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The Effect of Study Island Software on Grades 9-11 State Scores in Literacy

Peter P. KIRIAKIDIS[1]
Rodney L. GERNERT[2]

Abstract

At the research site, which was one high school within a public school district, state scores in literacy of Grades 9-11 indicated that students were not meeting academic standards. Study Island software was integrated into the literacy curriculum for Grades 9-11 students to help them improve their proficiency in literacy. The purpose of this quantitative study was to examine the effect of Study Island on state scores in literacy. The theoretical framework was based on Tomlinson's differentiated instruction theory. Data were collected from Grades 8-11 students who did not use Study Island in Grade 8 and used Study Island in Grades 9-11. Data were analyzed using one-way repeated measures ANOVA. The findings indicated that students' reading proficiency scores were significantly higher after Study Island was used in Grades 9-11. These findings can be used by school and district administrators regarding the integration of Study Island into other academic subjects. The use of Study Island in academic subjects in Grades 9-11 may help students pass standardized tests and graduate from high school.

Keywords: *computer assisted instruction, high school literacy and resources, integration of technology into literacy curriculum, reading comprehension, reading strategies, reading habits, reading comprehension using technology, state scores in literacy, and technology on reading.*

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Introduction

A standardized test is standards-based criterion-referenced assessment used to measure student achievement of the state academic standards (U.S. Department of Education, 2014). Proficiency in literacy is the satisfactory academic performance on standardized tests. Study Island is a software designed to help students in mastering state standards.

At the research site, which was one high school within a public school district, state scores in literacy of Grades 9-11 indicated that students were not meeting academic standards (e.g., standardized scores in literacy were below state average for over 3 academic years). Study Island software was integrated into the Grades 9-11 literacy curriculum to help students improve their proficiency in literacy as measured by standardized tests. States administered standardized tests to assess student proficiency in reading and writing (U.S. Department of Education, 2014). Literature review revealed a national literacy crisis in the U.S (Cookson, 2009; Garner, 2010; National Assessment of Educational Progress, 2011; Odden, 2009) because literacy students need to develop higher order thinking skills (Duke, 2010; Gewertz, 2010) to increase their reading proficiency (Chen, Chen, & Sun, 2010; Meyer, Wijekumar, & Lin, 2011; Weih, 2013).

Research Problem

At the research site, district and school administrators decided to integrate, Study Island, which is web-based reading program, into the Grades 9-11 curriculum to help students in developing higher-level thinking, analytical, and problem-solving skills, and in meetings academic standards. District and school administrators needed research-based evidence regarding the effect of Study Island on standardized tests in literacy in order to make decisions on the allocation of human and capital resources for training of literacy teachers to use software in the classroom and to integrate Study Island into the curriculum of other academic subjects.

Research Question and Hypotheses

The research question that guided this study was:

What is the effect of Study Island software on the proficiency of Grades 9-11 students in literacy as measured by standardized tests?

H_{o1}: There is no statistically significant difference in the Grades 9-11 students' proficiency in literacy as measured by standardized tests before and after the integration of Study Island software into the literacy curriculum.

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H_{a1}: There is a statistically significant difference in the Grades 9-11 students' proficiency in literacy as measured by standardized tests before and after the integration of Study Island software into the literacy curriculum.

Assumptions, Limitations, Delimitations, Scope, and Delimitations

Assumptions included: (a) literacy teachers used Study Island in the classroom; (b) students in literacy classes used Study Island in the classroom. Limitations included: (a) standardized test scores in literacy were archived data and (b) the scores were from Grade 8 students who participated in state tests without using Study Island and from the same students who participated in state tests by using Study Island in Grades 9-11 at the research site. The scope of this study was state scores of Grade 8-11 students who attended school at the research site in the academic years 2009–2013. The findings of this study may not be applicable to other school districts.

Literature Review

Reading instruction should include fluency, phonics, and phonological and vocabulary awareness (Rupley, 2009) to help students develop reading comprehension (Bluestein, 2010; Kamil et al., 2008; Ness, 2009; Nixon, Saunders, & Fishback, 2012). Reading scores of high school students are at substandard levels (Cookson, 2009; Garner, 2010; Jude & Udosen, 2012; Odden, 2009) because students have not developed language skills via reading (Fahser-Herro, 2010). When students read more, then their reading skills increase (Abdullah et al., 2012; Swanson & O'Connor, 2009) by using reading comprehension strategies (Ness, 2009) such as scaffolding (Prescott, 2010). Reading comprehension programs include reading comprehension strategies (Dewitz, Jones, & Leahy, 2009). Software reading programs can be used as reading comprehension intervention tools for students to improve reading proficiency (Attaprechakul, 2013; Baleghizadeh & Babanour, 2011; Fatemi et al., 2014; Kuhi & Yavari, 2013; Rosenthal & Ehri, 2011; Zarei et al., 2012). Reading software programs are designed to interact with students (Akinbobola & Afolabi, 2009) by retelling a story to increase reading comprehension (Hedin & Conderman, 2010; McNeil, 2011; Norman, 2012; Pang, 2013) via dialogue with peers and teachers (Maine, 2013) where teachers encourage students to read (Meyer et al., 2011; Murphy & Fink, 2012) and monitor students' progress (Chen, Chen, & Sun, 2010). Literacy software can provide students with immediate feedback (Mckie et

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al., 2012) to help students increase their comprehension (Wolff et al., 2013) via practice worksheets (Magliano et al., 2011; Wild, 2009). Reading software may increase student engagement in reading (McCullough, 2011; Park, 2013). The integration of software into the curriculum may help students with auditory and graphic enhancements (Souleyman, 2009; Stetter & Hughes, 2010).

Setting, Population, and Sample

Approximately 1,600 Grades 9-12 students attended the school at the research site per academic year. For the purpose of this study, scores were collected for 4 academic years giving a population of $N = 6{,}400$.

The sample consisted of scores of Grades 8-11 students. A sample size of $n = 363$ was appropriate to reflect the population with 95% accuracy along with a confidence interval of 0.5.

Instrumentation and Materials

Students were administered standardized tests in literacy by the state at the research site. The standardized test in literacy was a standards-based criterion-referenced assessment, which includes *advanced*, *proficient*, *basic*, and *below basic* assessment scale scores. Standardized tests were multiple-choice and open-ended. There is great consistency of reliabilities of the state scores, measuring in the low 0.90s (The Pennsylvania Department of Education, 2014).

Selection Criteria

The selection criteria included Grades 8-11 students who participated in literacy testing administered by the state. Grades 9-11 students attended the same school at the research site. Grade 8 students attended middle school within the school district.

Grades 8-11 students were 81% Caucasian American, 12% Hispanics American, and 7% African American. The ratio of students to teachers was 15:1. All literacy teachers were state certified and fulltime teachers at the research site.

Data Collection

For every Grade, (a) approximately 400 students participated in state tests in literacy and (b) 100 scores were randomly selected from the list of scores provided by the state department of education via the administrator responsible for research at the research site (i.e., all scores were matched per

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student). Archived state scores were provided by the administrators responsible for research at the research site in electronic format based on the selection criteria where for every student's his or her Grades 8-11 state scores were matched. For example, a student was in Grade 8 in a middle school within the school district and participated in the Grade 8 standardized test in literacy in the academic year 2009-2010. The same student participated in the Grade 9 standardized test in literacy in the academic year 2010-2011, in the Grade 10 standardized test in literacy in the academic year 2011-2012, and in the Grade 11 standardized test in literacy in the academic year 2012-2013 at the same high school. The literacy classrooms had the reading software installed in the literacy classrooms at the school where he or she attended. An example of the data collected is depicted in Table 1.

Table 1 - State Scores per Grade for Matched Students

Student	Grade 8 2009-2010	Grade 9 2010-2011	Grade 10 2011-2012	Grade 11 2012-2013
1	300	299	305	307
2	399	422	433	421
3	450	455	456	444
4	500	515	523	531
…	…	…	…	…
100	608	611	610	599

Each score contained three digits such as 123 with no decimal places. No description of the school or names of students were included during the data collection process implying that the participants' identities were kept confidential protecting the confidentiality of teachers, students, and administrators at the research site.

Data Analysis

State scores were entered into SPSS 20.0 for analysis. The scores were matched for each student who attended Grades 8-11 within the school district at the research. For each grade, 100 scores were entered and matched with each student.

Data were analyzed using within-subjects one-way repeated measures ANOVA. This methodology was selected for repeated measures on the

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same subjects (i.e., same student who participated in standardized tests in Grades 8-11 at the research site where the software was not used in Grade 8 and was used in Grades 9-11).

One-way repeated measures ANOVA and paired-samples *t* test are both appropriate for comparing scores in before and after designs for the same participants. Repeated-measures designs are considered an extension of the paired-samples *t* test when comparisons between more than two repeated measures are needed. For the purpose of this study, the first measure was state scores from Grade 8 students, who were taught without the use of the reading software, and the next three measures were state scores taken over 3 years when the same students were in Grades 9-11 and were taught literacy by using the software in the classroom. One-way repeated measures ANOVA was employed to measure change in state scores upon students' entry into a new literacy program in Grade 9, 1 year into the program (Grade 10), and 2 years into the program (Grade 11).

Descriptive statistics were computed. A *F* value indicated that the differences between treatments were greater than would be expected by chance or error alone. Pair-wise comparisons were conducted to assess the means that differ from each other.

Findings

In this study, there were 100 participants and 4 measures (Grades 8-11 scores). Descriptive statistics are shown in Table 2.

Table 2 - Descriptive Statistics for Grades 8-11

Measure	*M(SD)*
Grade 8 testing in 2009-2010	632.66(114.69)
Grade 9 testing in 2010-2011	645.63(115.71)
Grade 10 testing in 2011-2012	652.84(111.46)
Grade 11 testing in 2012-2013	660.63(109.42)

The *F* value was 34.09, $p = .011$. The between groups *SS* was 42386 with $df = 3$. The partial η^2 was .2561. To test for significance, a confidence level at or above 95% ($a = .05$) was used.

The means were different. The null hypothesis was rejected. The alternative hypothesis was accepted. Based on the findings, the Study Island software helped students improve their proficiency in reading as measured

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by state tests. The analysis was considered statistically significant, $F = 34.09$, $p < 0.05$. There was a significant statistical difference in the mean state scores.

Discussion of the Findings

The findings were in line with the findings of scholars that reading interventions help students improve their reading proficiency (Clements, 2009; Daisey, 2009; Fahser-Herro, 2010; Kashef et al., 2014). Reading software that uses reading strategies may have an impact on reading comprehension (Ness, 2009; Nosratinia & Shakeri, 2013; Rupley, 2009). Literacy teachers should use Study Island software in their classrooms to help students increase their proficiency in reading comprehension (Duke, 2010; Gallagher, 2009; Gewertz, 2010; National Assessment of Educational Progress, 2011; O'Connor, 2009). Study Island software can help students in understanding what they have read (Abdullah et al., 2012) via visual representations (Anderson, 2008; Rosenthal & Ehri, 2011) and feedback (Pang, 2013) when students tailor reading content (Macaruso & Rodman, 2009; Meyer et al., 2011).

The findings provided empirical evidence that the reading scores of Grades 8-11 students increased after the integration of Study Island into the curriculum. These practical applications of the findings of this study may be of interest to researchers, policymakers, parents, and the community. Literacy teachers might need professional development on how to use Study Island to improve their pedagogies and the use of software. School and district administrators could use these findings for the allocation of educational software funding. Professional development providers may benefit from having an awareness of the benefits of the integration of Study Island software into the high school curriculum. District and school administrators should identify strategies for the successful integration of Study Island software into the curriculum.

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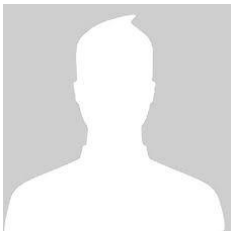
Biodata



Peter KIRIAKIDIS, PhD, has earned a doctorate degree in Educational Leadership in Higher Education. Peter's educational, IT, and research leadership relates to inspiration, direction, clear focus, vision, mission, and excellence. In the past 20 years, his successful administrative, consulting, training, teaching, and IT experience at the university, college, and K-12 levels has been an involved and intense one in a multicultural/diverse environment. Peter has expertise in quantitative, qualitative, and mixed-methods research. As a University Research Reviewer and research faculty, Peter's role is that of a content expert, research methods expert, and editor. Peter has been serving on EdD, PhD, and DBA doctoral committees. As a research reviewer, Peter ensures that a dissertation meets high quality academic standards set forth by the university.

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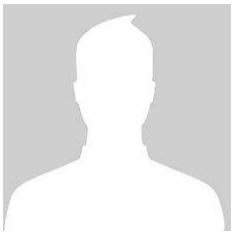
Dr. Kiriakidis has program and project management experiences including the development and evaluation of graduate and undergraduate programs and courses for industry and institutions of education. Peter has conducted research for large school districts related to (a) the evaluation of the effectiveness of professional programs for teachers on student achievement as measured by standardized mandated testing, (b) the development of district-wide policies and procedures based on test scores in science, math, reading, and language arts literacy; and (c) schools and district performance of instructional practices and enhanced curricula. Peter has also conducted research for large graduate colleges and universities related to (a) interactions between online students and instructors, synchronous and asynchronous communication in the online learning environment, (b) the development of policies and procedures for online course delivery, and (c) enhancement of curricula.

Dr. Kiriakidis has expertise in higher education educational leadership: (a) chairing comprehensive examinations and EdD, PhD, DBA, and MA committees; (b) developing and evaluating curriculum and academic programs; and (c) teaching graduate courses in research, educational leadership in higher education, educational and information technology, online technology, e-commerce, software development, and information systems. Peter is a reviewer of many peer-reviewed academic national and international journals. Peter has presented a plethora of research studies nationally and internationally.



Rodney L. GERNERT has expertise in teaching high school academic subjects. Rodney's current role is teacher. Rodney has facilitated and supported district initiatives related to software for literacy and math classes.

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