IS STUDY ISLAND JUST A CRAZE? A COMPARISON OF STUDENT ACHIEVEMENT TEST SCORES IN MATH BEFORE AND AFTER A TECHNOLOGY-INTEGRATED INTERVENTION

by

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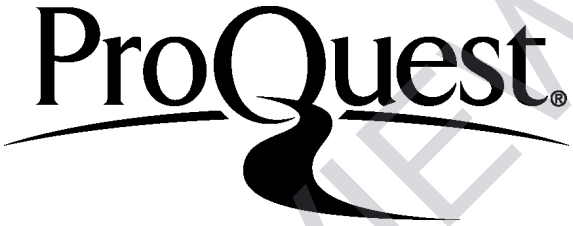

Abstract

The Study Island computer program is one of many highly used instructional programs in school districts nationwide; however, there is little independent research available that provides information about its impact on student achievement performance. This study used a descriptive comparative research design to compare the mean gain scores of the semester that students received math instruction with Study Island to mean gain scores of the semester that students did not receive math instruction with the program to determine if a significant difference exists between the two semesters. The test scores from a sample of 124 ninth-grade math students from an economically disadvantaged suburban school district in a southeastern state were used. The results concluded that the mean gain scores from pretest to posttest of the semester that students used the Study Island program were significantly higher than that of the semester that students did not use the program.

Dedication

This work is dedicated to my family for being supportive, understanding, and patient with me during this process. My children, Kagan Henry and Chelsea Paris Henry, were my motivating factors for pursuing a PhD degree. My desire is to set an example for them that there is nothing too great for them to achieve. “If you can think it, you can achieve it.” My parents, Katherine Benthall and Henry McMillan, taught me how to persevere through difficult times and showed me that I can accomplish any task through Christ who gives me the strength. My ex-husband Charles Henry has been there for me through all of the frustrating times along this journey to offer encouragement and to remind me that I was not alone. A special dedication to my mommy: I will always love you. I hope I have made you proud of me. I can only pray that I can give my children the same inspiration that you have given me. I remember the special times we shared before you left this earth to be with GOD. I know I will see you again one day; until then, I will continue to accomplish the dreams you started. Finally, to every child who lives in an impoverished neighborhood, sees the world through an uncommon lens, and chooses to set his/her own pathways in life, I am you.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

National and state mandates on educational improvements have resulted in school districts' increased spending to meet the specified requirements (Dorris, 2010). In this manner, the No Child Left Behind Act's (NCLB) Enhancing Education Through Technology Program has prompted several school districts in the nation to increase spending on various technological programs with hopes of increasing student achievement (Greenlee, 2007). Some of the said effective computer programs have included: GeoGebra, MyMathLab, Gizmos (ExploreLearning), and several online interactive textbooks. Dorris (2010) supports the idea of technology integration by stating that "technology . . . [remains] center stage in order to produce competitive graduates in an ever changing environment" (p. 72).

Study Island is also among the many technological programs used in school districts nationwide to assist students in learning the core curriculum. According to the Study Island website, the program promotes student learning by using "standards-based instruction, practice, and assessment" (Study Island, n.d.) that is both student and teacher-friendly. In fact, "over 23, 300 schools in both the United States and Canada" (Study Island, n.d.) currently use Study Island. However, very little information and literature are available that support Study Island's effect on student achievement test scores.

The remainder of the chapter will briefly describe the current study's research problem and purpose as well as provide the research questions that will guide the study. In addition, the remainder of the chapter will provide an introductory literature review that supports the study, explain the need and rationale for the study, and also describe the methodology that will be used to answer the research question.

Background, Context, and Theoretical Framework

Technology usage has become a highly recommended learning tool in today's classrooms. According to NCLB, technology-integrated instruction positively impacts student achievement (U.S. Department of Education [USDE], 2004). In fact, many low-performing schools, under this law, have been mandated to integrate technology into classroom lessons.

However, the topic of whether or not technology increases student achievement is not without debate. There are many educators who perceive the integration of technology as a best practice while some others believe that this practice is not necessarily useful. For example, Loertscher (2009) and Milbury (2005) supported the idea of technology being used in the classroom to enhance curriculum and instruction. Loertscher suggested for media specialists to promote student achievement by constructing their knowledge of a vast variety of technologies that enhance teaching and learning. Furthermore, Milbury recommended for teachers to collaborate with media specialists to become more competent and confident about effectively using technology to increase student understanding. In contrast, Hashemzadeh and Wilson (2007) and Cardenas (1998) provided specific situations where technology does not necessarily increase student levels

of engagement or achievement. Nevertheless, despite the ongoing debate, technology has found its place in school systems and continues to be a factor that administrators consider when conducting teacher evaluations.

Theoretical Framework

The theoretical framework that grounds this study is the constructivist learning theory. Constructivism emphasizes that students actively build new knowledge from past and/or current experiences, which allows them to bridge connections between newly learned information and their environment (Glatthorn, Boschee, & Whitehead, 2009). In this manner, constructivism promotes various instructional techniques such as differentiated and student-centered learning by allowing students to explore concepts for themselves to find answers (Glatthorn et al., 2009). John Dewey (1938) supported this theory by stating that instruction must enhance a student's curiosity to explore and allow the student to create meaning of his own world. In addition, today's educational researchers have not abandoned the constructivist theory by including in their literature the need for teachers to create student-centered learning environments to allow students to use preexisting knowledge to construct new knowledge. According to Darling-Hammond and Bransford (2005), people of all ages "actively attempt to interpret [their] world based on [their] pre-existing skills" (p. 52). Thus, the constructivist theory proposes for learning to be exploratory and hands-on (Glatthorn et al., 2009). Jadallah (2000) supported this statement by discussing how constructivism promotes student-centered learning, while opposes teacher-centered direct instruction (i.e., lecture).

Relating Study Island to Constructivist Theory

Many of today's students possess prior knowledge about computers and computer game applications (Rosario & Widmeyer, 2009). Because the Study Island program is computer-based, it promotes constructivist learning in that it allows students to use these prior experiences and knowledge to learn new content. Glatthorn et al. (2009) supported this idea by stating that technology allows students to experience an active, creative, and exploratory learning environment. More specifically, Study Island creates this type of exploratory learning experience through its online games and interactive assessments. The games and assessments allow students to problem-solve using multiple strategies as well as inquire (by accessing an "explanations" tab) and receive feedback about their responses.

Technology's Impact on Student Achievement

Several recent studies have suggested that technology-integrated classrooms have been shown to increase student achievement. Milbury (2005) discussed the need for school media specialists to become active members within their professional learning communities by engaging in collegial discussions with teachers about technology. Furthermore, Hall and Hargis (2004) conducted action research to investigate the impact of digital technology on the achievement of 10th-grade chemistry students. Cobb (2010) also supported technology integration; however, he suggested that differentiated instruction yields a greater increase in student achievement than technology that is geared towards direct-teaching methods. He supported his ideas by demonstrating how Compass Learning, which is a computer program that tailors reading instruction and assessments to

student abilities, was effective in increasing student achievement for economically disadvantaged minority students.

Hadsell (2009) also supported the idea of technology being used to increase student performance. The author conducted a correlational study which shows students' "timely, consistent completion of online quizzes is associated with increased exam scores" (p. 139). More specifically, the author suggested that, along with online quizzes providing immediate feedback, they also appear to keep students on track and more focused on staying current with their studies.

Study Island's Impact on Student Achievement

The Study Island website, www.studyisland.com, contains articles that support the computer program's positive impact on student achievement. Styers (2012b) states how digital learning programs, such as Study Island, increase student achievement while also "result in cost savings" (para. 2). In the same year, Styers (2012a) also indicated in another article, "Developing Student Mathematics Skills: How Study Island Aligns With Best Practice," how Study Island increases student achievement by offering the learner differentiated instruction and progress monitoring with timely feedback. In addition, the article suggested that Study Island "fosters [student] motivation by focusing on assessment and student mastery of content" (para. 23). However, one must note that Styers is one of many researchers hired by Study Island to conduct research for the software company. Therefore, the articles' credibility can be questioned because of a possible researcher bias.

Alternative Views

Some educators are not full supporters of technology integration. For example, Gratton-Lavoie and Stanley (2009) conducted a study on college-level economics students and compared traditional learning in classrooms to online learning. The results showed no significant difference in achievement between the two groups. Gratton-Lavoie and Stanley concluded that other factors such as age, marital status, number of children, and so forth, play an integral role in students' academic performance.

Furthermore, Cardenas (1998) discussed the many disadvantages of technology usage. She explained how the technology itself can fail (e.g., problems with the server, loss of video signals). She also proposed that courses that are "delivered by technology do not compare in quality with traditional classes" (Cardenas, 1998, p. 28). She indicated that teachers who are accustomed to "moving around the classroom" (Cardenas, 1998, p. 28), acknowledging students by name, and learning students' individual differences may agree that technology is no replacement for excellent teaching.

Relating the Gaps in the Literature to the Research Questions

The research questions is, Is there a significant difference in gain score in students' math achievement tests between the semester that students received the Study Island intervention and the semester that students did not receive Study Island? Although school districts have adopted the Study Island computer program as a means of increasing student achievement, there is no credible data available that support Study Island's positive impact on student achievement. The research studies that currently exist about the program were conducted by researchers who have been in a contractual agreement with Study Island since 2008 (Watts, 2009, 2010). Therefore, the consulting

firm may have received compensation for conducting research for Study Island. Because of this, the information that the researchers have gathered and published on the website may be partial towards Study Island's positive impact on student achievement. This raises the question of whether or not the studies' findings are credible and free of researcher bias. It also raises the question of whether or not Study Island has only published on its website the studies that showed student achievement, which serves as a marketing tool to gain new customers and keep existing ones. Therefore, the gap in literature is that little independent research is available that shows Study Island's impact on student achievement. Also, of the scarce information that exists, no current studies of the computer program's impact on student achievement was conducted by researchers who do not benefit from producing favorable results. In addition, 10 out of the 11 research studies that exist are conducted using a predominantly White and middle- to upper-middle-class socioeconomic demographic population. Therefore, the current research found on the company's website may only be the data that the company has chosen to display. The current research sought to fill the gaps in the literature by broadening the knowledge base about the program's impact on student achievement by attempting to offer unbias results and procedures that either solidified or nullified the existing research studies. In addition, the research study used a student population that is predominantly Hispanic and African American and of which 93% are from low-income families. The research questions attempt to be answered for this student population and broaden the knowledge base of whether Study Island is an effective instructional tool for this student demographic.

Statement of the Problem

There is a gap in the literature regarding Study Island's effect on student achievement performance. Study Island's website indicates that the program is "research-based" and proven effective because it offers 15 research studies that are available to the public (on the website). However, after careful evaluation of these studies, several concerns have become apparent.

The first concern is that all of the studies were conducted by one educational consulting firm that has contracted with Study Island to conduct research for them (Watts, 2009). Therefore, one can question whether or not the favorable results published were also of benefit to the firm. Porter and Malone (1992) described how conflict of interest arises when "personal gain becomes a significant second master" (p. 149). Therefore, the hiring of the consulting firm by Study Island to conduct research can possibly cause a certain conflict of interest if the consulting firm is benefitting financially from the position. Likewise, if this situation is even questionable, the credibility of the existing research studies is debatable.

As previously stated, the second concern is that 10 of the 11 studies that exist use a predominantly White and middle- to upper-middle-class student population. Therefore, the said proven results of Study Island's positive impact on student achievement may not be evident with an economically disadvantaged, minority student population. According to Cherlin (2010), demographics are a major component of research and have the potential to influence research process and results. Thus, after exploring the literature, there is not enough research that supports the program's effects on student achievement in math.

Purpose of the Study

The purpose of the current study is to compare student math achievement scores before and after the Study Island intervention is used. Careful review of the literature indicates that there is very little information and literature from independent research available that supports Study Island's effect on student achievement performance; however, school districts, nationwide, continue to subscribe to Study Island yearly and make it a predominant teaching tool in the classroom. Therefore, this study used a descriptive comparative research design to determine if a significant difference in math achievement exists between the semester that students use Study Island and the semester that students did not use Study Island.

Research Question and Hypotheses

The research study was guided by the following research question and hypotheses:

Research Question: Is there a significant difference in gain score in students' math achievement tests between the semester that students received the Study Island intervention and the semester that students did not receive Study Island?

Alternative Hypothesis: There is a significant difference in gain score in students' math achievement tests between the semester that students received the Study Island intervention and the semester that students did not receive Study Island.

Null Hypothesis: There is no significant difference in gain score in students' math achievement tests between the semester that students received the Study Island intervention and the semester that students did not receive Study Island.

Rationale, Relevance, and Significance of the Study

Rationale

As previously described, the gap in literature is that little independent research showed Study Island's impact on student achievement. Also, of the scarce information that existed, no current studies of the computer program's impact on student achievement was conducted by researchers who do not benefit from producing favorable results. In addition, the current research found on the company's website may have only been the data that the company has chosen to display for commercial purposes (to gain customers and keep existing ones). Therefore, the current study is needed because it can broaden the knowledge base about the computer program's impact on student achievement. Furthermore, the study was conducted by a researcher who receives no benefit from producing favorable results, which helps to eliminate doubt of researcher bias. The current study is also needed because it attempts to provide more information about whether Study Island can be used to increase achievement for schools for a minority, low income student population.

The current study compared the mean gain in test scores of the semester that students received the Study Island intervention to the mean gain in test scores of the semester that they did not receive Study Island to examine if a significant difference exists between the two semesters. The analysis and comparison of the student achievement scores can be used as a resource for school districts in determining the role that Study Island should play in the math curriculum.

The research study can also provide a foundation for future research. Since this study used a descriptive comparative design to compare the mean increase in math test

scores of students before and after they receive the Study Island intervention, the results cannot imply that Study Island, alone, impacted student achievement because an experiment was not conducted (Lauer, 2006). In this way, the study established a foundation for researchers to conduct future experimental studies to investigate whether or not Study Island increases student achievement in math.

Relevance

According to Posavac (2011), educational research should be conducted to, not only benefit the participants, but also the necessary stakeholders and the community at-large. Research should, in some way, improve a field of knowledge or practice (Simon-McWilliams, 2007). Likewise, the results of the current study can impact all educational stakeholders in the participating school district as well as other school districts across the country that use the Study Island program. If the results of the study indicated that students had a significantly higher increase from pretest to posttest in the semester that students used Study Island compared to the semester that students did not use Study Island, the district administrators of the intended school district may possibly feel confident that the purchasing and implementation of Study Island in the classrooms are positively impacting student achievement. Therefore, the district administrators may begin mandating for teachers to embed Study Island into their lessons and also integrate Study Island into their teacher evaluation system. District administrators may also allot more spending toward professional development that focuses on training teachers on how to effectively implement Study Island in the classroom. Also, if the results are favorable for Study Island, teachers who were not using the Study Island program may begin integrating Study Island in their lesson plans and collaborating with veteran users about

the most effective ways of using Study Island to increase student achievement. In addition, aside from analyzing the test score data generated from common unit assessments, teachers may also begin analyzing the assessment data generated from the Study Island program itself. Furthermore, because Study Island is a computer program that can be accessed from any device that uses the Internet, parents may become more proactive about encouraging their children to use it at home. Overall, school district administrators that use Study Island may feel confident in purchasing and implementing the computer program in their schools, and may use this research study as a resource for continuing its implementation.

However, if the results of the study indicated that there was no significant difference in student achievement between the semester that students used Study Island and the semester that students did not use Study Island, the participating school district may desire to further investigate the components of the study to determine if the unfavorable results for Study Island were possibly caused by the computer program's learning applications or the process in which it was administered. Also, district administrators may question Study Island's advantageousness in the school system and eventually discontinue its use. Similarly, these results may cause teachers to discontinue using Study Island or use it only as a secondary resource in the classroom and begin resorting to other available technology programs for increasing student achievement. Furthermore, because Study Island has been used in the participating school district for over six years and heavily supported by the school district as a means of increasing student achievement, the unfavorable results for Study Island may cause parents to lose

some faith in the public school system and may desire to explore other methods for educating their children.

Significance

The current study is significant because it relates the constructivist learning theory to computer-based learning. As previously discussed, the constructivist learning theory emphasizes that students actively build new knowledge from past and/or current experiences, which allow them to bridge connections between newly learned information and their environment (Glatthorn et al., 2009). The computer-based learning program, Study Island, integrates constructivism in that it allows students to use their prior experiences and knowledge in a student-centered environment. The findings from this study could add to the constructivist learning theory in that it provides insight about whether or not the application of the constructivist learning theory in Study Island supports student achievement in mathematics.

Furthermore, the current study is significant because it supports the improvement of curriculum and instruction. Since the NCLB Act of 2001, schools nationwide have been charged to use technology in the classroom to enhance instruction and increase student achievement (USDE, 2004). Study Island is a computer program used by many school districts to increase student achievement. However, little information and literature are available that show Study Island's impact on student achievement. Therefore, the current study compared the pre- and posttest data of students before and after they used Study Island to supplement math instruction to examine the program's impact on student achievement. Because Study Island is used by many school districts across the United States and Canada, this study can serve as another resource for