Square	F	Sig.
PostSumAllObjs* Between Groups (Combined)	54.736	19	2.881	0.701	*.740
PostSumAllObjs Within Groups	20.542	5	4.108		
Total	75.278	24			

*p>.05

As the table indicates, differences on the locally developed curriculum-based assessments were not statistically different.

CHAPTER V

DISCUSSION

This study examines the impact of technology on achievement in seventh grade social studies. The participants were part of an after school enrichment class utilizing technology to improve scores from the midterm to the final exam. The researcher taught the enrichment class and did not know what information would be covered on the final exam other than what information was covered on the midterm. The enrichment class covered curriculum-based social studies themes and concepts.

Data were gathered on several objectives associated with achievement in social studies in the Baltimore County Curriculum by utilizing the pre- and post-measures developed by Baltimore County that are associated with those curriculum objectives. The null hypothesis of no significant statistical differences between pre-knowledge and post-knowledge as measured by pre- and post-tests was retained.

Implications of the Study

Though the null hypothesis of no significant statistical difference in scores between the pre- and post-test measures was retained there are implications of this current study of the impact of technology on social studies achievement. While the results of this study do not support the findings of other research studies discussed in Chapter Two, the impact of technology on student achievement in social studies using other groups or other forms of technology than the ones utilized in the enrichment after school class could reveal a more positive outcome.

Threats to Validity

Even though the study retained the null hypothesis, there were several threats to external and internal validity of this study that may have affected the results. The participation in this study was small (n=24), and not all students attended every after school enrichment class. Eleven participants attended all twelve classes, six attended ten classes, two attended nine, two attended eight, one attended seven, and one attend six, or half the classes. Moreover, the classes were not held in twelve consecutive weeks but twelve sessions held over a fifteen-week period. The enrichment class was held after school and may not have been as effective in improving achievement had it been held during the school day.

Three of the participants in this study have an Individualized Education Program (IEP) to address reading deficits. This reality may have impacted the study because the assessments were not modified to meet individual needs of the students IEPs. Furthermore, IEP students may not possess the same confidence in completing assessments as other students in a standard education program.

The researcher, who also taught the class, did not know what social studies concepts would be covered on the post-test. The enrichment classes focused on using technology to reinforce curricular-based social studies concepts and themes and what was covered on the pre-test. The instructor of the class was limited to what was offered by the various technologies (e.g., Brain Pop, Scribble Maps). These Internet-based technologies are not aligned to the school system's curriculum so not all the social studies concepts and themes could be covered.

The pre- and post-tests were not identical but both instruments covered objectives from the state curriculum (SC) in which there were six common objectives assessed in both instruments, although the format of the items were different. On the pre-test an objective may

have been assessed via a selected response item which was awarded one point and the same objective was assessed on the post-test using an item which required the students to construct a written response worth three points. It is the researcher's opinion that there is content validity among the two instruments because of many common SC objectives covered on both. However, because the SC objective items were not identical, the ability of some participants to write more effectively than others could have affected the results.

Lastly, this study did not use a randomized group but a convenience sample, volunteers of students from the researcher/instructor's classes. This study could not be generalized for seventh grade social studies classes unless a similar setting and demographics could be duplicated.

Comparison to Previous Research

Using technology to improve student achievement has been the focus of many research studies. For example, Maninger et al., (2009) study examined an initiative in which fifth through eighth grade teachers and students used one-on-one tablet computers. In this study the researchers collected data from teacher interviews, classroom observation and student surveys. This was the first year of a multi-year initiative of integrating one-on-one laptop/tablet computer use thus inhibiting measures of student achievement while collection of data from teacher interviews and student surveys showed the success in terms of student usage, engagement and interest in both independent and collaborative school work as well as improved problem solving skills.

The results of this study demonstrate there is no statistical significant difference in using technology-based instruction to improve social studies achievement for middle school students. However, that is not the case in the 2009 study conducted by researchers Barbour et al., (2009)

which found increased student learning using WebQuest-like technology to create multimedia projects. WebQuests allow students to use the Internet to research topics and provides the teacher the opportunity to monitor and support students as well as scaffold instruction to meet the needs of individual students. In this study students accessed a website inspired by a WebQuest project to create their own PowerPoint games based on content knowledge they learned in class. Barbour et al's (2009) study found constructing PowerPoint games not only increased student motivation but also learning.

A study by Songer (2010) found using the technology of geographic information systems (GIS) improved undergraduate students' content knowledge of geography in a college-level Introduction to Geography class. In this study, students used Web-based GIS to teach geospatial skills to middle school students instead of using paper maps. One group of participants used Web-based GIS to complete mapping activities that taught geospatial skills and one group used paper maps only. This study demonstrates students who used the technology-based GIS activities showed a significant statistical improvement from pre-test to post-test content knowledge (Songer, 2010).

There were noteworthy differences between the aforementioned three studies which all demonstrated success with the integration of technology and the present study that showed no significant statistical improvement in social studies achievement. In the first example, this study's participants only used one-on-one laptops in six of the twelve after school enrichment classes as opposed to the Maninger et al., (2009) study. The Barbour et al., (2009) study had participants actively construct PowerPoint projects to show content knowledge while the present study did not this technology. The Songer (2010) study totally utilized GIS technology while the present study used the GIS technology on the ScribbleMaps.com website in six of the twelve

after school enrichment classes. These contrasts in the studies may account for the different results from the present study.

Summary and Implications for Future Research

The results of this study show using technology-based after school enrichment class had no significant statistical impact on improving social studies achievement in middle school students. However, most of the research does show there is a positive relationship between technology and achievement. Even though the results of this experiment showed no significant improvement from the pre- to post-test, the researcher did see increased engagement in the participants when using technology, especially when using laptops to access Scribble Maps to construct interactive maps to demonstrate content knowledge.

While there is much research into the use of technology to improve academic achievement there has been no research into the use of Internet-based technologies like Brain Pop videos or Scribble Maps or hardware such as the ELMO document camera. Future research could examine the efficacy of these technologies. Future research also could collect data from surveys instead of comparing scores on pre-and post-tests.

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