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WHAT IMPACT DOES THE SOFTWARE STUDY ISLAND HAVE ON 4SIGHT,

PSSA, AND NOCTI ASSESSMENTS OF PART-TIME CTE STUDENTS?

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Abstract

The impact of the No Child Left Behind Legislation has left Career and Technical Education searching for methods and strategies to infuse academics into their curriculum to help students, through a rigorous and integrated educational experience, develop competencies required for higher education and ultimately, work. Unfortunately, there were pressures placed on states, districts, and schools to arrive at certain preset bench marks where ultimately, by 2014, all students would reach the 100 percent proficiency benchmark in state standardized achievement assessments. The NCLB along with IDEIA, partnered to make sure that all students with IEPs or 504 plans were held to the same standards regarding participation in these standardized assessments and also in the reporting process (Cornell University Law School website, n.d).

This study looks at one part-time suburban Career and Technical Center and measures the impact of the software, Study Island, used to integrate academics into their Career and Technical Education programs. Specifically, 4Sight, PSSA, and NOCTI assessments were examined for effect and relationship with Study Island for students without IEPs and students with IEPs. Study Island is tutorial software that aligns with the state's core curriculum and standards.

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Chapter 1

Introduction

Historical Perspective

From the Elementary and Secondary Education Act (ESEA) stemmed the No

Child Left Behind (NCLB) Act of 2001 (No Child Left Behind Act of 2001 (Public law

107-110), 2001). This created an era of accountability for all elementary and secondary

schools in the United States. To keep pace with NCLB in Career and Technical

Education (CTE) the Carl D. Perkins Act of 2006 initiated the CTE Improvement Act of

2006 that mandated schools that received federal funding from Perkins to develop rigid

academic and technical standards that improve skill sets of students who choose to attend

Career and Technical Centers (CTCs) that will prepare them better to enter post-

secondary institutions and the workforce (Carl D. Perkins Career and Technical

Education Act of 2006 (Public Law 109-270) website, 2006). The Perkins Act ensures

that CTCs will provide the necessary services that will enable all students to achieve at

this level, to improve the tech prep initiatives, enable the state and localities to research

best practices, provide professional development for teachers, administrators, and

guidance personnel, to develop strong partnerships between postsecondary institutions

and business and industry, and to develop a workforce that will keep the United States

competitive in the global workforce. Under the authority of the NCLB Act, schools

became accountable and are measured by achievement on standardized testing. There are

annual publicized report cards and schools become at-risk of losing Title 1 and Perkins

funding if schools do not reach increasingly higher rates of proficiency on standardized state assessments ("Report card on the schools", 2010).

     School implemented strategies.

     Although this study focuses on student learning, it is imperative to understand the legislation that drives school improvement which has led to strategies towards that end. As a result of pressures on CTCs to improve accountability, many strategies have been implemented to raise CTE students' achievement on standardized assessments. Curriculum maps have been created that identify all of the standards and objectives and academic standards have been aligned with each objective as is appropriate. Initially the standards were broad, but academic anchors and eligible content sprouted from the standards to create specific and detailed examples of what may appear on the standardized assessment (SAS Standard Aligned Systems, n.d.). Professional development and in-services increased as a result of NCLB for CTC teachers to guide them in infusing academics into their CTE disciplines. Many numeracy and literacy strategies were integrated into theory lessons to ensure that students were receiving instruction in a variety of ways to account for the many learning styles of students. There became available grants for tutoring and as a result many schools were able to provide additional instruction after school hours. There were also grants for reading and math coaches to assist teachers in incorporating academics into their CTE curriculum. In the sending districts, schools were adding remediation courses for those at risk of not being proficient. 4Sight testing was incorporated in the sending districts and those districts that did not show adequate yearly progress (AYP) were mandated to adopt these tests and

give them four times a school year (Success for All Foundation, n.d.). CTCs were faced

with the challenges of how to remediate without losing valuable technical theory and

laboratory time. As a result, schools adopted strategies that were least invasive or that

blended in with regular technical theory instruction. Many schools implemented

Computer Aided Instruction (CAI) such as Carnegie, Plato, and Study Island. The school

of this study implemented Study Island and the students get pulled from their technical

discipline for 30 to 45 minutes per week.

Not only do the students have to be proficient in academic skills as measured by

the state academic assessment, but they also have to be proficient in their technical skills

as measured by the end-of-program NOCTI assessment.   One strategy to help CTE

students achieve academically is integration of academics in CTE instruction. The

Pennsylvania Department of Education Bureau of Career and Technical Education (PDE

BCTE) implemented several professional development activities for teachers to increase

academic achievement of CTE students. PDE adopted programs such as Governor's

Institutes where teachers and administrators of CTCs could attend and learn strategies to

incorporate academics into all CTC programs (Pennsylvania Staff Development Council

website, 2009). Currently there is another initiative called the Technical Assistance

Program (TAP) also through Pennsylvania Department of Education (Bureau of Career

and Technical Education website, n.d.). This is a mandated initiative for CTC schools in

Pennsylvania in which CTC teachers, academic teachers, and CTC administrators learn

how to integrate numeracy and literacy strategies into CTE disciplines. By relating to the

sending districts that this suburban CTC could do more to help students meet proficiency

scores in the PSSAs, they may continue to send 10th graders. Some part-time CTCs

implemented additional strategies to remediate students. For example some schools,

implemented competency-based electronic tutorials such as Study Island." (Study Island

website, 2010). This suburban CTC worked in concert with a sending district to let the

CTC implement the electronic tutorial, Study Island, on site so the students would not

have to be pulled back to the sending district for remediation. Study Island is a computer

aided instruction software that is aligned with the PSSA achievement test required for all

11th grade students in Pennsylvania. This software, the focus of this study, will be used

as an independent variable to determine if, when used, will help students learn and

improve scores.

The Problem

This study will attempt to investigate if part-time CTCs can enhance students'

scores, at least to the proficiency level, in the PSSA state standardized assessment, the

NOCTI assessment, and improve students' overall educational experience by integrating

academic assistance in grades 10 through 12. More specifically, the purpose of this study

is to determine if Study Island, a Software package designed around the Pennsylvania

State System of Assessment (PSSA), will aid IEP and non IEP students in achieving

proficiency scores on both the PSSA and NOCTI exams in the part-time career and

technical center of this study. The purpose of including IEP students in this research is

because they make up 53 percent of the senior class that is the focus of this study. Unless

the IEP students qualify for the Pennsylvania Alternate State Assessment, (PASA) they

are part of the school's overall accountability system. Thus, it is necessary to make sure

IEP students receive the necessary accommodations and assistance that will make them successful as well. Federal regulation, specifically United States Code 1412 (16), requires that students with disabilities must be included in state accountability systems and must be included in the assessment results reporting process (Cornell University Law School website, n.d).

Overview of CTC of this study.

The CTC of this study is a half-time technical school residing in suburban Philadelphia (hereafter referred to as Suburban CTC) for grades 10 through 12. With a few exceptions, the sophomores attend in the morning session and the juniors and seniors attend in the afternoon session. There is a 53 percent IEP population that is predominantly learning disabled. There are six cluster areas which include Architecture and Construction, Arts, A/V Technology and Communication, Human Services, Hospitality and Tourism, Manufacturing, and Transportation and Distribution. There are four major sending districts and one parochial school that feed this CTC. The male population makes up 68.5 percent of the total student population and the female population makes up 31.5 percent.

Research Questions

The following research questions will be addressed:

1. To what degree does Study Island Software aid all students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

2. To what degree does Study Island Software aid IEP students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

3. To what degree does Study Island Software aid all students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

4. To what degree does Study Island Software aid IEP students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

5. To what degree does Study Island Software aid all students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

6. To what degree does the Study Island Software aid IEP students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

Significance of the Study

The significance of this study will help to determine if Study Island, a Software package developed in line with Pennsylvania Standards and common core indicators, will aid non-IEP and IEP students in achieving proficiency scores on both the PSSA and NOCTI exams in this part-time suburban CTC. Many part-time CTC schools have used a multitude of strategies and initiatives to help improve student academic learning for purposes of boosting career skills as well as improving academic achievement. Currently

there is not, nor has there ever been a part-time CTE in the state of Pennsylvania that made the threshold for AYP.

Limitations

There are a few limitations to this study including the diverse learning population, lack of parity of the different assessments, the frequency and amount of time each student spent on the Study Island Software, and the diverse academic backgrounds of the Study Island facilitators. The researcher recognizes that there are many factors other than Study Island that influence student achievement at the suburban CTC. The author is not able to isolate the effects of Study Island from other factors. Therefore, the methodology will be limited to the use of regression analysis that shows the relationship between student performance on Study Island and student achievement measured by standardized tests.

First, the suburban CTC that was studied has a 53% IEP population including students who have been diagnosed with learning support, emotional support, gifted, economically disadvantaged, and students who have a 504 plan. A 504 plan is for students not qualifying for an individual education plan (IEP) and is aligned with the Americans with Disabilities Amendment Act (The ADA Amendments Act of 2008, n.d.) to accommodate students to be part of inclusion classrooms (Ed.gov: U.S. Department of Education, n.d.). In a larger academic facility, some of these classifications equal forty or more students which then can be categorized as groups that can be evaluated within their

own sub-groups. The school that was being studied is not large enough to have sub-groups this large.

Second, the three assessments, Study Island, 4Sight, and PSSA exams, all have their way of scoring which is different from one another. Study Island exams, 4Sight exams, and NOCTI exams have purely raw scores whereas the PSSA state assessment reports raw scores and scaled scores. Even though the three tests have raw scores, the number of questions is different and a proficiency score in one is unrelated or unequal to a proficiency score in another. When comparing across tests, it is necessary to use cut score means and medians for proficient and advanced score interpretations.

Finally, the original time-Table for Study Island work shops were originally designed for one half hour per week. Some students found that this was not enough time so extended their time to forty-five minutes or even an hour. Some students wanted only the one-half hour as they didn't always take it seriously and just wanted it over with. Students were assigned user names and passwords and since this was a web-based program, students could log on at home as well. Some students did this and some did not. Although hours were tracked for time online, it didn't necessarily mean it was productive time for the students.

Definition of Terms

Academic Anchors: Academic anchors stemmed from the academic standards and are specific to questions that may appear on the PSSA exams. (Pennsylvania Department of Education website, n.d.). Anchors are critical to CTE teachers in that they develop curriculum maps (Stone, III, Alfeld, & Pearson, 2008, p. 778) where they list each duty

and task and beside each task associate a corresponding math, reading, or science anchor. This helps the CTE teacher apply and incorporate the appropriate academic component relevant to the lesson.

Eligible Content: Eligible content is actually the content of the standards that are examples of problems and questions in the form that they may appear on the actual exam (Pennsylvania Department of Education website, n.d.). This helps both academic and CTE teachers develop sample problems that are much like the eligible problems found on the 4Sight and PSSA Exams.

Emotional Support : Term used to describe a diagnosable mental, behavioral or emotional disorder that lasts for a significant duration that meets the criteria within the Diagnostic and Statistical Manual of Mental Disorders (Pennsylvania Department of Education website, n.d.).

IEP: Individual Education Plan

Learning Disabled: Special education term used to define a disorder in one or more of the basic psychological processes involved in understanding or using language spoken or written that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or do mathematical equations (Understanding Special Education website, 2009).

4Sight Exams: An exam created by PDE that contains a number of sample questions relating to the PSSA exams (Pennsylvania Department of Education website, n.d.). These were designed by PDE to help remediate students and prepare them for the PSSAs by using drill and practice theoretical framework. Schools that come under corrective action for not making AYP are required to purchase these and use these to help find

weaknesses and target those weaknesses in order to be successful on the state assessments. Schools use these however to mimic the PSSA Exams as they have the feel of the PSSAs. They can use these exams to target weaknesses and also to simulate a real time PSSA testing experience. 4Sight Exams are typically given 4 times a year in order to create benchmarks for improvement. Typically schools use an accompanying drill and practice Software to remediate and target weaknesses that emerge for each student in the 4Sight Exams.

504 Plan: Section 504 of the American with Disabilities Act guarantees that a child with a disability has equal ACCESS to an education and that it is comparable to an education provided to those who do not have a disability (Understanding Special Education website, 2009).

Assumptions

In this study, the following was assumed:

1. Most students performed at a level to their best ability.

2. The work done was the students' own.

3. Some students would not take the practice Software seriously.

4. IEP students would not perform at the level of all students.

5. The students would spend at least one half hour a week in school on the Software and more time at home for homework.

6. There are many other initiatives besides Study Island that the CTC in this study was involved with to help influence state standardized tests such as:

   a. Governor's Institutes

      b. PA TAP Initiative

      c. MAX Teaching

      d. Professional Development relating to numeracy and literacy

      e. 4Sight testing that helped target weak areas

      f. More emphasis applied contextual learning

Theoretical Framework

Given the evaluation of high IEP population and low school performance, the theoretical model of this study focuses on remediation using strategies to improve both academic and CTE initiatives. The 4Sight assessment is used as a diagnostic tool to determine the academic levels of non-IEP and IEP students. There are many treatments used here but the ones used at this suburban CTC are classical conditioning by way of using computer aided instruction such as Study Island and applied and contextual learning for help with the NOCTI assessment.

The first theoretical framework for this study is Classical Conditioning and the vehicle used to work within this framework is the computer aided instruction (CAI) practice. Classical conditioning is defined as, "A basic form of learning, sometimes referred to as Pavlovian Conditioning, in which a neutral stimulus is repeatedly paired with other stimulus that naturally elicits a certain desired response" ("Dictionary of Psychology," n.d.). Although CAI is used primarily to describe drill and practice

instruction, this study examines the ability of a software-based program to facilitate learning of new math and reading concepts in a variety of ways. In as far as student achievement and attitude towards learning, "research has not proven the efficacy of computers and software alone. However when used as a supplement to conventional instruction several researchers have found the results to be overwhelmingly positive, especially for learning disabled students" (Rosenberg, 2003, p. 1). The beneficial characteristics of CAI for students are immediate feedback, where students can ascertain their own weaknesses, receive immediate rewards when the correct answer is derived, can work at their own pace, and the computer grades without bias. Included in this theoretical framework for this study is the use of drill and practice (rote learning) to give students the necessary foundations to be able to go on and apply this fundamental knowledge to a higher level of critical thinking and problem solving. Rote learning is defined as, "Learning in a mechanical fashion through repetition, e.g. memorization, practice drills" (Herod, 2002, p. 1). Sometimes it is necessary to memorize quickly through drill and practice those fundamentals that allow one to perform higher level conceptualization and tasks so that they don't get bogged down in minor details that would otherwise prevent you from solving a problem. CAI learning reflects behaviorist learning theory such as classical conditioning. For these students, lessons are chunked, students should receive constant reinforcement, lessons are pulled out of context, taught, and reintroduced back into context, and are teacher-centered.

(See Figure 1)
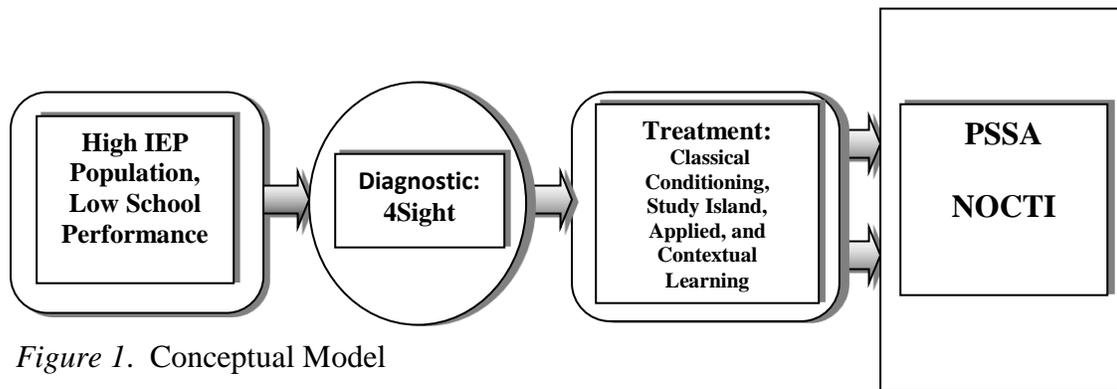
Figure 1. Conceptual Model

The second theoretical framework is that of applied and contextual learning.

Applied and contextual learning occurs when students can process new information or

knowledge in such a way that it makes sense to them in their own frame of reference

(Center for Occupational Research and Development, n.d). CTE by nature creates this

type of learning. This suburban CTC has added academic standards only to where they

specifically apply to a certain task. Once the academic standard is understood in context,

the next step is to isolate that academic standard and teach students other applications in a

more academic context. This helps both with CTE and academic skills. Sauders &

Prescott (1999) cite Kolb (1983) as stating that, educators are encouraged to choose and

design learning environments that incorporate as many different forms of experience as

possible – social, cultural, physical, and psychological – in working toward the desired

learning outcomes. Sauders & Prescott (1999) suggest a few means of presentations that

lends themselves well to contextual learning. Hands-on learning is considered traditional

in CTE and laboratory experiences that create excellent environments for knowledge,

discovery, critical, and creative thinking. Project-based assignments involve many steps

and can take a long time to complete. It can involve other benefits such as group learning and is often interdisciplinary. For example, students involved in a motorcycle project could include machinists, welders, electronic technicians, and auto mechanics. Contextual connections use application of academics and can be accomplished by text introduction, media technology such as DVDs and CDs, internet searching, and interviews of people currently working in the profession of interest. Applications of a task or a project aid in terms of communication and presentation of ideas through presentations to teacher and classmates, technical writing, homework assignments, creating models of projects, and using slide presentations. The whole workplace learning concept can help students shadow with current employers, develop a mentoring relationship with subject matter experts, cooperative education, and apprenticeships.

Chapter 2

Review of Literature

Introduction

This review of related literature focuses on the purpose of this study, which is to determine if Study Island, a Software package designed around the Pennsylvania State Systems of Assessment (PSSA) state assessment, will aid all and IEP students in achieving proficiency scores on both the PSSA and the NOCTI exams in a suburban part-time career and technical center. The focus will also help to examine the federal and state legislation's No Child Left Behind (NCLB) (No Child Left Behind Act of 2001 (Public law 107-110), 2001) impact on CTE in general, and what initiatives and steps CTE has taken to help address the ramifications. The reactions and efforts of education reform begin at the federal level, then trickle down to the state, local, school district, and finally to the individual school levels.

Ravitch, (2010) states that the leading reform initiatives in American education were accountability and choice. Standardized test scores became the main focus of schools and these tests became the yardstick to measure the quality of schools. This is when the NCLB Legislation was passed and signed into law in January of 2002. Little did career and technical educators know how much this legislation would impact what they would teach and how they would teach it. Models were developed for enhancing math and reading improvement across academics. The career and technical education sector as educators felt that students, including career and technical education students, do not have the academic skills necessary for today's high-skill workplace or entrance

into postsecondary institutions (Stone. Alfeld, & Pearson, 2008). Professional development using these models skyrocketed at an immense expense to the state and local school districts in Pennsylvania and across the country.

NCLB Impact on Career and Technical Education

NCLB has four primary areas that have possible ramifications for Career and Technical Education (CTE) (Kymes, 2004). First, it requires highly trained teachers. Teachers that graduate college for teacher education must now be highly qualified in the subject areas that they will teach. If they are a special education teacher, in order to be highly qualified, they must pass the Praxis exam in at least one area of the four core academic subjects; English, Math, Science, or Social Studies. Many special education teachers are highly qualified in more than one academic area. Also, a teacher can qualify for National Board for Professional Teaching Standards (NBPTS) Certification, which also identifies a teacher as highly qualified. The ramification for this is that a CTE educator may never qualify under this current category of NCLB because a CTE teacher can be hired right out of business and industry and obtain a state teacher certification while teaching.

The second category in NCLB that may impact CTCs is the state accountability component. Career and Technical Centers (CTCs) are not directly accountable for academics. Sending districts are responsible and may choose to hold students back from CTCs in order to meet state guidelines and benchmarks in NCLB.

CTE Institutions, at least in some states, have well-defined accountability

standards. While technically exempt from NCLB requirements, CTCs in

most states depend heavily upon common schools' cooperation for

recruiting students. In order to maintain this cooperation, CTE institutions

additionally may have to assume responsibility for the academic growth of

their standards in mathematics and science. (Kymes, 2004, p. 3)

Third is the aspect of research. The academic curriculum of all subjects must be

rooted in some sort of applied research to ensure meeting the standards. Career and

Technical Education is involved heavily in the sciences, and aligns with standards in

business and industry which is also mostly related to the world of science. This in fact

may serve as a benefit to CTCs as the sending districts may want to award credit for a

student's CTC discipline in the area of science.

Finally, parental choice plays a significant role in impacting CTE. Parents have

an option of having their children bussed to a different school or district that has made

Adequate Yearly Progress (AYP) and if they decide to do so the sending district and the

CTC could potentially lose a student.

Students with IEPs.

"Because NCLB rewards school districts with incentive awards based on student

performance, special needs students often feel personally responsible for their district's

failure to receive such rewards" (Kymes, 2004, p. 4). Most CTCs in Pennsylvania range

between 30 and 50 percent special needs populations. Therefore, the opportunity for a

CTC to share making AYP with their sending districts could be rare. CTCs calculate the

percentage of students that attend their schools making a proficient score or better on the

PSSAs. When non IEP students' scores at this suburban CTC alone are measured, the

school could make AYP. But since this school has such a large portion of IEP students,

the total junior population fails to make the bench mark scores. Both groups, the sending

districts and the CTCs, must work together to meet the challenge of making AYP

regardless of the high IEP enrollment.

Pressures of statewide assessments.

"American educators feel anxiety about improving student achievement now

more than ever. Under the NCLB Legislation, districts and schools are held accountable

to share performance data about student achievement in the form of a district report card"

(Starmack, 2007, p. 10). The anxiety really begins at the beginning of the year when the

eleventh graders arrive and teachers and administrators feel some relief but the anxiety is

really not over until sometime in July or August when the scores are actually reported.

The relief at best however is only temporary as in September, the cycle starts all over

again. Through the NCLB Act, the state has placed minimum cutoffs as far as the

percentages of students needing to score proficiently on the PSSAs in making AYP

which means that the opportunity to make AYP gets harder every time the state raises the

threshold. Ideally, by 2014, all schools will have reached 100 percent in the amount of

students who score at least proficiently on the PSSAs. Given this, it will be even more

intense in the 2010/2011 school year as the bar is raised for cut scores for PSSA

proficiency and above. The schools that barely made it in 2009/2010 will struggle to

reach the new benchmarks for 2010/2011. The benchmark cutoff percentage for reading

and math in 2009/2010 was 56 and 63 percent respectively for math and reading, while in

2010/2011, the percentages increases to 67 and 72 respectively (Pennsylvania

Department of Education: Academic Achievement Report 2009/2010, n.d.).

In need of improvement or corrective action.

Regardless of what you may call failing to make AYP, in need of improvement or

corrective action, "when you have that label, it's a little cloud over your head. It really

clears the air to have it removed" (D'Orio, 2009, p. 37). This is from a school that has

been in need of improvement and worked its way back into making AYP. In

Pennsylvania, once schools have made the corrective action list, they have to make AYP

for two years in a row to be removed from the list. A huge responsibility falls on the

principal to turn the school in a different direction and stress and anxiety infuse the

climate and culture to the point of forgetting all the good things that schools do. It seems

to become what defines what a school is and what goals becomes priorities.

Teaching to the test mentality.

Educators become so engulfed with the accountability to the state that they forget

the pressure and angst that are placed on the students.

> These are difficult times for educators who believe that learning is worth
>
> pursuing for its own sake and that the chief purpose of school is the
>
> nurturing of students as whole human beings. Higher test scores seem to
>
> be the order of the day. To accomplish this aim, administrators strain to
>
> meet political agendas, teachers respond by teaching to the test, and
>
> students in return react by cheating, taking "learning steroids" (legal and

illegal psycho stimulants), or just not caring in order to cope with the

demands placed on them in schools. (Armstrong, 2006, p.7)

Exploratory learning, wonderment, culture enrichment, and being excited about learning life skills have been put asunder to make AYP. The spontaneity of learning has given way to rigorous, uniform, sequential learning. Education has been in danger of adopting a cookie cutter mentality and NCLB seems to take away individual styles of learning. State officials from the Pennsylvania Bureau of Career and Technical Education have followed suit by encouraging use of study guides for the NOCTI Exam and the practice Pre- NOCTI assessments. These Pre-NOCTI assessments help teachers target weaknesses in the students' efforts and the teachers are given reports in each category of the exam on strengths and weaknesses. These efforts help primarily in the written portion of the NOCTI exam while the performance component still relies heavily on the student learning the skills necessary to function as an intern in his or her own chosen field. Professionals from business and industry create both the written and performance components to make sure the exams align with industry standards.

Major CTE Initiatives

Governor's Institutes, High Schools That Work (HSTW), Technical Centers That Work (TCTW), the Technical Assistance program (TAP), Motivation, Acquisition and Extension (MAX) Teaching, and literacy and numeracy programs have emerged and an educator in CTE can't attend a professional development workshop that doesn't involve one of these initiatives. These initiatives were all developed in the name of NCLB to help improve PSSA scores, NOCTI scores, and to help maintain student enrollment.

Governor's institutes.

Although Governor's Institutes do not exist anymore, they were instrumental in aiding CTE teachers in the process of academic integration.

> The Pennsylvania Governor's Institutes for educators are part of a series of Summer professional educator's programs designed to ensure the creation of challenging learning environments in the commonwealth public, private, and non-public schools. Each of the institutes provides an intellectually challenging program of study that will enhance academic classrooms and thereby assist educators in improving their students' performance and building capacity among educators. The Governor's institutes for educators are intensive week-long professional development opportunities available for educators during the summer. The programs are rich with opportunities to deepen subject area knowledge and real-world experiences that help educators make the link to the Pennsylvania academic standards, reading and math education as a priority for all, classroom assessments and technology. (Pennsylvania Staff Development Council website, 2009, p. 1)

Some of the professional development workshops included literacy, numeracy, data collection and analysis, Science, Technology, Engineering, and Math (STEM), CTE work standards, early childhood literacy, English Language Learners (ELL) strategies, improving school climate, and focus on urban education.

Contextual and experiential learning.

Contextual and experiential learning theories have been major components used in CTE.

> According to the contextual learning theory, learning occurs only when students (learners) process new information or knowledge in such a way that it makes sense to them in their own frames of reference (their own inner worlds of memory, experience, and responses). This approach in learning and teaching assumes that the mind naturally seeks meaning in context, that is, in relation to the person's current environment, and that it does so by searching for relationships that make sense and appear useful. (Center for Occupational Research and Development, n.d.)

In concert with contextual learning, experiential learning uses the premise that learning by doing maximizes students' ability to grasp difficult concepts.

> When education is said to be experiential, it means that it is structured in a way that allows the learner to explore the phenomenon under study – to form a direct relationship with the subject matter – rather than merely reading about the phenomenon or encountering it indirectly. Experiential learning, then, requires that the learner plays an active role in the experience and that the experience is followed by reflection as a method for processing, understanding, and making sense of it. (Education.com website, n.d.)

One of the most often used contextual learning theory problems is that of engine sizing. When teaching engine size, it is necessary to use the formula for a cylinder. The terms used in a cylinder of an engine are the bore and the stroke that relates directly to the diameter and the height of a cylinder. The formula for the volume of a cylinder is: $V = \pi r^2 h$, where V = volume, r = radius, and h = height. In the contextual learning approach the formula would be CV $= \pi \left(\dfrac{bore}{2} \right)^2 * s$ where CV = cylinder volume, the bore is the diameter, and s is the stroke or height. The bore (diameter) is divided by two to obtain the radius. Therefore, if the bore (diameter) is 4 inches, and the stroke (height) is 4.25 inches, the size of the cylinder would be 58 cubic inches. If we wanted to further calculate the engine displacement, we would multiply this result by the number of cylinders. If it were a six cylinder engine, the engine displacement would be 348 (350 nominally) cubic inches. For an eight cylinder engine, the displacement would be 464 cubic inches. These were popular engines when fuel economy was not an issue. The concept in learning contextually here is that there is an assumption that students are applying math to what they are truly interested in or at least feel is important to their trade competency area. The next step of course in rounding out their whole academic and technical experience is to transfer this knowledge into the math that would help the students calculate volume for any type of cylinder. In this case, by understanding language and literacy, the students can associate the word bore with diameter and stroke with height. Stone, III et al., (2008) quotes Fuchs et al., (2003) as stating, "Unless students are taught the abstract principle behind what they are learning in context and

guided through other contextual examples to which it applies, it is unlikely that cognitive

transfer will occur outside the classroom (p. 772). In other words, knowing how to

calculate the cylinder volume of a vehicle is of little use in transference if CTE educators

do not include academic examples outside of the realm of the discipline that the students

are studying. The 1991 report by the Secretary's Commission on Achieving Necessary

Skills (SCANS) includes the following statement:

> We believe, after examining the findings of cognitive science, that the
>
> most effective way of learning skills is "in context" placing learning
>
> objectives within a real environment rather than insisting that the students
>
> first learn in the abstract what they will be expected to apply.
>
> (Secretary's Commission on Achieving Necessary Skills [SCANS], 1991,
>
> p. viii).

Berns & Erikson, (2001) in their article on contextual learning, use the contextual

learning definition from the study conducted by the U.S. Department of Education at the

Ohio State University in partnership with Bowling Green State University:

> Contextual teaching and learning is a conception of teaching and
>
> learning that helps teachers relate subject matter content to real
>
> world situations; and motivates students to make connections
>
> between knowledge and its applications to their lives as family
>
> members, citizens, and workers and engage in the hard work that
>
> learning requires.

Estepp and Norton (2003) list Stripling and Roberts' (2010) seven steps for their experiential model shown at a poster presentation in State College, Pennsylvania during the North American Colleges and Teachers of Agriculture (NACTA).

1. Assess students' prior knowledge

2. Create a common introductory experience

3. Communicate the importance of the new educational experience

4. Use a contextual learning experience

5. Provide a reflection experience

6. Provide a generalizing experience

7. Provide a culminating application experience

"Implementation of this model should allow students to create transferable knowledge which will then become prior knowledge for new learning experiences" (p. 19). Contextual and experiential learning are two important strategies to teaching and learning at this suburban CTC and are incorporated in all programs at all levels.

High schools that work.

High Schools That Work (HSTW) is an initiative developed in the southern states by the "Southern Regional Educational Review Board (SREB), State Vocational Education Consortium, a partnership of SREB, its member states, their school systems, and school sites" (About High Schools That Work website, 1999, p. 1). It currently consists of 1200 school sites in 30 states.

The program is based on the belief that most students can master complex academic and technical concepts if schools create an environment that

encourages students to make the effort to succeed. Member schools implement ten

key practices for changing what is expected of the students, what they are taught,

and how they are taught. (About High Schools That Work website, 1999, p. 1)

The ten key practices incorporate the concepts of high expectations, strong programs of

study geared toward college entrance, academic studies, CTE studies, work-based

learning, teachers working together, students actively engaged, strong guidance, extra

help, and a culture of continuous improvement.   This program was originally designed

for comprehensive CTCs throughout the southern U.S. The issue up north was that most

CTCs use the one-half day schedules so academics are isolated from the CTCs. The

SREB developed a program from HSTW called Tech Centers That Work (TCTW) and

Pennsylvania adopted their program through the Pennsylvania Technical Assistance

Program (TAP) to work with part-time CTCs. It is the mission of TCTW is to create a

culture of expectations and to help students to continually improve. Some of the goals of

TCTW toward this end are to increase scores in reading, math, and science on the

National Assessment of Educational Progress exam (NAEP), increase the percentages of

students who complete a CTC program and enter into a field in which they studied,

increase graduation rates, develop policies and leadership initiatives that sustain a school

improvement effort, increase the percentage of students who go on to postsecondary

education without having to take remedial courses, and to increase the percentage of

students who pass employers' exams such as national licensure, state exams, and

industrial credentials like the ASE certification. Workshops for TCTW were held in

State College, PA where literacy and numeracy strategies were taught to academic,

technical, and administrative personnel.

MAX teaching.

Max Teaching is a reading and writing strategy program developed by Dr. Mark

A. Forget (MAX Teaching With Reading and Writing website, 2006). MAX Teaching is

a staff development opportunity for schools that are interested in improving reading,

writing, and learning skills of all students from first to thirteenth grades. Schools can

purchase materials and books from this organization and have representatives from MAX

Teaching come to their schools and provide as much as two days of professional

development. After the in-service when teachers had some practice implementing these

strategies, a representative from MAX Teaching will return to the school following up

with modeling these strategies with students in the room while the classroom teacher

observes and learns.

Data collection and analysis.

Another AYP improvement strategy is teachers and administrators developing

action plans from data collection and data analysis (Horn, 2010). A sample district goal:

"During the 2009/2010 school year, all staff will incorporate eligible content in every

common assessment for all core academic subject areas" (Horn 2010, p.14). A sample

school wide goal: "The percentage of students in the targeted cohorts achieving

proficiency on the 2010 PSSAs in math will increase by twenty percent for the

economically disadvantaged and Hispanic cohorts and ten percent for the individualized

education plans (IEP) and English language learners (ELL) cohorts" Horn (2010). The

thinking here is that there is an increasing awareness of children's success as the scores increase and success perpetuates success. Having this awareness and being able to see marked improvement encourages teachers to continue with their efforts and set even higher goals. "Many educators harbor negative perceptions of data use because in the past the data have been incomprehensible, unhelpful, or used solely for compliance purposes, but using data to inform instructional and management decisions has been a characteristic of high-performing, high-achieving schools" (Laird, 2008, p. 34).

Pennsylvania technical assistance program.

PDE developed the Technical Assistance Program (TAP) to package initiatives and provide support for schools with low performing data. TAP, in partnering with Tech Centers that Work (TCTW), currently has 3 cohorts and 54 CTCs involved in developing rigorous academic and technical programs across the state of Pennsylvania, and the goal is to have all of the CTCs across the state participate and complete the two-year cycle (The Pennsylvania Department of Education website, 2010). Each school that participates in a cohort sends technical and academic program teachers and administrators to the workshops where they define and decipher appropriate strategies to infuse these disciplines. PDE also supplies a liaison from the state to work with individual schools to provide them with guidance and assistance. TAP offers professional development activities that encompass many numeracy and literacy strategies. Some of the literacy strategies include anticipation guides, admit slips, alphabet review, Cornell notes, exit slips, Jigsaws, mnemonics, hunt for treasure, and four corners activity. All of these activities tend to enhance student reading and writing skills.

Using standards.

Using standards for improvement of curriculum and assessment is essential (Association for Supervision and Curriculum Development [ASCD], 2000). One should employ backward design, which is a technique by which teachers design lessons from assessment and the standards. Standards-based education is the charged role of the teachers and it is a changing process and not an event (Association for Supervision and Curriculum Development [ASCD], 2000). Teachers should design instruction with the end in mind. Teachers should also post and explain the standards to students in the way that they understand them and explain how they are accountable for them.

Additional strategies and initiatives for CTCs.

To supplement the strategies described, schools have developed other initiatives to improve their students' scores in the state academic and technical assessments. Many CTCs are using Software to help remediate students in reading and math. The CTC of this study is providing students with 30 to 45 minutes per week removed from their technical studies in order to enhance their academic experiences both at the sending districts and in their technical area of study. Schools have also purchased, from the Pennsylvania Department of Education, 4Sight exams which mirror the PSSA Assessment. These are mini-PSSA tests that allow students to practice taking the PSSA exams and also help to target weaknesses. Typically, schools will facilitate these exams four times in a year to create benchmarks. The school that I am studying in my research has adopted the 4Sight exam.

Computer intervention programs.

In yet another academic strategy, schools have purchased computer math and reading software. "As a result of the shift to integrate technology administrators may spend large amounts of money to purchase computers, hardware, peripheral devices, and software applications in an effort to obtain the most sophisticated items" Jones, Taylor, Smith, & Smith (2007, p. 18) quote from (Materials Technology, 1990). Jones et al. (2007) created a study to determine if participants using a math-based computer intervention program improved work-related mathematical skills of ninth grade students. Among the independent variables examined were student type (at risk or regular education) and gender. The dependent variables were pretests and posttests generated from a quasi-experimental design to establish as much control as allowable in an experiment where experimental control is extremely difficult. In determining their first hypothesis, they wanted to see if there was a significant difference between pretest and posttest scores of all ninth grade students, the study found a significant difference between the pretest scores and the posttest scores. This was an indication that the computer-based math intervention program was effective. No significant difference was found for student type on the pretest, however there was a significant difference in the mean posttest scores of the at-risk and regular education groups. The at-risk students had a higher mean score than the regular education students. It is also stated that, "at risk students may respond better to the computer-aided instruction than regular education students" (Jones et al., 2007, p. 27). Also this success can be attributed to differentiated instruction and more time spent with at risk students.

Benefits of Computer Aided Instruction.

A study was performed to determine if CAI made a difference in 11th grade students' attitudes towards biology (Soyibo & Hudson, 2000, p. 195). There was a control group where the teacher used lecture and discussion, and an experimental group where the students also used lecture and discussion but added a CAI component. There was an instrument used to measure attitude towards biology at the beginning of the study and at the end. Initially the attitude of the 11th graders towards biology in the control group was significantly better than the attitude towards biology of the experimental group. After the study was done, it was determined that the attitude of the students in the experimental group increased and was significantly better than those in the control group. Also, there was a pre and posttest biology assessment for the 11th graders. The mean pretest biology test score of the control group was significantly higher than the mean of the experimental group pretest score (M = 97.46, M = 84.83 respectively). However, the mean test score of the biology posttest was significantly higher for the experimental group than it was for the control group (M = 92.77, M = 89.24 respectively)

Mioduser, Tur-Kaspa, & Leitner (2000) performed a reading study with 46 five and six year old IEP students that were divided into three groups. The first group used printed materials and computer assisted instruction with a special reading program. The second group used printed material only with the special reading program and the third group, which was the control group, was just given the traditional IEP reading program. The results are shown in Table 1.

Table 1.

Mean, SD, % Improvement and F-Values for the Three Groups in the Computer Assisted
Instruction Reading Test

	Printed and computer (n=16)		Printed without computer (n=15)		Control group (n=15)		F	Between Groups
	Increase Mean (sd)	%	Increase Mean (sd)	%	Increase Mean (sd)	%		
Letter naming	5.75 (2.67)	26.1	2.93 (1.91)	13.3	0.50 (0.94)	2.3	25.67 **	1>2>3
Word recognition	3.94 (1.24)	32.8	2.73 (1.94)	22.8	.36 (1.55)	3.0	18.85 **	1>2>3
Phonological awareness	28.31 (8.25)	23.2	17.07 (4.82)	14.0	5.86 (4.47)	4.8	49.30 **	1>2>3

Note. ** *P* value < .005   Mioduser, D., Tur-Kaspa, H., & Leitner, I. (2000). The learning value of computer-based instruction of early reading skills. *Journal of Computer Assisted Learning*, *1*(16), 54-63.

All three groups showed improvements in reading but the improvement for the group that used computer assisted instruction was significantly higher than the print-only group and the control group (Mioduser et al., 2000). Mioduser et al., (2000) present a caveat in using computer assisted instruction:

> After several decades of educational implementation of computer technology, it is agreed that the technology by itself means only the necessary infrastructure upon which should be built robust pedagogical solutions to real learning problems. Notwithstanding, when the new technology, the web, irrupted to the educational scene, the old pattern prevailed once again. Transitional stages at which new technologies are assimilated by means of known models are a reasonable (and perhaps unavoidable) phenomenon, only if they lead to mindful reflection and building of sound pedagogical applications of the new possibilities

in response to the learners' needs. (p. 61)

 Computer assisted instruction in and of itself cannot stand alone as its only pedagogical method, but a blend of this strategy along with well-thought out other teaching strategies is necessary. The computer is merely a tool which students and teachers can use to enhance the teaching and learning process and this is the approach that this suburban CTC takes with the Study Island Software.

Study Island Software.

The school that is the subject of this research adopted the Study Island Software to help remediate students in reading and math through instruction, testing, and drill and practice. The software allows for web-based instruction, practice, testing, and rigorous academic content that is fun and engaging, is researched based with proven results, user friendly anywhere because it is web-based, and relatively affordable (Study Island website, 2010). This software keeps a data base of all students' scores and monitors time on task. All students registered have their own personal database of information so that teachers and administrators can track progress or lack thereof. This study uses this database as part of a comprehensive independent variable to measure progress against 4Sight and PSSA testing. Study Island includes mini lesson plans for students to see examples of how to solve problems. (See Figure 2)

There are options in this software to view questions as they would be found on each individual state's standardized tests or students can play games while learning. For example, there is a hockey component in which every time you answer a question correctly you have an opportunity to shoot at a goal in a given amount of time. Some

students prefer this and others prefer the standard methods of answering questions. Since the program is web-based, the students can work on the Software at home and it is often assigned by teachers as homework assignments. The managing of students and their progress can log on to each student's site and determine if the student was guessing, how much time was spent on each item, and how many items a student completed. Teachers can then use a rewards based system of their choosing to reinforce student activity on the program.

This suburban technical school also initiated a math in CTE challenge event in which students log onto Study Island, go to the custom screen, and answer questions that are associated with PSSA math but have a technical component included to make it applicable to the students' programs. A nice feature of Study Island provides a custom area in the software that allows teachers to add their own CTE math related problems. There are prizes and awards for those who answer the most questions correctly. For example, a sample problem in fractions might ask, "If a plumber cut 17 ¾" of ½" copper from a length of five feet, how much copper would be left?" In the culinary arts program, a sample problem in fractions might ask, "If a recipe calls for 2 2/3 cups of flour for four servings, how many cups of flour would be needed for six servings?"

Square Roots

The **square** of a number is that number times itself.

$$A^2 = a \times a$$

The inverse of squaring is finding the **square root**.

Example

What is a square root of 100?

Solution

$10 \times 10 = 100$

Therefore, $10^2 = 100$.

So, a square root of 100 is **10**.

Every positive number has two square roots that are opposite in sign, and the square root of zero is zero.

Example

What are the square roots of 4?

Solution

$$2 \times 2 = 2^2 = 4$$
$$(-2) \times (-2) = (-2)^2 = 4$$

So, the square roots of 4 are **2** and **-2**.

The radical symbol $\sqrt{}$ denotes the **principal square root**, which is the non-negative number that squares to equal the number under the symbol.

Examples

$$\sqrt{4} = 2$$
$$\sqrt{25} = 5$$
$$-\sqrt{49} = -7$$

Figure 2. A sample mini lesson with examples as it would appear on Study Island.

Chapter Summary

Chadd & Drage (2006) cite Brand (2003) as stating, "CTE programs are a vital and necessary component of the high school curriculum. Evaluations of CTE Programs in schools and districts show CTE programs contribute to increased school attendance, reduced high school drop out rates, higher grades, and increased entry into post secondary education" (p.81). Given this evidence of success, CTE educators need to do everything possible to integrate academic subjects into their technical subject matter to not only sustain success, but to continue to make improvements. Chadd & Drage (2006) also state that "studies have also been done to show that contextual learning is more beneficial and effective for students in retaining information" (p.84).

One problem with contextual learning however is that students may not be able to generalize this information that was learned as applied to a task in a CTE discipline to generic math problems found on the PSSA assessment (Stone, et al., 2008). This is the reason that CTE educators have to also teach the applied academics in the generic sense after they are learned in a contextual environment. In the school that was studied, the teacher teaches the academic content contextually and generically, then students continue to learn and practice on the Study Island Software. In effect, the Study Island Software exercises combined with contextual learning and what they learn in their regular academic studies, combine to provide a comprehensive and full academic experience that will help them to be successful in NOCTI and academic state assessments.

Chapter 3

Methodology

The Problem

The purpose of this study was to determine if Study Island, a Software package designed around the PSSA state assessment, will aid non-IEP and IEP students in achieving proficiency scores on 4Sight, the Pennsylvania State Systems of Assessment (PSSA), and National Occupational Competency Testing Institute (NOCTI) assessments in a part-time career and technical center (CTC). The underpinning of this study focuses around three core premises: the impact that A Nation at Risk (1983) had on the U.S. and State Departments of Education, the ripple-effect impact on career and technical education (CTE) of No Child Left Behind (NCLB), and what career and technical education agencies and schools have done and are doing to ameliorate any negative influences impressed upon them as a result of national, state, and local legislation's imposition on traditional academic education.

Research Questions

In order to gratify this research's problem statement, six research questions are explored in depth:

1. To what degree does Study Island Software aid all students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

2. To what degree does Study Island Software aid IEP students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

3. To what degree does Study Island Software aid all students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

4. To what degree does Study Island Software aid IEP students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

5. To what degree does Study Island Software aid all students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

6. To what degree does the Study Island Software aid IEP students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

Measurement

Population.

The population of students at the career and technical school of this study is mostly Caucasian, living in a suburban community, and are from relatively middle class to wealthy areas. There is a small minority from the local parochial school that does not participate in the PSSA assessments but participate in the Terra Nova exams, so these students are exempt from this study. The class of 2011 was studied. In this group of 251

seniors, 172 (69 percent) are male and 79 (31 percent) are female. Students enroll in one

of nine career clusters consisting of Transportation, Architecture and Construction,

Human Services, Hospitality, Health Science, Information Technology, Public Safety,

Manufacturing, and Science, Technology, Engineering, and Math (STEM).

Transportation, Architecture and Construction, Information Technology, Public Safety,

and STEM are primarily male dominated disciplines at this school but non-traditional

students are encouraged to enroll in any program they would like to pursue. Health

Science, Hospitality, and Human Services are programs that have predominantly female

enrollment. There are a total of 94 IEP students enrolled in the class of 2011; 79 are male

and 15 are female. Seventy-three of the IEP students are learning support and 19 are

emotional support. There is one student who is considered MR and one that is

"unidentified" for IEP reporting purposes.

Variables.

Independent variables.

One independent variable for this study is the initial score that the students

receive on the Study Island Software as they log on, participate in the lessons, perform

the drill and practice, and take formative assessments. These scores are recorded and

posted on the Study Island Web Site where they can only be accessed by school officials

that have the appropriate user name and password.

The tenth grade students who participated in the Study Island Software

remediation program are those students who did not perform to a proficiency level in the

preliminary 4Sight Exam taken in September of their sophomore year. Those who did

perform at a Proficient level could opt out of this initiative. The students who need

remediation are pulled from their technical programs approximately 30 to 45 minutes per

week and can log on to computers in the resource center where monitors/instructional

assistants (IAs) preside over the session. The IAs monitor student behavior and are there

to offer assistance in any of the numeracy and literacy exercises that students may

struggle with. Students are also able to log onto Study Island from home or a library

computer because it is web-based software. The hours that they are logged on can be

invigilated so that progress monitoring can occur.

The software also has a way of determining if the students are merely guessing so

that the overseer can determine if students are working through the process or merely

using a process of elimination. In this way, if the teacher is using this Software exercise

to evaluate student progress as part of a student's grade, the teacher can speculate as to

how much learning is actually occurring.

The questions are generated randomly so the opportunity for a student to get a repeat

question is extremely rare. This helps to determine if the students are learning the

concepts and can transfer their learning to a multitude of problems. The Study Island

Software also refers instructors and students to the applicable academic anchor from the

Pennsylvania Academic Standards. (See Figure 3) Upon completion of a question or

problem a student can access an explanation of the derived answer to reinforce their

learning of the concept. (See Figure 4) In this case they explained that by converting the

exponent to resemble the exponent of the first value it is then easier to perform a simple

subtraction.

PA Grade 11, Math Anchor

M11.A.1.1.1
Find the square root of an integer to the nearest tenth using either a calculator or estimation.

Covered by Study Island Topic:
Square Roots

Figure 3. Anchor sample from Study Island Software.

$(8.9 \times 10^{-2}) - (1.4 \times 10^{-4})$

First, convert (1.4×10^{-4}) so the exponent is the same as the first number,

$(8.9 \times 10^{-2}) - (0.014 \times 10^{-2})$

Then, complete the subtraction.

8.886×10^{-2}

Figure 4. Study Island explanation of correct answer.

4Sight Assessment.

Another independent variable for this research is the scores students received in the 4Sight Assessment.

> The 4Sight Benchmark Assessments are typically quarterly benchmark assessments in reading and math developed for grades 3 to 11. Developed by the Success for All Foundation (SFAF) (Success for All Foundation, n.d.) with items field tested in Pennsylvania Schools, 4Sight mirrors the blue print of the PSSA and provides an estimate of student performance on the PSSA. 4Sight provides diagnostic information on Pennsylvania standards and specific sub-skills to guide classroom instruction and professional development efforts. (4Sight Benchmark Assessments, 2009, p. 2)

Another independent variable is whether the student has or does not have an IEP. This is critical as this suburban CTC has a 53 percent IEP population and according to the Individuals with Disabilities Education Improvement ACT (IDEIA) of 2004, all IEP students must be measured and reported along with non-IEP students (Katsiyannis, Zhang, Ryan, & Jones, 2007, p. 161)

Dependent Variables

The dependent variables for this study were the PSSA and NOCTI scores. These scores will be compared to the class of 2010 scores to measure improvement if any. Caution must be taken here in that there is no claim that 4Sight Benchmark tests are a predictor of PSSA scores but only used as a measure of improvement from one quarterly assessment to the next. The CTC of this study only uses 4Sight twice yearly; once in

September and once in April. Time constraints of CTCs do not allow for more frequency than this. The test is time limited to 60 minutes and is meant to be on grade level for both literacy and numeracy.

PSSA Assessments.

The PSSA assessment is Pennsylvania's state achievement test given to third, fifth, eighth, and eleventh grade students. It includes math, reading, writing, and science components. The PSSA Assessments are given in the Spring of each school year (window to be determined by the Pennsylvania Department of Education) for juniors. Even though reading, math, science, and writing assessments are all available and taken, CTC centers are primarily concerned with the math and reading components at this time. Students from some sending districts are excused from CTC attendance as the assessments are given all day. For other sending districts, attendance for the CTC is not impacted as the assessments are given during their regular academic class times. This suburban CTC attempts to hold their NOCTI assessments for seniors during the PSSA window so that juniors are not in attendance during the NOCTI exam. Results for the PSSAs are announced in July for sending districts. For those schools that administrate the PSSAs, they log on to a web site to access their scores. For CTCs, results come in the early Fall and can be accessed on the e-metric web site. (Data Interaction for Pennsylvania Student Assessments, n.d.) This is a very secure web site accessed only by educational administrative personnel after being given a PDE assigned username and password. This site gives both aggregated and disaggregated data to include race, gender,

special needs, and school district. It gives the raw scaled scores as well as the level of achievement: Advanced, Proficient, Basic, and Below Basic categories.

NOCTI Assessment.

The Carl D. Perkins Act of 2006 requires states receiving federal assistance for CTE to report a measurement of student technical skill performance. Pennsylvania implements a national test in each instructional program area. The tests are developed and scored by NOCTI. The NOCTI Assessment is given to seniors at the end of their program experience.

Burke (1999) quotes Archibald and Newman (1988), "before educators try to assess authenticity, they should make sure they teach authenticity" (p.xvi). Career and technical educators teach authenticity as described by Burke (1999). Authentic educators use meaningful performance tasks, communicate clear industry standards and criteria for excellence, require quality work from students, emphasize meta-cognition and self-evaluation, teach skills that transfer, and create a positive interaction between assessor and student. The NOCTI exam accentuates all of these attributes of authentic learning by including both written and performance components in the exam. There is a performance piece and a written component. The written component consists of approximately 150 questions, depending on the discipline, and related with it is a cut score developed by a team of professionals and craftsmen from each industry area.

A student must score equally or better in both the written and performance portions of the exam to score at that level. The lower score determines the level of

achievement. If a student receives a Competent in the written and an Advanced in the

performance, the student receives a Competent score on the NOCTI exam.

Data Collection

Scores from the Study Island, 4Sight, PSSA, and NOCTI assessments all come

from secure web sites which are user name and password protected. The 4Sight reading

and math assessments are given in September of the students' sophomore year as a

pretest to establish a baseline and in April as a posttest to measure improvement. Study

Island tests are taken after each unit is completed. The PSSA assessment is taken in

Spring of the students' junior year and results aren't usually available until the following

Fall semester. The NOCTI assessment is given in the Spring of the students' senior year

and since it is the written portion is taken online, the scores are available almost

immediately. The security of the PSSA and the NOCTI testing process is of the utmost

importance and these tests are monitored. These results were tallied on a spread sheet

and the students' names and Pennsylvania Identification (PAID) numbers were coded so

that confidentiality remained. Data were collected and transferred to a spread sheet and

electronically stored on a computer which was username and password protected. The

"honest broker method" was used to collect and analyze data i.e., the person at this

suburban CTC, who was in charge of securing this data, randomly assigned numbers

where names and PAID numbers were listed to ensure confidentiality and privacy that is

essential to the Family Education Rights and Privacy Act (FERPA).

The items that were stored on the spread sheet for Study Island included:

(1) The number of items completed on the math section,

(2) The total score of all of the tests taken on the math section,

(3) The number of items completed on the reading section,

(4) The total score of all the tests taken on the reading section,

(5) The total number of items completed for each of the subjects,

(6) The combined score of the math and reading sections,

(7) The level of competency the students scored on the math tests

(Advanced, Proficient, Basic, or Below Basic),

(8) The level of competency received on the reading tests,

(9) Grade level at which students performed the exercises (eighth through

eleventh),

(10) The number of minutes students spent in each of the categories of

math and reading.

(11) For the 4Sight section the following categories will be listed in the

spreadsheet:

    (a) The baseline math scores,

    (b) The baseline reading scores,

    (c) The final math scores, and

    (d) The final reading scores.

(12) For the PSSA exams,

    (a) The math scaled score and

    (b) The reading scaled score will be inserted for both the

    2009/2010 and the 2010/2011 school year.

(13) For the NOCTI data,

       (a) The final written scores will be inserted for the 2009/2010 and the 2010/2011 school year.

One important caveat to be aware of in this study is that NOCTI scores, although based out of a scale from 0 to 100, use cut scores to determine levels of success for each program and they are all different. As an example, the cut scores for the 2010/2011 NOCTI year for carpentry are 37.5 percent for Basic, 46.9% for Proficient, and 56.4% for an Advanced level for the written component of the NOCTI exam.

The Nedelsky Method of determining cut scores is used by the team of experts. "The main premise of the Neldesky Method is that the test takers who do not know the correct answers to a question will eliminate as many answers as possible before making their final selection or guess" (Supernaw & Mehvar, 2002, p. 2). A substantial panel of qualified evaluators with clear instructions is used for this process. Each evaluator is instructed to review each question by crossing out the items that a minimally competent examinee should be able to eliminate. Each question is then given a reciprocal depending on the number of items remaining. The sum of the reciprocals over all items is denoted as the probable score of a minimally qualified examinee for a single evaluator. All evaluator results are averaged to arrive at the Competent Level. The Bureau of Career and Technical Education (BCTE) has determined the Advanced Level to be 2 standard errors of measure above the Competent Level and Basic Level to be 2 standard errors of measure below the Competent Level.

It is up to the panel of experts to determine which answers will be eliminated by the entry-level senior and proceed to cross those off. For example, in one question, one of the answers were eliminated as distracters, the three remaining answers would be reciprocated which would equal 1/3 or .67. If all of the questions for one evaluator equaled a mean score of .67, then that score would be averaged in with the other evaluators' final scores. If all of the subject matter experts' scores averaged to a .67, then the cut score for this exam would be 67 percent. Severe errors can be made here. If the subject matter experts assumed too much knowledge for the students, too many distracters would be taken away resulting in too high of a cut score. If the subject matter experts assumed no knowledge of a high school senior, then too low of a cut score could result. It can be very difficult then for an expert to think like a high school senior and errors in cut scores have resulted using this method. It is very critical that the Nedelsky Method is explained thoroughly and that each subject matter expert understands the process. Before the Spring of 2011, the performance part of the assessment had standardized cut scores in that an Advanced score is 80% or better, a Competent score is between a 75 percent and 79 percent, a Basic score is between 70 percent and 74 percent, and a Below Basic score is a sixty nine percent or lower. As of the 2011 NOCTI testing date, the Angoff Method of establishing cut scores for the performance piece of the NOCTI was adopted (NOCTI Job Ready Criterion Referenced Cut-Score Project: Developmental Procedures, 2010, p. 1). In this method, subject matter experts are used to rate the difficulty of a task from a three to a five; five being the most competent and

three being minimally competent. All of the subject matter experts' scores are averaged

and changed to a percentage to arrive at the performance cut score.

        (14) The gender will be listed for each student as well as whether the

        student is a

        (15) IEP student and whether the

            (a) IEP student is learning support (LS) or is an

            (b) Emotional support (ES) student.

    Data Analysis

    Although formative and summative tests are easily accessible and do provide a

level of valuable information about student progress, it is longitudinal data that tell a

bigger story about long-term progress. "Educators often have access to various formative

and summative assessment results, but leaders at all levels must demand, understand, and

use longitudinal data to improve instruction and management" (Laird, 2008, p. 36). This

in effect gives teachers more information such as information of increased or decreased

improvement over the years. With this knowledge, teachers can tailor instruction to help

students improve. As in the case of the Pre-NOCTI Assessments, teachers can zero in on

sections of the written NOCTI that students were weak on and then can target these

weaknesses for a better final NOCTI outcome. The longitudinal data provide valuable

information to administrators that can help them manage and lead more effectively and

with goals in mind such as percentage increases in the various assessments. Longitudinal

data also empower administrators to calculate which initiatives show the best evidence of

increasing student achievement (Laird, 2008). The Pennsylvania Department of Education (PDE) has begun a longitudinal data system in many areas but for the purposes of Career and Technical Education (CTE) the e-metric site is the most appropriate. PDE began loading data to this site in 2002 but regarding PSSA information accessible to appropriate administrators only really began for the 2007/2008 school year (Data Interaction for Pennsylvania Student Assessments, n.d.).

Both descriptive and inferential statistics will be used to determine gains in mean and median scores, correlations and regression analysis will be used to determine any relationship between Study Island and the three assessments, and regression analysis will be used to determine how much or to what extent the Study Island Software impacts test results. A Factorial ANOVA (sometimes referred to as a Factorial ANOVA) will be used to determine if any interaction of scores occur between Study Island and non-Study Island participants, and those with or without IEPs

Table 2 lists the research questions, the key variables, and the data-analysis strategies that will be used in this study. The questions relate to how Study Island will aid IEP and all students' success in state standardized academic and technical assessments in a part-time CTC. There will not be a total reliance on any one statistic but on a blend of the inferential data, particularly on regression analysis, correlation, and the p value, along with the descriptive statistics of the mean and median scores. The key variables of IEP, all, gender, Study Island scores, 4Sight pre and posttest scores, PSSA scores, and NOCTI scores are included. For our correlation results, Hinkle, Wiersma, & Jurs' (1998) correlation rule of thumb was used. The Factorial ANOVA will also be used

to compare results of Study Island participation, whether the students have an IEP or not,

and if there is an interaction between them.

Table 2.

Research Questions, Key Variables, and Data Analysis Strategies.

Research Questions	Key Variables	Data Analysis-Strategies
• To what degree does Study Island Software aid all students in reaching proficiency levels in state academic assessments (4Sight &PSSA) in the part-time CTC of this study?	IEP students, All students, Non IEP Students Study Island scores, 4Sight pre and posttest scores, PSSA scores, NOCTI Scores	Descriptive Statistics (Mean, SD, Median scores, correlation) Inferential Statistics (regression analysis, R Squared Values, p values, Factorial ANOVA) Determine how much of the variances in PSSA and NOCTI is explained by Study Island.
• To what degree does Study Island Software aid IEP students in reaching proficiency levels in state academic assessments (4Sight &PSSA) in the part-time CTC of this study?	IEP students, All students, Non IEP Students Study Island scores, 4Sight pre and posttest scores, PSSA scores, NOCTI Scores	Descriptive Statistics (Mean, SD, Median scores, correlation) Inferential Statistics (regression analysis, R Squared Values, p values, Factorial ANOVA) Determine how much of the variances in PSSA and NOCTI is explained by Study Island.
• To what degree does the Study Island Software aid all students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?	IEP students, All students, Non IEP Students Study Island scores, 4Sight pre and posttest scores, PSSA scores, NOCTI Scores	Descriptive Statistics (Mean, SD, Median scores, correlation) Inferential Statistics (regression analysis, R Squared Values, p values, Factorial ANOVA) Determine how much of the variances in PSSA and NOCTI is explained by Study Island.

Table 2 (Cont.)

• To what degree does the Study Island Software aid IEP students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?	IEP students, All students, Non IEP Students Study Island scores, 4Sight pre and posttest scores, PSSA scores, NOCTI Scores	Descriptive Statistics (Mean, SD, Median scores, correlation) Inferential Statistics (regression analysis, R Squared Values, *p* values, Factorial ANOVA) Determine how much of the variances in PSSA and NOCTI is explained by Study Island.

Chapter Summary

This chapter focused on population, methods used for data collection and data

analysis, dependent and independent variables, and a short description of all of the

variables that will be used in this study. This will be a quantitative study using existing

data from assessments that are used by the suburban CTC being studied which is stored

on the various provider agencies' web sites of the assessments being studied. The

"honest broker" method will be used so that only the designated person at this school will

know the names and Pennsylvania ID numbers of the seniors being studied. This person

will use random numbers for identifiers so that the students will not be at risk of any

confidentiality breaches. No local assessments will be used in this study but only the

outside private and public tests and the Study Island computer assisted learning Software.

This Software was originally designed for IEP students and filtered out to the all

population. This is a nationally recognized and used Software and is targeted toward the

individual state's assessment systems. For Pennsylvania, this is the PSSAs which are

given to students in their junior year of high school. The 4Sight exams are typically used as a "corrective action" mandate for local education agencies (LEAs) and although not a computer assisted teaching and learning tool, it is used universally as an assessment tool that helps target weaknesses and guides educators and teachers to focus on those areas where students may need extra help. The extra help is facilitated through the Study Island Software package where students can view a lesson, practice their skills, and test out to monitor progress.

Chapter 4

Analysis of Data

The purpose of this study was to determine what impact the Software Study Island has on 4Sight, PSSA, and NOCTI assessments for a suburban part-time Career and Technical Center (CTC). The research method used was quantitative, and six research questions were used to help determine the outcome:

1. To what degree does Study Island Software aid all students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

2. To what degree does Study Island Software aid IEP students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

3. To what degree does Study Island Software aid all students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

4. To what degree does Study Island Software aid IEP students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

5. To what degree does Study Island Software aid all students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

6. To what degree does the Study Island Software aid IEP students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

Both descriptive and inferential statistics were used to compare the score means, standard deviations, maximum scores, and the analysis included correlation, Factorial ANOVA, and regression analysis. The senior class of 2011was followed from their sophomore year until their final NOCTI assessment in their senior year. All entering sophomores were given a 4Sight assessment in September of their sophomore year.

- •September of Sophomore Year
- •All students take 4Sight pretest

- •Those who score below proficient
- •Participate in Study Island breakout sessions

- •April of Sophomore year
- •All students take 4Sight posttest

- •September of junior year
- •All students take 4SIght pretest

- •Those who score below proficient
- •Participate in Study Island breakout sessions

- •Take PSSA or Keystone Exams
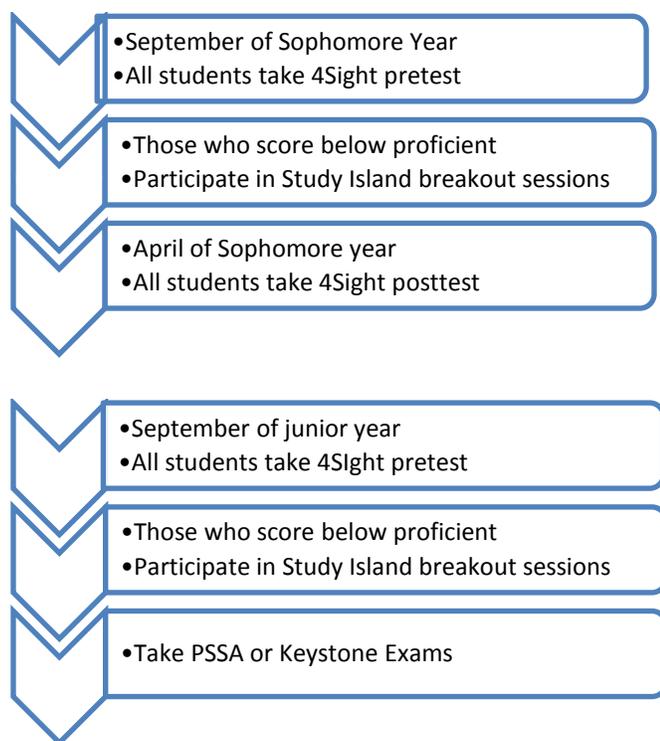
Figure 5. Timeline from 4Sight pretest to PSSA assessment.

Those that failed to score at a Proficient level or better participated in Study Island break-out sessions once a week for 30 to 45 minutes throughout the year. Those who scored at

a Proficient or Advanced level did not have to participate in the Study Island Software break-out sessions. All sophomores, however, took a 4Sight post-assessment in April. The same procedure was followed in their junior year but the Study Island sessions ended after the PSSA Assessment in April. All of these students then took a pre-NOCTI assessment in September of their senior year in preparation of the post-NOCTI assessment in March of 2011. All of the existing data to include Study Island, 4Sight, the Pennsylvania System of State Assessments (PSSA), and NOCTI assessments were collected using the "honest broker" method. A person who secured all testing data in this suburban CTC listed all of the scores that each student received on the four assessments and randomly assigned numbers to each individual to ensure confidentiality and therefore none of these scores could be traced back to the individual specific name of the students.

The study also included the IEP population scores to determine if a disability made a difference in 4Sight, the PSSA, and the NOCTI assessments while using the Study Island Software. Although the effects of gender were not examined in this study, Table 4 describes the gender breakdown of the senior class of this suburban CTC. Because the majority of the programs in this CTC related to male dominated occupations, the majority (68.59%) of the students are male. This represents about a two to one ratio of males to females. The females are mostly distributed among the traditional female occupations associated with enrollments in Cosmetology, Health Sciences and Occupations, Dental Assisting, and the Early Childcare Program. The Transportation and Construction Clusters are made up mostly of male students with a few non-traditional exceptions.

Table 3 shows the breakdown of gender in numbers and percentages.

Table 3.

Gender of Participants

Gender	n	%
Male	172	68.5
Female	79	31.5

Note. n = 251

Table 4 shows the makeup of the IEP population by gender. Proportionately appropriate, the males make up most of the special IEP population.

Table 4

IEP Students

Gender	n	%
Males	79	84
Females	15	16

Note. n = 94

Table 5 shows the breakdown of the students' disabilities as they relate to learning support, emotional support, and other disabilities. The breakdown of specific IEP

classifications was not used but may be a topic for future study. The majority of the IEP

students in this study relates to learning disabilities.

Table 5.

IEP by Disability

Disability	n	%
Learning Support	73	77.7
Emotional Support	19	20.2
Other	2	2

Note. n = 94

Research Question 1 – Proficiency in 4Sight math and reading for all students

To what degree does Study Island Software aid all students in reaching

proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

The evidence that follows will show that for the 4Sight assessment, Study Island

had negligible if any impact on the 4Sight reading and math tests. There was no

improvement from the pretest to the posttest in reading which indicates that for whatever

reason, students did not improve in the reading assessment. Study Island was not

effective here. The non-Study Island participants scored higher than those who

participated in Study Island.   For math, those that did not participate in Study Island

scored higher on the 4Sight math test than those who participated in Study Island.

Although, there was a significant improvement in math from the pretest to the posttest,

the interactions between the conditions of whether students participated in Study Island math or not was not significant.

Table 6 reflects the parameters used in the study to qualitatively describe correlation strength. These are general guidelines for Social Sciences and most of the correlations in this study fit into the moderate to low category. Table 7 reflects the parameters used in this study to determine the strength of the R^2 effect.

Table 6.

Correlation Coefficients and Associated Strengths

Strength of Correlation	
Very High Correlation	$\pm$ .90 - 1.00
High Correlation	$\pm$ .70 - $\pm$ .90
Moderate Correlation	$\pm$ .50 - $\pm$ .70
Low Correlation	$\pm$ .30 - $\pm$ .50
Little if any Correlation	.00 - $\pm$ .30

Note. Adapted from "*Applied statistics for the behavioral science*" Hinkle, D. E., Wiersma, W., & Jurs, S. G. (1998). Boston, MA: Houghton Mifflin. (4th ed.)

Table 7

R^2 Values and Associated Strengths

Effects Size	
Small Effect	$0.01 - <0.09$
Medium Effect	$0.09 - <0.25$
Large Effect	> 0.25

Note. Adapted from "*Statistical power for the behavioral sciences*" Cohen, J. (1988). NY: Academic Press. (Revised ed.)

To follow the succession of how this class of students proceeded through the testing process, it is important to study the results of the 4Sight exams first, as they align with the PSSA assessments and are used as an improvement analysis tool for the PSSA. It is important to understand that the 4Sight process doesn't assert to be a predictor of PSSA success, but only to be a practice tool to help students prepare themselves for this type of testing.

Table 8 shows the results of regression analysis that was performed on the Study Island math and reading assessments with the post-4Sight assessment results. There was a positive correlation between scores in Study Island for reading and scores for the 4 Sight reading posttest ($r = 0.517$). This shows that the students who performed better on the Study Island reading also performed better in the 4 Sight reading. This was found to be significant, $p < .05$. The regression analysis showed an R^2 value of 26.8% which provides a measure of the shared variability and provides some evidence regarding the extent explained / predicted by Study Island scores in reading.

There was a positive correlation between scores in Study Island for math and scores for the 4 Sight math posttest ($r = 0.339$). This shows that the students who performed better on the Study Island in math also performed better in the 4Sight in math. This was found to be significant, $p < .05$. The regression analysis showed an R^2 value of 11.5% which provides a measure of the shared variability and provides some bases regarding the extent 4Sight reading tests can be explained / predicted by Study Island scores in reading. (See Table 8)

Table 8.

Regression Analysis of Study Island with 4Sight Post Assessment Results by Subject: All Seniors

Subject	S	R^2	t	p	r
Math	13.43	11.5%	3.76	0.000	0.339
Reading	11.92	26.8%	6.57	0.000	0.517

Note. S = standard error of the estimate R^2 = correlation squared, $t = t$ test, $p = < .05$, r = Pearson Correlation

A paired t-test was used to compare mean scores of the 4Sight pretest versus the scores of the 4Sight posttest for all seniors of the class of 2011 sophomore year. Table 9 reflects *p* values, the t values, and the confidence interval between the two tests for both math and reading. The reading portion of the 4Sight Assessment showed no difference in the pretest posttest mean scores at -0.10 (*p* = .927), while the math portion showed a mean difference of -3.94, (*p* < 0.001). The mean difference between the pre and post-reading 4Sight test was negligible. The 4Sight reading pretest had a mean of 58.39 (SD=16.36) while the 4Sight reading posttest had a mean of 58.48 (SD= 18.54). A paired samples t-test showed no significant differences between the tests. For whatever reason, students did not demonstrate an improvement in reading throughout the year, at least when tested with the 4Sight. (See Table 9)

Table 9

Paired t-test: 4Sight Reading and Math Pretest and Posttest. All Seniors

	n	M	SD	95%CI	t	p
Reading						
Pretest	186	58.39	16.36			
Posttest	186	58.48	18.54			
Difference	186	-0.09	14.63	-2.21, 2.02	-0.09	0.927
Math						
Pretest	186	43.74	10.17			
Posttest	186	47.68	12.26			
Difference	186	-3.94	10.60	-5.48, -2.41	-5.07	< 0.001

The data in table 10 shows that non-Study Island participants averaged 70.85 (SD=10.95) in their reading pretest and a 67.66 (SD=15.47) on their posttest, which means they did slightly worse on their posttest. For the students who participated in Study Island, their pretest mean score was 50.07 (SD=14.39), and their posttest was 53.32 (SD= 18.18), which means they did slightly better on their posttest.

When comparing the four conditions together it was shown that there was a significant difference between the pretest and posttest performance between the Study Island users and non-Study Island users, F=6.52, p<.05. However, as the main effect between the pretest and posttest was negligible, it can be inferred that this value is significant because of how much better the non-Study Island user performed over the Study Island group. This statistic evidences that Study Island in itself had either no or a minimal effect on performance in the 4Sight reading test.

Table 10

Examination of Study Island versus Non-Study Island Participants as
measured for 4Sight Reading Pre and Posttests: All Seniors

Variable	n	Mean	SD	F	_p_
Pretest					
SI					
No	67	70.85	10.95		
Yes	119	50.87	14.40		
Posttest					
SI					
No	67	67.66	15.47		
Yes	119	53.32	18.18		
Pre and posttest difference				6.56	.738
Difference between SI and no SI				6.56	.011

The data in Table 11 show that students who *did not do* Study Island scored a

49.66 (SD=9.38) in their reading pretest and a 52.99 (SD=12.82) on their posttest, which

means they did slightly better on their posttest. For the students who did participate in

Study Island, their pretest score was 38.9 (SD=8.26) and their posttest was 43.25 (SD=

10.18), which means they did slightly better on their posttest.

Table 11

Examination of Study Island versus Non-Study Island Participants as
measured for 4Sight Math Pre and Posttests: All Seniors

Variable	n	Mean	SD	F	p
Pretest					
SI					
No	76	49.66	9.38		
Yes	110	38.90	8.26		
Posttest					
SI					
No	76	52.99	12.81		
Yes	110	43.25	10.18		
Pre and posttest difference				23.56	< .001
Difference between SI and no SI				.413	0.521

The interaction between the conditions was not significant, which means that
regardless of whether the students participated in Study Island or not, in they improved.
This statistic evidences that Study Island had either no or a minimal effect on
performance in math for the 4Sight test.

Table 12 shows the regression analysis and correlation coefficients of all seniors
relating the 4Sight posttest to the PSSA assessments taken by all seniors in the 2009-2010
school years. Even though a modest mean difference exists between the 4Sight reading

assessment pretest and the 4Sight reading posttest, a moderate to high relationship exists

in the correlation between the 4Sight posttest and the PSSA reading

Table 12

Regression Analysis PSSA Assessment versus 4Sight Posttest Results by Subject: All Seniors

Subject	S	R^2	t	p	r
Math	137.6	46.4%	12.7	$<.001$	.681
Reading	155.1	49.2%	15.09	$<.001$	.702

Note. S = standard error of the estimate, R^2 = correlation squared, t = t test,
$p = <.05$, r = Pearson Correlation

portion of the analysis (r =.702). There is also evidence of a strong correlation in the

math assessments with a R^2 value of 46.4 percent and a correlation coefficient of .681.

The *p* values are both $<.05$ which shows a very strong statistical relationship.

Research Question 2

To what degree does Study Island Software aid IEP students in reaching

proficiency levels in the 4Sight Math and Reading Assessments in this part-time

CTC?

The evidence that follows will show that for the 4Sight assessment, Study

Island had some impact on the 4Sight reading and math tests for students with IEPs.

Even though the difference was not significant, the students without IEPs scored better on

the 4Sight reading than students with IEPs. The non-Study Island participants scored

higher than those who participated in Study Island.   For math, Students without IEPs

scored significantly higher on the math 4Sight than those with IEPs. Those that did not

participate in Study Island scored higher on the 4Sight math test than those who

participated in Study Island. Although, there was a significant improvement in math from the pretest to the posttest, the interactions between the conditions of whether students participated in Study Island math or not was not significant. The correlation and regression data show considerable impact of Study Island of students with IEPs.

The same regression and correlation analysis was performed for the IEP population for both math and reading. Table 13 shows the values of p, R^2, and correlation coefficients. Although the correlations are moderate, the R^2 values are medium to strong per Cohen's guidelines. There were significant improvements in the 4Sight and PSSA scores for the IEP students, but the Study Island Software breakout sessions only account for 27.10 percent and 17.80 percent of the variances for math and reading scores respectively.

Table 13

Regression Analysis Study Island with 4Sight Assessment Results by Subject: IEP Students

Subject	S	R^2	t	p	r
Math	7.96	27.10%	4.35	< .001	0.520
Reading	16.79	17.80%	2.40	0.020	0.422

Note. S = standard error of the estimate, R^2 = correlation squared, $t = t$ test, $P = < .05$, r = Pearson Correlation

There are many other initiatives that help IEP students achieve, and it's a combination of all of these interventions including Study Island that help explain improvements for this population. However, significant positive relationships exist between Study Island and the 4Sight exams for both.

A paired t-test was done to compare mean scores of the 4Sight pretest versus the scores of the 4Sight posttest for sophomore IEP students for the class of 2011. Table 14 reflects p values, the t values, and the confidence interval between the two tests for both math and reading. The reading portion of the 4Sight Assessment showed no significant difference in the mean scores (mean difference = 0.07, p = 0.965), while the math portion showed a significant mean difference (mean difference = 3.56, p = 0.003). (See Table 14)

Table 14

Paired t-test: 4Sight Reading and Math Pretest and Posttest: IEP Students

	n	M	SD	95%CI	t	p
Reading						
Pretest	86	54.68	16.82			
Posttest	86	54.61	18.54			
Difference	86	0.07	15.21	3.18, 3.33	0.04	0.965
Math						
Pre -test	86	40.92	9.41			
Posttest	86	44.48	11.15			
Difference	86	-3.56	10.78	-5.87, -1.25	-3.06	0.003

In reading, for students with IEPs, those who did not participate in Study Island scored a mean of 68.89 (SD=17.02) while those who did participate in Study Island scored a mean of 52.30 (SD=17.83). For students without IEPs, those who did not participate in Study Island scored a mean of 74.38 (SD=11.02) while those who did participate Study Island scored a mean of 55.071 (SD=17.25). There was no significant interaction between IEP's and Study Island, which means that regardless whether the students did SI or didn't do SI it didn't necessarily have an effect on those students with IEPs or those students without IEPs, and vice versa. (See Table 15)

Table 15

Examination of Study Island versus Non-Study Island Participants as measured for 4Sight Reading Posttests: IEP, Non IEP, SI and No SI

Variable	n	Mean	SD	F	p
IEP	86	54.61	18.54		
SI					
No	12	68.89	17.02		
Yes	74	52.30	17.83		
No IEP	101	61.76	17.89		
SI					
No	35	74.38	11.02		
Yes	66	55.07	17.25		
Difference between IEP and Non IEP				1.79	.183
Difference between SI and No SI				33.65	< .001
Interaction SI/No SI, IEP/Non IEP				.193	.661

Since there was no significant interaction between whether a student had an IEP or participated in Study Island, Study Island did not necessarily have an effect on those students with or without IEPs. (See figure 6)
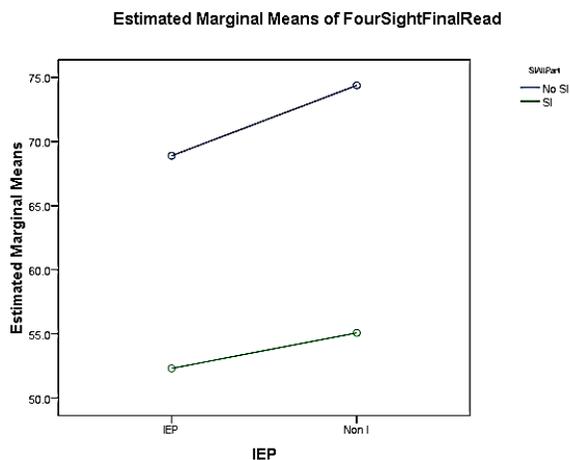
Figure 6. Interaction graph of Non-Study Island and Study Island participants
and IEP and Non IEP students in 4Sight reading

In the 4SIght math assessment, for students with IEPs, those who did not
participate in Study Island scored a mean of 52.00 (SD=13.16) while those who did
participate in Study Island scored a mean of 42.716 (SD=10.34). For students without
IEPs, those who did not participate in Study Island scored a mean of 56.75 (SD=11.60)
while those who participate in Study Island scored a mean of 46.41 (SD=11.51). There
was no significant interaction between IEP's and Study Island, which means that
regardless whether the students did participate in Study Island or did not participate in
Study Island, it didn't necessarily have an effect on those students with IEPs or those
students without IEPs, and vice versa. (See Table 16)

Table 16

Examination of Study Island versus Non-Study Island Participants as
measured for 4Sight Math Posttests: IEP, Non IEP, SI and No SI

Variable	n	Mean	SD	F	p
IEP	86	44.01	11.16		
SI					
No	12	52.00	13.16		
Yes	74	42.72	10.34		
No IEP	101	49.99	12.50		
SI					
No	35	56.74	11.60		
Yes	66	46.41	11.51		
Difference of IEP and Non IEP				4.05	.046
Difference between SI and No SI				21.89	< .001
Interaction SI/No SI, IEP/Non IEP				.063	.803

Since there was no significant interaction between whether a student had an IEP
or participated in Study Island, Study Island did not necessarily have an effect on those
students with or without IEPs and vice
versa. (See figure 7)
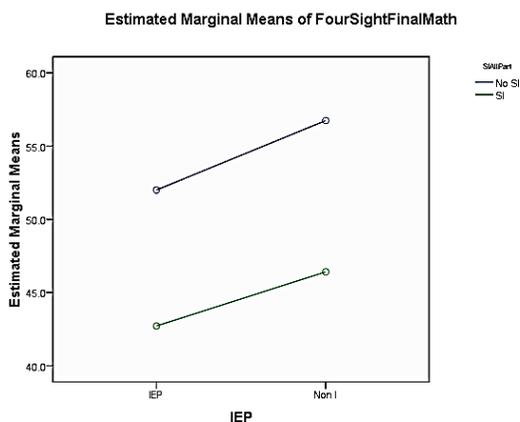
Figure 7. Interaction graph of No Study Island and Study Island participants and IEP and
      Non IEP students in 4Sight math

Research Question 3

To what degree does Study Island Software aid all students in reaching proficiency

levels in state academic assessments (PSSA) in the part-time CTC of this study?

The evidence that follows will show that for the PSSA assessment, Study Island

had negligible if any impact on the 4Sight reading and math assessments. The students

who did not participate in Study Island scored significantly higher in the reading

assessment that those who participated in Study Island. When regression and correlation

analysis were used, the data shows that one may be able to use the Study Island scores to

predict PSSA reading scores, but the data collected does not lend itself to determine

whether Study Island had an effect on PSSA reading. In PSSA math, students who did

not participate in Study Island scored significantly better than those who did not. The

correlation and R^2 values were to low and small to predict/explain any variation in PSSA math scores.

There was a positive correlation between scores in SI for reading and scores for the PSSA reading (r = 0.359). This shows that the students who performed better on Study Island in reading also performed better on the PSSA in reading. This was found to be significant, p < 0.001. The regression analysis also showed an R^2 value of 12.9% which provides a measure of the extent to which differences in PSSA reading tests can be predicted / explained by Study Island scores in reading. (See Table 17)

There was a positive correlation between scores in Study Island math scores with the PSSA math scores (r = 0.210). However, this correlation was not significant ($p = .054$). Therefore, there is no direct statistical relationship that can be inferred from how students perform in Study Island math and how they will perform in their PSSA math.

Table 17

Regression Analysis Study Island with PSSA Assessment Results by Subject: All Seniors

Subject	S	R^2	t	p	r
Math	180.7	4.4%	1.95	0.054	0.210
Reading	210.5	12.9%	3.75	< .001	0.359

A two-sample independent t test was performed on the PSSA reading scores comparing the students who did not participate in Study Island (mean of 1344, SD=237) with the students who did participate in Study Island (mean of 1195, SD=224). There was

found a significant difference (t = 4.30, p <.001). It is important to note that there was a

very large standard deviation within the scores. This shows that there was a significant

degree of variability within the tests score. In other words, the students were all over the

place. This statistic evidences that for whatever reason the students not selected for study

island were able to perform much better on their PSSA in reading. (See Table 18)

Table 18

Two-Sample t test for PSSA Reading for those who participated and those who did not
participate Study Island

Participation	n	Mean	SD	SE Mean	t	p
No SI	83	1344	237	26	4.30	< .001
SI	97	1195	224	23		

A two-sample t test was performed on the PSSA math scores for the students who

did not participate in Study Island (mean of 1369,SD=217) with students who did

participate in Study Island (mean of 1216, SD=184). There was a significant difference (t =

4.94, p <.001). Another important statistic was that there was a very large standard

deviation within the scores. This shows that there was a significant degree of variability

within the tests score. This statistic indicates that for whatever reason the students not

selected for Study Island were able to perform much better on their PSSA in math. (See

Table 19)

Table 19

Two-Sample t test for PSSA Math for those who participated in Study Island and who did participate use Study Island

Participation	n	Mean	SD	SE Mean	t	*p*
No SI	84	1369	217	24	4.94	0.000
SI	85	1216	184	20		

The PSSA with 4Sight posttest relationship results for all seniors by subject are shown in Table 20. The R^2 value for math was relatively moderate at 46.4 percent, and for reading it was 49.2 percent. However, the p values for both showed high significance at $< .05$ ($p = 0.000$ for both subjects). The correlations were .681 for math and .702 for reading which were both considered high.

Table 20

Regression Analysis PSSA Assessment with 4-Sight Posttest Results by Subject:

All Seniors

Subject	S	R^2	t	*p*	r
Math	137.6	46.4%	12.7	$< .001$	.681
Reading	155.1	49.2%	15.09	$< .001$	.702

Research Question 4

To what degree does Study Island Software aid IEP students in reaching proficiency levels in state academic assessments (PSSA) in the part-time CTC of this study?

The evidence that follows will show that for the PSSA assessment, Study Island had somewhat of an impact on the 4Sight reading and math tests for students with IEPs when analyzing regression and correlation. When compared with non IEP students however, the students with IEPs who participated in Study Island did not do as well. In terms of the reading, the students without IEPs scored higher than those with IEPs. The students who did not participate in Study Island scored higher in reading than those who did participate in Study Island. There was no significant interaction between whether a student had an IEP or not, or participated in Study Island or not, and vice versa.

In the reading portion of the PSSAs for students with IEPs, those who did not participate in Study Island scored a mean of 1310 (SD=242) while those who did participate in Study Island scored a mean of 1144 (SD=210). For students without IEPs, those who did not participate Study Island scored a mean of 1422 (SD=226) while those who did participate in Study Island scored a mean of 1268 (SD=208). There was no significant interaction between IEP and Study Island, which means that regardless whether the students participated in Study Island or didn't participate in Study Island didn't have an effect on those students with IEPs or those students without IEPs, and vice versa.

In terms of the PSSA reading scores, the difference between IEP students' (M = 1180, SD = 227) and non IEP students' scores (M = 1341, SD = 229) was significant in that students without IEPs scored higher (F= 10.64, p<.05). The difference between the scores for students who participated in Study Island and those who did not was also significant (F = 19.57, p < .05). Those who did not

participate in Study Island scored better in reading than those who did participate

in Study Island. The interaction between Study Island participants and non-

participants was insignificant. (F= 0.033, p >.05)   (See Table 21) This means

that whether a student participated in Study Island or not, or whether a student

dad an IEP or not, had no impact on the outcome in the reading portion of the

PSSA assessment.

Table 21

Examination of PSSA Reading and Study Island: IEP, Non IEP, SI and No SI

Variable	n	Mean	SD	F	p
IEP	87	1180.83	227.23		
SI					
No	19	1310.90	242.74		
Yes	68	1144.49	210.50		
No IEP	93	1341.44	229.41		
SI					
No	44	1422.25	226.34		
Yes	49	1268.88	208.85		
Difference for IEP and Non IEP students				10.64	< .001
Difference between SI and No SI				19.57	< .001
Interaction SI/No SI, IEP/Non IEP				.033	0.857

As shown in figure 8, there is no significant interaction between IEP status and participation in Study Island which means that regardless if students participated in Study Island or not, it didn't necessarily have an effect on students with IEPs and vice versa.

Estimated Marginal Means of PSSARead
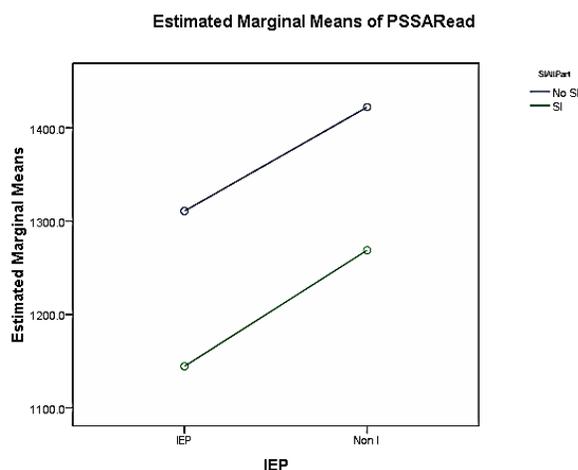
Figure 8. Interaction graph of Non-Study Island and Study Island participant and IEP and Non IEP students

In math for students with IEPs, those who did not participate in Study Island scored a mean of 1295 (SD=230) while those who did participate in Study Island scored a mean of 1158 (SD=171). For students without IEPs, those who did not participate in Study Island scored a mean of 1439 (SD=189) while those who did participate in Study Island scored a mean of 1312 (SD=182). There was no significant interaction between IEP and Study Island (F = .024, p = .576), which means that regardless whether the students did participate in Study Island or not didn't necessarily have an effect on those students

with IEPs or those students without IEPs, and vice versa.

In terms of the PSSA math, the difference between IEP students' and non IEP students' scores was significant in that students without IEPs scored higher (F= 22.58, p<.05). The difference between the scores of students who participated in Study Island and who did not was also significant (F = 17.56, $p <$ .05). (See Table 22)

Table 22

Examination of PSSA Math and Study Island: IEP, Non IEP, SI and No SI

Variable	n	Mean	SD	F	p
IEP	76	1192.86	195.49		
SI					
No	19	1295.21	230.94		
Yes	57	1158.74	171.17		
No IEP	93	1372.77	195.44		
SI					
No	63	1439.52	189.45		
Yes	106	1312.84	182.50		
Difference for IEP and Non IEP students			22.58		< .001
Difference between SI and No SI			17.56		< .001
Interaction SI/No SI, IEP/Non IEP			0.024		0.576

As shown in figure 9, there is no significant interaction between IEP status and participation in Study Island which means that regardless if students participated in Study Island or not, it didn't necessarily have an effect on students with IEPs and vice versa.
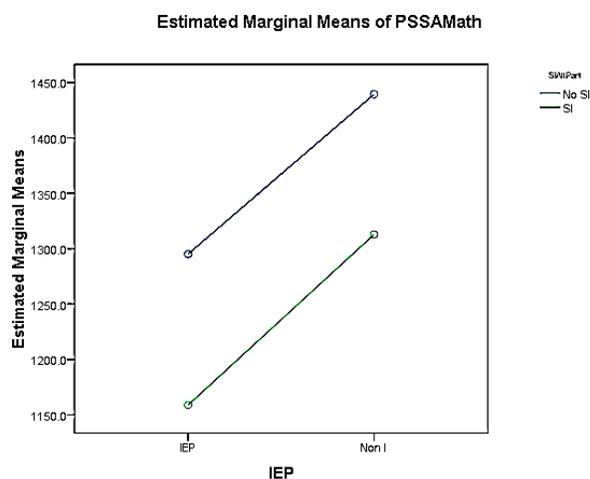
Figure 9. Interaction graph of Non-Study Island and Study Island participants and IEP and Non IEP students

The PSSA and 4Sight posttest relationship results for IEP students by subject are shown in Table 23. The R^2 value for math was relatively high at 27.5 percent and for reading was 32.9 percent. Also, the *p* values for both showed high significance at $< .05$. The correlations were moderate at .524 for math and .573 for reading. (See Table 23)

Table 23

Regression Analysis PSSA Assessment with 4Sight Posttest Results by Subject: IEP Students

Subject	S	R^2	t	p	r

Table 23 (Cont.)

	S	R^2	t	p	r
Math	157.04	27.5%	9.07	0.000	.524
Reading	180.73	32.9%	11.89	0.000	.573

Note. S = standard error of the estimate, R^2 = correlation squared, $t = t$ test, r = Pearson Correlation

A regression and correlation analysis of the PSSA reading and math assessments with the Study Island reading and math was performed. (See Table 24) In both subjects the *p* value was < .05 which indicates statistical significance. The R^2 value for reading was 49.2 percent which is a strong indication that Study Island explains about one-half of the variance in the PSSA reading assessment scores. The correlation for reading was .702 which is high. The correlation value of .517 for math shows a moderate level, while the R^2 value was 26.8 percent.

Table 24

Regression Analysis PSSA Assessment with Study Island Assessment Results by Subject: IEP Ser

Subject	S	R^2	t	r	p
Math	145	26.8%	4.32	.517	0.000
Reading	157	49.2%	15.09	.702	0.000

Note. S = standard error of the estimate, R^2 = correlation squared, $t = t$ test, r = Pearson Correlation

To take an even more detailed analysis at how the IEP students performed in the PSSA assessment, Table 18 shows descriptive statistics of the current IEP seniors versus the IEP seniors' PSSA performance of the 2009/2010 school year. The mean score for reading for the previous year was 1140 versus a mean score of 1158 for the current

seniors. This is a difference of +18 for the two scale scores. For math, the difference was

+ 55. The IEP seniors of the class of 2010 were not involved in Study Island. Although

the R^2 and the correlation values for reading were larger than those of math, the IEP

seniors' improvement gap from the previous year was larger for math than that of reading.

(See Table 25)

Table 25

Descriptive Statistical Values of PSSA Years 09/10 – 10/11: IEP Students

Subject	Year	n	Mean	Median	SD
Reading	09/10	101	1140	1155	204.4
Reading	10/11	119	1158	1166	224.3
Math	09/10	102	1116	1109	181.1
Math	10/11	104	1171	1172	183.5

Research Question 5

To what degree does Study Island Software aid all seniors in reaching Proficiency

levels in the state end-of-program technical assessment (NOCTI) in the part-time CTC of

this study?

The evidence that follows will show that for the NOCTI assessment, Study Island

had negligible if any impact. Students' scores increased significantly from the NOCTI

pretest to the posttest. The students however, who did not participate in Study Island

performed significantly better on the NOCTI posttest than those who did participate.

There was no significant interaction between pre and posttest NOCTI and whether

students participated in Study Island or not. A correlation test showed no significant

relationship and the R^2 value did not show that Study Island had an effect of NOCTI.

Table 26 and Figure 10 show the number of students who scored at the Advanced,

Competent, Basic, and Below Basic levels in the NOCTI pre and post assessments from

2008 – 2011. Each year the number of seniors who scored Advanced and Competent in

the pre and post-assessments increased; while at the same time the numbers of students

who scored Basic and Below Basic decreased. The largest decrease in the Below Basic

level occurred from the 2009/2010 posttest to the 2010/ 2011 post score tests. From

2008/2009 to 2009/2010, the number of seniors who scored at the Below Basic level in

the posttest increased by two points. These students had no exposure to Study Island.

From 2009/2010 to 2010/2011 however, the number of students scoring at the Below

Basic level decreased by 19 points; from 34 to 15. These students were exposed to Study

Island.

Table 26

NOCTI Written Test Analysis 2008-2011

	Advanced	Competent	Basic	Below Basic
2008-2009 Pretest	77	16	53	49
2008-2009 Posttest	98	36	47	32
2009-2010 Pretest	83	46	55	51
2009-2010 Posttest	112	29	31	34
2010-2011 Pretest	103	38	36	45

Table 26 (Cont.)

2010-2011 Posttest	155	24	8	15

Note. The pretest was taken in September and the posttest was taken in April of the same school year.
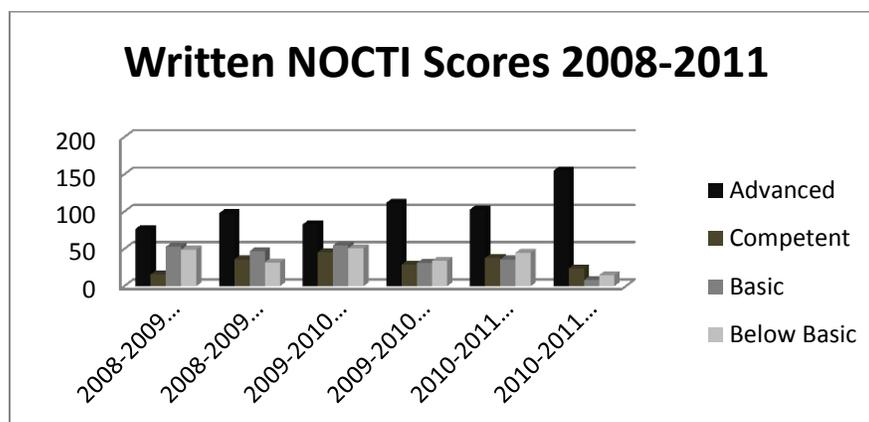
Figure 10. Number of seniors who scored at the Advanced, Proficient, Basic, and
          Below Basic levels in the pre and post NOCTI assessment from 2008 – 2011.

The number of Advanced scores rose from 98 to 112 from 2008/2009 – 2009/2010

which is an increase of 14. The number of Advanced scores rose from 112 to 155 from

2010/2011 which yields an increase of 43 seniors. Table 27 shows the percentages of

seniors who scored at the four levels in the written, performance, and both the written

Table 27

Percentage of the Seniors scoring levels of Post- NOCTI Assessment, All
Seniors

NOCTI Component	Advanced	Competent	Basic	Below Basic	Adv/Comp
Written	76	12	5	7	88
Performance	80	13	2	5	93
Both	62	21	5	12	83

and the performance levels. In order to receive a Governor's Certificate, the students need to score at least a Competent level in both of the categories. Governor's Certificates are awarded for those who score at the Advanced level on both the written and performance components. For those who receive at least a Competent score in one of the categories receive a certificate as well but is signed by the Secretary of Education rather than the Governor. Even though 88 percent scored at the combined Advanced/Competent levels in the written portion, and 93 percent scored at the combined Advanced/Competent levels in the performance portion, a total of 83 percent received a Competency or better for both. This means that some students received a Competency or better in one area but only a basic or below in another.

A paired t test was performed on the NOCTI pre and posttests and the pretest had a mean of 61.87 (SD=13.54) while the posttest had a mean of 70.12 (SD=12.73). This shows that the students' performance increased significantly throughout the course of the year, at least on the NOTCI, t=11.95, p<.05. (See Table 28)

Table 28

Paired t test for NOCTI Pre and Posttest

	n	Mean	SD	SE Mean	t	*p*
Post NOCTI	156	70.12	12.73	1.02	11.95	0.000
Pre NOCTI	156	61.87	13.55	1.08		
Difference	156	8.26	8.63	0.69		

Table 29 shows the between subject t test for the NOCTI pre and posttests. In both the pre and posttest, non-Study Island participants outscored Study Island participants and the difference was significant ($p < .05$). The mean score for the pretest for those who did not participate in Study Island was 64.96 while the mean score for the pretest for those who did participate in Study Island was 60.03.   The mean score for the posttest for those who did not participate in Study Island was 73.81, while the mean score for the posttest for those who did participate in Study Island was 67.94. Both the difference between the pretest and the posttest was highly significant and the difference in scores of those who participated in Study Island and of those who did not was also highly significant.

Table 29

Examination for Study Island versus Non-Study Island Participants as measured for NOCTI Pre and Posttests: All Seniors

Variable	n	Mean	SD	F	p
Pretest					
SI					
No	58	64.96	13.50		
Yes	98	60.03	13.31		
Posttest					
SI					
No	58	73.81	12.04		
Yes	98	67.94	12.68		

Table 29 (Cont.)

Pre and posttest difference	7.17	0.008
Difference between SI and no SI	7.17	0.008

Table 30 shows the regression and correlation data between the Study Island Math, Reading, and both subjects versus the post-NOCTI scores; the 4Sight Math, Reading, and both subjects versus post NOCTI; the PSSA Math, Reading, and both subjects versus the post NOCTI scores; and finally the pre-NOCTI versus the post-NOCTI scores. There exists no significant relationship with any of the Study Island assessments and the post-NOCTI scores. One could argue the significance of Study Island due to the fact that the only students who participated in the Study Island exercises are the ones that did not receive at least a Proficiency score on the baseline 4Sight exam. All students took both the baseline and final 4Sight exam so a better predictor of any influences would be one using the 4Sight assessments. It's not until we reach the 4Sight reading assessment data do we begin to see a relationship. ($p = 0.000$, r = 0.359) The 4Sight and the PSSA Reading components show a highly significant relationship ($p = 0.000$), and a low to moderate correlation (r = .36 for 4Sight and a .43 for PSSA).

Table 30

Regression Analysis and Correlation of Study Island, 4Sight, PSSA, and Pre-NOCTI versus Post-NOCTI, All Seniors

	S	R^2	t	p	r
SI Math versus Post NOCTI	12.85	0%	.13	0.899	0.015
SI Read versus Post NOCTI	12.42	2.9%	1.55	0.125	0.171
SI Both versus NOCTI	12.63	1.2%	1.10	0.276	.110
4Sight Math versus Post NOCTI	12.24	2.5%	1.86	0.065	0.159
4Sight Read versus Post NOCTI	11.67	12.2%	4.28	0.000	0.359
4Sight Both versus Post-NOCTI	11.71	12.2%			
PSSA Math versus Post NOCTI	12.21	7.7%	3.36	0.001	0.277
PSSA Read versus Post NOCTI	11.68	18.3%	5.69	0.000	0.427

Table 30 (Cont.)

	S	R^2	t	p	r
PSSA Both versus Post NOCTI	11.64	16.5%			

Research Question 6

To what degree does the Study Island Software aid IEP students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in the part-time CTC of this study?

The evidence that follows will show that for the NOCTI assessment for students with IEPs, Study Island had negligible if any impact. Although there was not a significant difference in NOCTI scores for those students with IEPs and those who did not have an IEP, the students who did not participate in Study Island scored significantly higher than those who did. There was no significant interaction between whether a student participated in Study Island or not, or whether a student had an IEP or not and vice versa.

Figure 11 shows the number of IEP seniors who scored at the Advanced, Competent, Basic, and Below Basic levels in the NOCTI Assessment. Fifty-nine students scored at the Advanced level, 11 scored at the Competent level, no students scored at the Basic level, and 7 students scored at the Below Basic level.
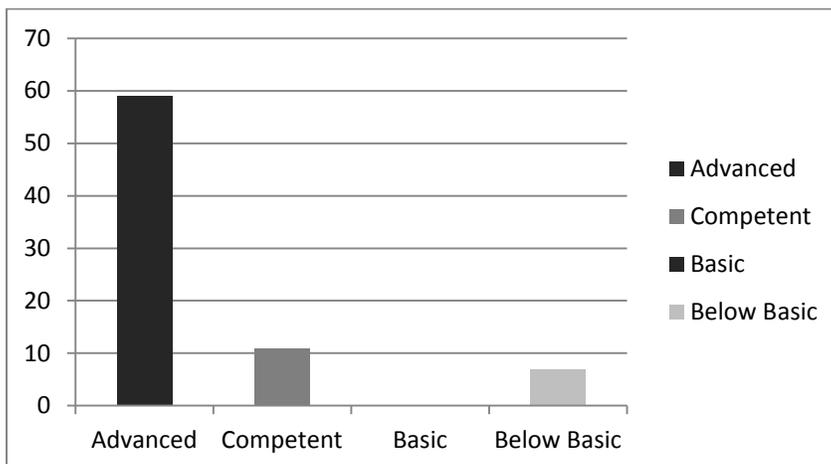
Figure 11. n = 77. Number of IEP students who scored at different levels in the written portion of NOCTI. There were no Basic scores in this group.

Figure 12 shows these numbers as percentages. Seventy-seven percent of the

students scored at the Competent level or better in the written component of the exam,

while only nine percent scored at the Below Basic level.
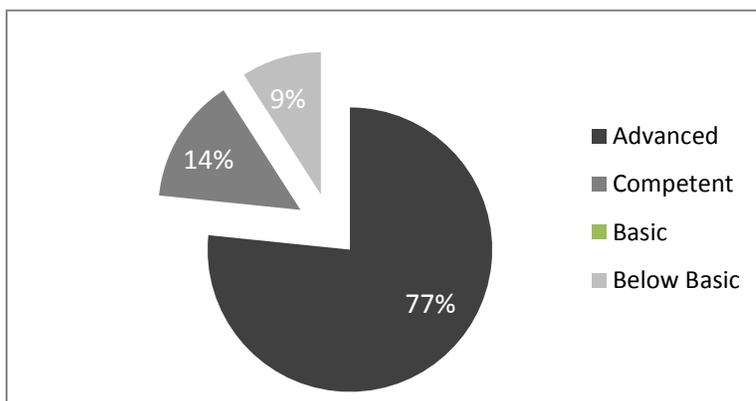
Figure 12. Percentage of IEP students who scored at different levels in the written portion of NOCTI. There were no Basic scores in this group.

For students with IEPs, those who did not do Study Island scored a mean of 72.79

(SD=12.39) while those who did do Study Island scored a mean of 66.23 (SD=12.46).

For students without IEPs, those who did not do Study Island scored a mean of 73.87

(SD=12.09) while those who did do Study Island scored a mean of 70.43 (SD=12.65).

There was no significant interaction between IEP and Study Island, which means that

regardless whether the students did Study Island or not didn't necessarily have an effect

on those students with IEPs or those students without IEPs, and vice versa.

In terms of the NOCTI posttest, the students who did Study Island scored a mean

of 67.91 (SD=12.64) while the students who did not scored a mean of 73.57 (SD=12.08),

which means that the non-Study Island students performed better than the Study Island

students on the NOCTI posttest, which proved to be a significant difference, F= 5.10,

p<.05. (See Table 31)

Table 31

Examination of NOCTI test Study Island versus Non-Study Island Participants: IEP,
Non IEP, SI and No SI

Variable	n	Mean	SD	F	p
IEP	76	67.61	12.66		
SI					
No	16	72.79	12.39		
Yes	60	66.23	12.46		
No IEP	83	72.21	12.41		
SI					
No	43	73.87	12.09		
Yes	40	70.43	12.65		

Table 31 (Cont.)

IEP and Non IEP Difference	1.42	0.236
Difference between SI and No SI	5.11	0.025
Interaction SI/No SI, IEP/Non IEP	0.498	0.481

Figure 13 shows that there is no significant interaction between whether a student had an IEP or not and whether a student participated in Study Island or not.
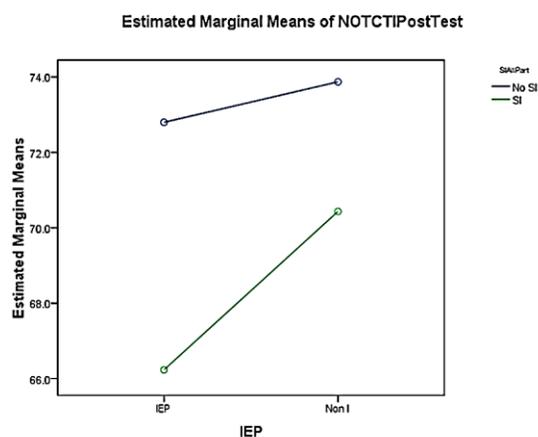
Figure 13. Interaction graph of Study Island and Non-Study Island for NOCTI posttest

Table 32 reveals some interesting data regarding PSSA and NOCTI. Of the students who scored Proficiency or better on both the reading and math components of the PSSA exams, 17 of those students scored a Competent or better on the NOCTI. This

is relatively a low number considering how well these students performed in the PSSA.

Table 32

Comparison of PSSA and NOCTI Levels for IEP Students

Reading and Math		NOCTI Competent Level	NOCTI Advanced Level
Proficient in Both	17	3	14
Non-Proficient in one area	13	3	10
.Non-proficient in both areas	35	6	29

Note. Proficient in PSSA is comparable to Competent in the NOCTI

Of the students that scored a Proficient in at least one of the PSSA categories, 13 students scored at the Competent and Advanced levels in NOCTI. Of the 35 students who did not score at least at the Proficiency level on either of the PSSA components, six received a Competent and 29 received an Advanced score.

Table 33 shows regression Analysis and Correlation of Study Island, 4Sight, PSSA, and Pre-NOCTI versus Post-NOCTI for IEP Students. Unlike Table 29 that refers to all seniors, there is only one category that shows any significance; the PSSA Reading and the post-NOCTI. ($p = 0.011$, r = 0.303) for PSSA Reading.

Table 33

Regression Analysis and Correlation of Study Island, 4Sight, PSSA, and Pre-NOCTI versus

Post-NOCTI, IEP Students

	S	R^2	t	p	r
SI Math versus Post NOCTI	12.85	1.5%	0.86	0.395	0.124
SI Read versus Post NOCTI	12.30	4.3%	1.45	0.154	0.207
SI Both versus NOCTI	12.27	4.7%	1.70	0.095	0.218
4Sight Math versus Post NOCTI	12.14	1.0%	0.84	0.402	0.102
4Sight Read versus Post NOCTI	11.78	6.7%	2.21	0.031	0.259
PSSA Math versus Post NOCTI;	12.55	4.7%			
PSSA Read versus Post NOCTI	11.68	9.2%	4.96	0.093	0.217

Table 34 shows the results of a paired t test was performed on the NOCTI pre and

posttests and the pretest had a mean of 58.13 (SD=12.59) while the posttest had a mean

of 67.72 (SD=12.71). This shows that the students' performance increased significantly

throughout the course of the year, at least on the NOTCI (t = -8.42, p<.05).

Table 34

Paired T-Test and CI: NOCTI Pretest, Posttest, IEP Students

	n	M	SD	95% CI	T	P
Pretest	75	58.13	12.59			
Posttest	75	67.72	12.71			
Difference	75	-9.58	9.86	-11.85, -7.32	-8.42	0.000

Note: CI = Confidence Interval, $p < .05$

Conclusions

For the following analysis, the following was determined:

- Study Island and 4Sight: All Seniors

  o The statistics used here evidence that although you can use SI reading scores as a predictor for how students are going to perform on the 4 Sight in reading, SI in itself does not actually have an effect on improving that performance for the 4 Sight test.

  o The statistics used here evidence that although you can use SI math scores as a predictor for how students are going to perform on the 4 Sight in math, SI in itself do not actually have an effect on improving that performance for the 4 Sight test.

- Study Island and 4Sight: Seniors with IEPs

  o There was no significant interaction between IEP's and SI, which means that regardless whether the students did SI or didn't do SI, it didn't necessarily have an effect on those students with IEPs or those students

without IEPs, and vice versa. However, there was a strong enough R^2
value to indicate that Study Island had some effect on 4Sight math.

- Study Island and PSSAs: All Seniors
  - The statistics used here evidence that although you can use SI reading
    scores as a predictor for how students are going to perform on the PSSA in
    reading, the data collected do not determine whether SI had an effect on
    the PSSA in reading.

- The statistics used here evidences that although you can use SI math scores as a
  predictor for how students are going to perform on the PSSA in math, the data
  collected does not lend itself to determine whether SI had an effect on the PSSA
  in reading.

- Study Island and PSSAs: Seniors with IEPs
  - There was no significant interaction between IEP's and SI, which means
    that regardless whether the students did SI or didn't do SI, it didn't
    necessarily have an effect on those students with IEPs or those students
    without IEPs, and vice versa. However, regression analysis using Study
    Island and PSSA assessment shows a correlation and the R^2 values are
    strong enough to indicate that Study Island had some effect on PSSAs.
    However, there was a strong enough R^2 value to indicate that Study Island
    had some effect on PSSA math and reading.

- Study Island and NOCTI: All Seniors

o Although NOCTI scores improved immensely from the 2009/2010 school year to the 2010/2011 school year, and improved immensely from the NOCTI pretest to the posttest, the statistics here used show no relationship with Study Island and NOCTI

- Study Island and NOCTI: Seniors with IEPs

o Even though the IEP students' scores improved immensely from the 2009/2010 to the 2010/2011 school year, and they improved immensely from the pre-NOCTI to the post-NOCTI, there was no significant interaction between IEP and SI for the NOCTI Exam, which means that regardless whether the students did SI or didn't do SI it didn't necessarily have an effect on those students with IEPs or those students without IEPs, and vice versa.

Chapter Summary

In the data analysis, an attempt was made to see what impact Study Island made on proficiency levels in the 4Sight, PSSA, and the NOCTI achievement tests. Descriptive statistics were used to determine if mean scores and median scores improved from the 2009/2010 school year to the 2010/2011 school year. Inferential statistics were used to determine if the R^2 values, *p* values, and correlations were significant enough to determine if Study Island related positively to the 4Sight, PSSA, and NOCTI assessments. The Factorial ANOVA was used to see if there was an interaction between Study Island and non-Study Island participants, IEP and non-IEP participants, and between Study Island participants/non participants, and IEP/non IEP students.   It was

found that for all students and IEP students, the single greatest factor in NOCTI

improvement was the pre-NOCTI assessment. The pre-NOCTI assessment was designed

to provide feedback to both teachers and students in which weak areas were identified to

be targeted for improvement.

Chapter five will discuss findings, implications, and recommendations for further

study.   It will explain why academic leaders should care about this study, which will

benefit most from this study, and what CTC leaders, teachers, guidance counselors, and

special needs coordinators can do with the results of this study.

Chapter 5

The purpose of this study was to determine if Study Island, a Software package designed around the PSSA, will aid non IEP and IEP students in achieving proficiency scores on both the PSSA and NOCTI exams in the part-time career and technical center of this study.

As superintendents, directors, and other key stakeholders who have an investment in curriculum look into purchasing remediation software such as Study Island, it is imperative that they consider the cost-benefit factor of such an initiative. For 4Sight testing, a renewal fee of $1000 annually is required to buy the site license. For the Study Island software, the cost is $1039 for each module purchased such as the eleventh grade math, eleventh grade reading, ninth and tenth grade PSSA math, and the ninth and tenth grade PSSA reading. See Table 35

Table 35

Annual Cost of 4Sight and Study Island Licenses

4Sight	$1000
11th Grade Math	$1039
11th Grade Reading	$1039
9th and 10th Pre PSSA Math	$1039
9th and 10th Pre PSSA Math	$1039
Total	$5156

It might be well advised to fund initiatives that would better serve the Career and Technical Education curriculum. One such example might be to use funds to purchase

test-preparation study guides for NOCTI or other industry standard certifications that

would enhance employability. Chapter's four and what follows here in chapter five

should be examined carefully before purchasing remediation software such as Study

Island.

Research Question 1

To what degree does Study Island Software aid all students in reaching

proficiency levels in the 4Sight Math and Reading Assessments in this part-time

CTC?

Findings

Study Island and 4Sight Reading: All seniors

It was determined by the data that Study Island had no impact on the 4Sight

reading assessment. For whatever reason, the students made no improvement in reading

as far as the 4Sight exam was concerned.

A paired t-test was performed (Table 9) to determine if there were improvements

from the 4Sight pretest to the 4Sight posttest for all seniors in reading. The test showed

that for reading, the difference was negligible at -0.098 with a p value of .927. This

statistic shows that the seniors as a group made no improvements throughout the year in

the reading portion of the 4Sight exam. These were all seniors so within that group, there

were IEP students, non-IEP students, Study Island participators and non-Study Island

participators.

A Factorial ANOVA was then performed on this same group with students who

participated in Study Island and with those who did not. With the pretest and the posttest

averaged together, the students who did not participate in Study Island performed better than those who did participate in Study Island. (F = 68.30, $p < .05$) A between-subject t-test was done to determine further how Study Island affected the 4Sight reading assessment and to see if there was an interaction. Table 10 in chapter four shows that the students who did not participate in Study Island went down from the pretest to the posttest, but still scored significantly higher in the pre and posttests than the Study Island participants. Table 10 also shows that the Study Island participators' scores went up a little. (50.87 – 53.32) Since this is somewhat negligible, it can be determined that Study Island had no or a minimal effect on 4Sight exams. The p value for the pretest and the posttest was not significant at .738 while the p value for the differences in Study Island participants and non-participants was significant ($p = 0.011$) in favor of those who did not participate in Study Island.

Study Island and 4Sight Math: All Seniors

Although the 4Sight math scores improved from the 4Sight pretest to the 4Sight posttest, it can be determined from the data that Study Island had negligible or no effect on this improvement. The students who did not participate in Study Island actually out performed those who did.

A paired t-test was performed (Table 9) to determine if there were improvements from the 4Sight pretest to the 4Sight posttest for all seniors in Math. The test showed that, the difference was significant at -3.94 with a p value of 0.000. This statistic shows that the seniors as a group made improvements throughout the year in the math portion of

the 4Sight exam. These were all seniors so within that group, there were IEP students, non-IEP students, Study Island participators and non-Study Island participators.

A Factorial ANOVA was then performed on this same group with students who participated in Study Island and with those who did not. With the pretest and the posttest averaged together, the students who did not participate in Study Island performed better than those who did participate in Study Island. (F = 63.63, $p < .05$) A between-subject t-test was done to determine further how Study Island affected the 4Sight math assessment and to see if there was an interaction. Table 11 in chapter four shows that students who did and did not participate in Study Island, went up in the posttest from the pretest. However, the non-Study Island participants scored significantly higher in the pre and posttests than the Study Island participants. This evidences that overall student performance in math increased throughout the year. The p value for the pretest and the posttest was significant at 0.000 while the p value for the differences in Study Island participants and non-participants was not significant.   ($p = 0.521$)

In the regression analysis of Study Island versus 4Sight, the correlation for each subject was a little different. (r =0.339 for math and r = 0.517 for reading) The p values were identical at 0.000 which shows a high significance in both subject areas.

The major difference in this comparison was the R^2 values reading was 26.8 percent while 11.5 percent for math. The Study Island test is a good predictor of how students will perform in the 4Sight and the R^2 value is strong enough to determine that Study Island explains the variance in the 4Sight exams for reading but not for math. (See Table 8)

Conclusions

For the 4Sight reading test, we can determine that there was negligible or no improvement from the pretest to the posttest. However, for the 4Sight math, the data show that there was a significant improvement from the pretest to the posttest for whatever reason. As far as what effect Study Island may have had on the 4Sight outcomes, the data shows that Study Island could be used as a predictor of how well students will perform on the 4Sight, but Study Island only showed a strong effect on the reading portion of the 4Sight test. The data also show that the students who did not participate in Study Island outperformed those who did.

Research Question 2

To what degree does Study Island Software aid IEP students in reaching proficiency levels in the 4Sight Math and Reading Assessments in this part-time CTC?

It was determined by the data that Study Island had no impact on the 4Sight reading assessment for students with IEPs. For whatever reason, the students made no improvement in reading as far as the 4Sight exam was concerned.

Findings

Study Island versus 4Sight Read Posttest: IEP Students

A paired t-test was performed (see Table 14) to determine if there were improvements from the 4Sight pretest to the 4Sight posttest for those students with an IEP in reading. The test showed that for reading, the difference was negligible at 0.07 with a *p* value of .965. This statistic shows that the seniors with an IEP made no improvements throughout the year in the reading portion of the 4Sight exam.

In terms of the 4Sight reading posttest, the students with an IEP scored a mean of 54.61 (SD = 18.54) while the students without an IEP scored a mean of 61.76 (SD =17.89) which means that the non-IEP students performed slightly better than the IEP students. However, the difference between the two populations was not significant. ($p =$ 0.183) As shown in Table 15, the difference however between those who did Study Island and those who did not was almost 20 points (F = 33.65, $p =$ 0.000) with the non-Study Island group performing better.

Study Island versus 4Sight Math Posttest: IEP Students

The data shows that although the students without IEPs scored higher on the 4Sight that those with IEPs, and the non-Study Island participants scored higher than those who did participate, the correlation between Study Island and the 4Sight test was moderate and the R^2 value was large which means Study Island was a good predictor of 4Sight scores in math and that Study Island had an effect on math improvement for students with IEPs.

A paired t-test was performed (see Table 14) to determine if there were improvements from the 4Sight pretest to the 4Sight posttest in math for those students with an IEP. The test showed that for math, the difference was significant at -3.56 with a *p* value of .003. This statistic shows that for whatever reason, the seniors with IEPs made significant improvements throughout the year in the math portion of the 4Sight exam.

In terms of the 4Sight math posttest, the students with an IEP scored a mean of 44.01 (SD = 11.16) while the students without an IEP scored a mean of 49.99 (SD = 12.50) which means that the non-IEP students performed slightly better than the IEP

students. The difference between the two populations was significant. ($p = 0.046$) As shown in Table 16, the difference between those who did Study Island and those who did not was almost 11 points which was also found to be significant (F = 33.65, $p = 0.000$) with the non-Study Island group performing better.

In the regression analysis of Study Island versus 4Sight for IEP students, the correlations for both subjects were a little different. (r =.520 for math and r = .422 for reading) The p values were a little different at 0.000 for math and 0.020 for reading but both still show a high significance. The R^2 value was 17.80 percent for reading which shows a medium effect and a 27.10 percent for math which was a large effect that Study Island had on 4Sight for IEP students.   The data indicate that IEP statistics in regression analysis between Study Island and 4Sight were positive. (See Table 13)

Conclusion

There was a significant difference in the pre-4Sight test and the post-4sight test which shows that for whatever reason, the IEP students were able to improve in math at least in terms of the 4sight exam. The data show that non-IEP students outperformed the IEP students but the difference was barely significant which one could argue that the IEP students kept pace with the non-IEP students. Those IEP students who did not participate in Study Island also outscored those who did participate, and the difference was significant. The data show no relationship between those who were or were not IEP students, and those who did or did not participate in Study Island. The correlations show that you can use Study Island to predict how a student will perform on the 4Sight exam.

At least for reading, the data shows that Study Island had a strong effect on the 4Sight exam.

Research Question 3

To what degree does Study Island Software aid students in reaching proficiency levels in state academic assessments (PSSA) in this part-time CTC?

Findings

Study Island and Non-Study Island Participants and PSSA Read: All Seniors

It was determined by the data that Study Island had little or no impact on the PSSA reading assessment. The students who did not participate in Study Island outscored those who did.

Because there is no PSSA pretest, it is very difficult to determine to what extent Study Island affected the improvement in the reading assessment. Therefore, a between-subject t-test was performed. The students who did not participate in Study Island out performed those who did participate in Study Island. The difference was found to be significant. (See Table 18)

In the regression analysis performed on the PSSA Assessment and Study Island, the correlation for Reading was low to moderate which shows that students who performed better on Study Island reading performed better on the PSSA. The p value showed a high significance ($p < .05$) and the R^2 value for reading was moderate at 12.9 percent which shows that Study Island had a moderate effect on the PSSA. (See Table 18)

Study Island and Non-Study Island Participants and PSSA Math: All Seniors

It was determined by the data that Study Island had little or no impact on the PSSA math assessment. The students who did not participate in Study Island outscored those who did.

Because there is no PSSA pretest, it is very difficult to determine to what extent Study Island affected the improvement in the Math assessment. Therefore, a between-subject t-test was performed. The students who did not participate in Study Island out performed those who did participate in Study Island. The difference was found to be significant. (See Table 19)

In the regression analysis performed on the PSSA Assessment and Study Island, the correlation for math was low to moderate which shows that students who performed better on Study Island reading performed better on the PSSA. The *p* value showed a high significance ($p <.05$) and the R^2 value for math was low at 4.4 percent which shows that Study Island had minimal or no effect on the PSSA. (See Table 17)

Conclusion

The students who did not participate in Study Island out performed those students who did. The difference was significant in both math and reading. The regression analysis showed the R2 values of 12.9% and 4.4% in reading and math respectively, and although the correlation statistic provides a measure of the variability to which future PSSA reading tests can be predicted by SI scores, the data here indicate that Study Island had little or no effect on the PSSA assessments.

Research Question 4

To what degree does Study Island Software aid IEP students in reaching proficiency levels in state academic assessments (PSSA) in this part-time CTC?

Findings

PSSA Assessment and Study Island Read: IEP Seniors

It was determined by the data that Study Island had some impact on the PSSA reading assessment for students with IEPs. The students with IEPs who did not participate in Study Island outscored those who did. The correlation and R^2 values were moderate and large respectively, indicating that Study Island may be a good predictor for PSSA scores and that Study Island had some effect on PSSA outcomes. .

The non-IEP students scored 192 points higher in the PSSA reading assessment than the IEP students. The difference between the groups was significant. For students with IEPs, those who did not do Study Island scored 166 points higher than those students with IEPs who did Study Island.

PSSA Assessment and Study Island Math: IEP Seniors

It was determined by the data that Study Island had some impact on the PSSA math assessment for students with IEPs. The students with IEPs who did not participate in Study Island outscored those who did and there was no interaction between Study Island and whether a student had an IEP or not. However, the correlation and R^2 values were strong and large respectively, indicating that Study Island may be a good predictor for PSSA scores and that Study Island had some effect on PSSA outcomes.

The non-IEP students scored 180 points higher in the PSSA math assessment then the IEP students. The difference between the groups was significant. ($F = 17.56$. $p = <$ .05) For students with IEPs, those who did not do Study Island scored 137 points higher than those students with IEPs who did Study Island. As shown in figure 11, there is no significant interaction between IEP status and participation in Study Island which means that regardless if students participated in Study Island or not, it didn't necessarily have an effect on students with IEPs and vice versa.

Regression analysis PSSA Assessment versus Study Island Assessment, Math and Reading: IEP Students

A regression analysis was done between PSSA and Study Island reading for students with IEPs. The correlation in reading was considered moderate at r = .573 with a strong R2 of 32.9 percent. The p value showed high significance at 0.000. Math was almost equally as strong, carrying a moderate correlation of r = .524, a p value of 0.000, and an R^2 value of 27.5 percent. (See Table 24) According to Cohen (1988) the R^2 values in both cases are strong.

Conclusion

Non IEP students significantly outscored the IEP students in the PSSA assessments. The IEP students who did not participate in Study Island significantly outscored those who participated. There was no significant interaction between the two to show that one affected the other. The regression analysis data show however that Study Island can be used as a predictor to how students will do in the PSSAs and the

strong R^2 values and *p* values show that for the IEP population in general, Study Island had an effect.

A comparison was done between the 2009/2010 school year and the 2010/2011 school year for PSSA Scores using descriptive methods. The mean score for reading in the 2009/2010 school year was (M = 1140) while for the 2010/2011 school year was (M = 1158); an improvement of 18 points. The mean score for math in the 2009/2010 school year was (M = 1116) while the mean score for the 2010/2011 school year was (M = 1171); which was an improvement of 55 points. Although the gain was significantly greater in math, the reading scores were still higher for this class. (See Table 26)

Research Question 5

To what degree does Study Island Software aid students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in this part-time CTC?

Findings

Study Island and NOCTI: All Seniors

The data indicates that Study Island had little or no impact on NOCTI for all seniors. Students that did not participate in Study Island outscored those that did. The correlation and R^2 values were small.

A paired t-test was performed for the NOCTI pretest and posttest for the written portion of the assessment for all seniors. The mean score for the pretest was 61.87 (SD =

13.54) while the mean score for the posttest was 70.12 (SD = 12.73). A t value of 11.95

and a *p* value of < .05 indicate a significant increase with a difference of 8.26.

When a between subject t-test was performed for Study Island participants/non

participants and the NOCTI posttest, it showed that for whatever reason, the students

who did not participate in Study Island performed better on the posttest than did the

students who participated in study Island.

When a Factorial ANOVA was performed using the NOCTI pre and posttests'

differences, and whether Study Island was used or not, the differences between the pre

and posttests for NOCTI were about the same. This means that it appears that Study

Island had a minimal impact on the NOCTI assessment and even though the data does not

indicate this, one might be able to argue that without Study Island, the Study Island

students may not have kept pace with the non-Study Island participants.

A correlation and regression analysis was performed using Study Island and

NOCTI and although positive, was insignificant. The R^2 value was also low at 1.2

percent. Therefore, there is a minimal relationship between the two and nothing can be

inferred about how the students performed on the post-NOCTI test. (See table 29)

An analysis of written NOCTI over the last three years shows significant

improvements overall but the largest improvements occurred between the 2009/2010 and

2010/2011 school years and this reflects the students who were involved in the Study

Island process" versus those who were not.   In the advanced category, the largest jump

was between the 2009/2010 and the 2010/2011 school years. There were 112 seniors

who scored at an Advanced level in 2009/2010 (non-Study Island participants), while in

2010/2011 school year there were 155 students who scored at the Advanced level (Study Island participants). This shows an improvement of 43 Advanced scores versus an improvement of 14 for the previous school year. The Competency levels however show a trend of going down which may imply that those who may have scored at the Competency level are now scoring at the Advanced level due to Study Island. For the last three years the Competency scores were 36, 29, and 24 starting from the school year 2008/2009.

The Basic scores fell as well with a 47, 31, and 8 respectively each year, which may mean students who normally would score a basic, would now score at a competent level or even at the Advanced level. A really significant indication of improvement shows at the Below Basic level. Between the 2008/2009 and 2009/2010 school year the Below Basic score went up from 32 to 34 students (non-Study Island participants). Between the 2009/2010 and the 2010/2011 school years however, the Below Basic levels went down from 34 to 15 students; a drop of 19 students (Study Island" participants). (See Table 17, p. 65)

Another point of interest is the comparison of the pre-NOCTI written versus the Post-NOCTI written. It is important to note that in every year, the improvement gap went up between the two but the largest improvement gap occurred between the 2009/2010 (8) and the 2010/2011 school year (52). A paired t-test was performed using the Pretest and the Posttest to determine if there was a significant difference in the mean scores. (See Table 28) A histogram of the mean differences is shown in Figure 14.

The mean score for the Pretest (M = 61.87) and the Posttest (M = 70.12) shows a difference of 8.26 with a confidence interval between 6.89 and 9.62 and the p value (p = 0.000) shows a very high significance.

Histogram of Differences
(with Ho and 95% t-confidence interval for the mean)
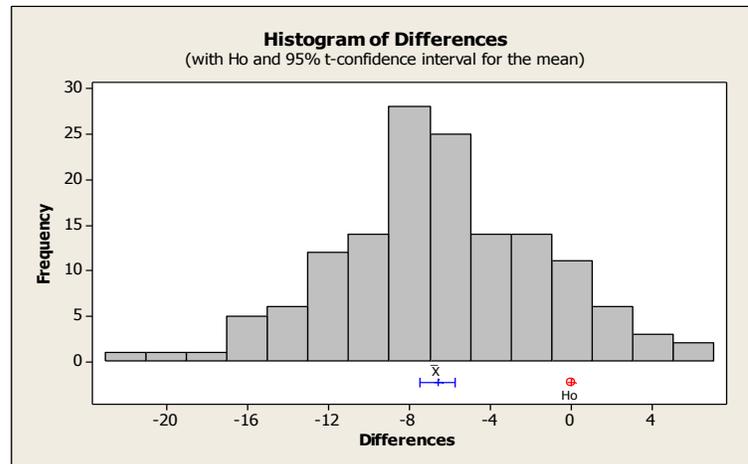
Figure14. Histogram of differences between mean scores of Pre-NOCTI and Post-NOCTI

Conclusion

There was a significant increase in scores from the NOCTI pretest and the NOCTI posttest for all seniors. The between-subject t-test indicated that that the non-Study Island participants scored better on the NOCTI posttest than those who participated in Study Island. The Factorial ANOVA that included the pre and post-NOCTI scores and whether the students participated in Study Island or not, indicated that the differences were minimal which could indicate that one could argue that the Study Island students may not have been able to keep pace if they did not participate in study Island. All descriptive statistical data indicate that the students improved in NOCTI from previous graduating classes.

Research Question 6

To what degree does Study Island Software aid IEP students in reaching proficiency levels in the state end-of-program technical assessments (NOCTI) in this part-time CTC?

Findings

Study Island and NOCTI: IEP Students

The data indicates that Study Island had little or no impact on NOCTI for students with IEPs in NOCTI. Students that did not participate in Study Island outscored those that did. The correlation and R^2 values were weak.

In terms of the NOCTI posttest for the written portion of the assessment for IEP seniors the mean score for IEP students on the posttest was 67.61 (SD = 12.66) while the mean score for non-IEP students in the posttest was 72.21 (SD = 12.41). Even though the non-IEP students scored higher, the difference did not prove to be significant.

A Factorial ANOVA was performed using the NOCTI posttests differences with and without IEP status, and whether Study Island was used or not. The difference between scores on the NOCTI posttest was significant in that non-Study Island participants scored higher than the students who did participate in Study Island. The Factorial ANOVA showed no significant interaction between IEP students and Study Island and non-Study Island participants and vice versa.

A correlation and regression analysis was performed using Study Island and NOCTI for IEP students and although positive, was insignificant. The R^2 value was also low at 4.7 percent and a correlation of 0.095 which shows minimal relationship between

the two and that nothing can be inferred about how the students performed on the post-NOCTI test.

The IEP students performed exceptionally in the NOCTI exam for the 2010/2011 school year. Of the 77 IEP students who were eligible to sit for the NOCTI, 58 scored at the Advanced level, 11 scored at the Competency level, no students scored at the Basic Level, and only eight students scored at the Below Basic level. This translates to 77 percent receiving Advanced, 14 percent receiving a Competent, and nine percent received a Below Basic. See Figures 7 and 8, pp. 69 and 70)

Another emerging phenomenon from this study was comparing the PSSA scores with the NOCTI scores for IEP students by level of achievement. Of those students who scored a Proficient or better in both reading and math for the PSSA Achievement test (17), three scored an Advanced and 14 scored a Competent on the NOCTI. Of those that only scored a Proficient or better in one of the categories of reading or math on the PSSA (13), 3 scored an Advanced and ten scored a Competent. This is the surprising part: of those who failed to score a Proficient or better on either reading or math of the PSSA (35), 6 scored a Competent and 35 scored an Advanced on the NOCTI. This data may show that IEP students who chose CTE are truly embedded in their course of study. And although Study Island was instrumental in part in helping improve 4Sight and PSSA scores, it may have played an even more major role in NOCTI success for IEP students. (See Table 20)

Figure 15 shows the histogram of differences between the mean scores of the Pre-NOCTI and the Post-NOCTI Assessments.
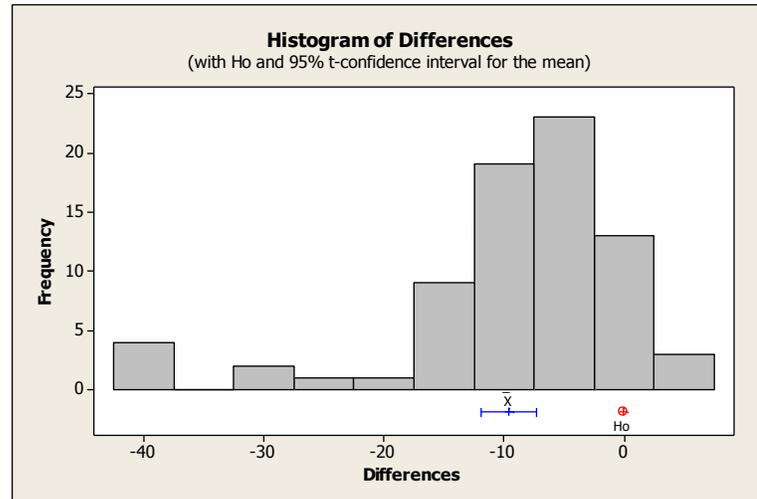
Figure15. Histogram of differences between mean scores of Pre-NOCTI and Post-NOCTI: IEP students

Conclusion

The data show that there was a large significant difference between the pre and post-NOCTI scores for the IEP students. Non IEP students scored higher than the IEP students but the significance was not significant which one could argue that if it were not for Study Island participation, the IEP students may not have been able to keep pace with the non IEP students. The non-Study Island participants scored better than the Study Island participants and this difference was significant. There was no indication of interaction and therefore whether having an IEP or not, and participating in Study Island made no difference. The regression analysis showed no indication of a good correlation so Study Island was not a good predictor of how students would perform on the NOCTI and a very weak R^2 value which means that Study Island had no effect on the NOCTI score.

Overall Conclusion

Table 36 is a summation of the impact that Study Island may or may not have had on student achievement tests taken at this suburban CTC. The statistic that showed the largest relationship was correlation. It appears that in every case, with the exception of the NOCTI for non IEP and IEP students, Study Island can be used as a prediction as to how these students will perform in the associated assessments. Regression analysis showed a positive effect in the 4Sight read for non IEP and IEP students, in the 4Sight math for IEP students, and in the PSSA read and math categories for IEP students. The Factorial ANOVA only faired positive in one category in the NOCTI exam for the IEP students. In this case, the IEP students who participated in Study Island showed evidence of keeping up with their counterparts who did not participate in Study Island. The paired t-test used to determine if there was a significant difference between the 4Sight pretest and 4Sight posttest for non IEP and IEP students showed that for whatever reason, both groups improved in math in at least the 4Sight test is concerned. Descriptive statistics were used to determine if PSSA and NOCTI scores have improved from previous years and for whatever reason, there was improvement in both for non IEP and IEP students.

The data show that Study Island may be more beneficial for IEP students but not with over whelming results. There are 14 instances where a yes occurs in table 36 that are aligned with students with IEPs. There are nine instances where a yes occurs in table 36 that are aligned with non IEP students.

Table 36

Impact of Study Island on 4Sight, PSSA, and NOCTI

	Descriptive Means, SD	Paired T-Test	2-Sample T-Test	Between Subject T-Test	Factorial ANOVA	Regression Analysis	Correlation
4Sight Read No IEP		No		No	No	Yes	Yes
4Sight Math No IEP		Yes		No	No	No	Yes
4Sight Read IEP		No		Yes	No	Yes	Yes
4Sight Math IEP		Yes		No	No	Yes	Yes
PSSA Read No IEP			No	No		No	Yes
PSSA Math No IEP			No	No		No	Yes
PSSA Read IEP	Yes			No	No	Yes	Yes
PSSA Math IEP	Yes			No	No	Yes	Yes
NOCTI No IEP	Yes	Yes		No	Yes	No	No
NOCTI IEP	Yes	Yes		No	No	No	No

Implications of the Study

When comparing Study Island participants with non-Study Island participants, the data

show that typically non-Study Island students outperform the students who were Study

Island participants. When comparing IEP students with non-IEP students, the data shows

that students without IEPs score higher on standardized achievement tests than those with

IEPs. The study also shows that there are no interactions between students with IEPs

and whether or not they participated in Study Island or not.

Emerging Data

The NOCTI Pretest has the largest impact on the success of the NOCTI Posttest.

This was initially not part of the data collection and analysis. It would be highly

encouraged for all CTCs have their seniors take the Pre-NOCTI Test in the Fall to

prepare them for a successful Post-NOCTI experience.

The second piece of emerging data was that for purposes of NOCTI, it did not

appear relevant at what level the IEP students scored in the PSSA standardized tests, as

the majority of these students scored Advanced and Competent in the NOCTI exam.

Recommendations

- Given the overall
  - Use professional development time to train teachers to teach
    literacy and numeracy strategies to create a diversified teaching
    approach in teaching academics.

- o Bring in the MAX Teaching professionals to help with this diversified instruction.

- o Use math and literacy coaches to train teachers how to deliver academic instruction related to CTE.

- o Get involved with the PDE Tech Centers That Work Program through the current TAP initiative.

- o Get academic teachers involved with CTE teachers to develop co-teaching strategies, in that CTE teachers can teach related academics and academic teachers can focus in on skill-specific applied academics at the individual task level.

- Have the seniors take the Pre-NOCTI in September to prepare them for the Post-NOCTI.

- Track all relevant data:

  - o PSSA scores taken from the PDE e-Metric System.

  - o Pre-NOCTI Scores

Recommendations for Further Research

To better understand the impact on the students with IEPs, it may be beneficial to breakdown the analysis even further with regards to the specific disability; namely whether the student was considered as needing learning support or emotional support. A researcher may discover that that emotional support students may not benefit at all from Study Island.

Another opportunity for research is to consider if students did better on Study Island while working from home or at school. It may be determined that within the tranquility of their own home, students may perform better.

One may want to see if pulling students out of their major study in CTE has a negative impact on attitudes towards CTE or Study Island. A student may resent the fact that they are being pulled away to do something they deem to have no added value in for CTC skill set.

One might also study the environment in which Study Island takes place at school to measure distractions, whether or not the monitor is of any help, or if there should be a math or reading expert in the room. A student may show that students have more respect for one who is highly qualified in the area of study and may feel a higher comfort level with this type of support.

Given the primarily monoculture of this study, it may be beneficial to extend this study to a more multicultural group such as you might find in an inner-city CTC. This suburban CTC is made up primarily of Caucasian, middle class students with a few students of Hispanic, African American, and Indian backgrounds, and a small economically disadvantaged representation.

Study Island facilitates a lot of data regarding time on task. It could be beneficial to track time on task versus outcome to determine if the amount of time spent on a subject correlates with the success of the testing. The researcher of this study avoided this as it may have been thought that time ticking away while students were logged on might not always represent "authentic" work. A student who is logged on to Study Island

but is daydreaming won't give you a measurement of actual productive work. If there were a way to monitor this, such as when the student is working one on one with a facilitator who can verify "on task" activity, this may add another valuable dimension to the study.

The number of items completed may be another valuable measure that could be correlated with outcome. Would completion of more items by the students correlate directly with higher scores on tests? This is a quality versus a quantity issue in which the researcher would be more valuable for a student to spend more time on an item rather than rush through the exercises to see how many he/she could get done. If this is something that can be monitored by a facilitator it may provide valuable data.

<p style="text-align:center">Summary</p>

This study provides CTE educational leaders with additional knowledge, relating to the importance of integrating academics into CTE. Also should at justify all that educational leaders are doing today to improve PSSA and NOCTI scores. A vehicle such as Study Island, as evidenced by the data in this research, does not seem to be a valued integral part of an overall comprehensive plan for students without IEPs to make these improvements. However, for students with IEPs, the data shows that Study Island does show sevidence of some impact. Because this program is tailored to the PSSAs, it may be more beneficial in a purely academic setting. The state is moving away from PSSAs and towards the Keystone exams as part of the new high school graduation requirements to better help students prepare for college and career. The school of this study may be better served by giving attention and funding dollars towards improvement of NOCTI

exams, industry specific certifications, and articulation agreements with local colleges and postsecondary trade and industrial schools.

Starting with the class of 2015, new high school graduation requirements will help ensure that Pennsylvania's students prepared for college and career. Along with current requirements (course completion and grades, completion of culminating project, and demonstration of proficiency in each of the state standards not assessed by a state assessment) students will complete one of the following pathways for each main subject:

1. Successful completion of courses in which a Keystone Exam serves as the final exam and counts for at least one-third of the course mark; or

2. Demonstration of proficiency on independently-validated local Assessment systems; or

3. Demonstration of proficiency on a Keystone Exam used as a Stand-alone graduation requirement in a given content area; or

4. Demonstration of proficiency on an Advanced Placement or the International Baccalaureate Exam.

(Pennsylvania Department of Education SAS, n.d., p. 1)

As graduation requirements become more stringent and defined by the year 2015, it will be crucial for CTE educators to get involved in academic as well as career-

education initiatives such as those examined in this document in order to ensure CTE

student success.

> Several requirements dictate the testing of career and technical
> education students. First, at their November 1996 meeting, the
> State Board of Education approved an occupational competency
> measure requiring the use of student occupational competency
> assessment for all secondary and adult career and technical
> education completers. Second, the Carl D. Perkins Career and
> education Act of 2006 requires that each state develop a system
> of core performance measures and standards for the purpose of
> evaluating its secondary, adult, and postsecondary career and
> technical education programs. Third, Pennsylvania is a unified
> state where state and federal career and technical programs are part
> of the Governor's Executive Order for the Pennsylvania Workforce
> Investment Board which calls for an integrated workforce
> Investment system with core performance measures and
> Standards. (Bureau of Career and Technical Education, 2007, p. 2)

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    website

APPENDIX A

IRB Basic Training

From:	Office for Research Protections [orprotections@psu.edu]
Sent:	Thursday, August 20, 2009 7:04 AM
To:	Thomas A. Viviano, Sr.; Viviano, Thomas
Subject:	[Junk released by Allow List] IRB Training - The Pennsylvania State University Certification for Thomas A. Viviano Sr.

CONGRATULATIONS Thomas A. Viviano, Sr.!

You have successfully completed the Institutional Review Board (IRB) Basic Training on the Protection of Human Participants on August 31, 2007. This training is provided by the Office for Research Protections at The Pennsylvania State University. **This email serves as a verification of the successful completion of your training; please retain this email notice for your records.**

Important Notice: The successful completion of this training DOES NOT grant automatic approval of a human participants research study. To receive IRB approval for a research study involving human participants, you must complete the appropriate IRB application and submit it to the Office for Research Protections. Applications and additional information can be found at our website at http://www.research.psu.edu/orp.

If you have any questions, please do not hesitate to contact our office.

Office for Research Protections

The Pennsylvania State University
201 Kern Graduate Building
University Park, PA 16802
Phone: (814) 865-1775
Fax: (814) 863-8699
Email: ORProtections@psu.edu
Web: http://www.research.psu.edu/orp

APPENDIX B

IRB Approval Letter

Date: December 15, 2010

From: Dolores W. Maney, Compliance Coordinator

To: Thomas A. Viviano, Sr.

Subject: Results of Review of Proposal – Expedited **(IRB #35414) Secondary Data**

Approval <u>Expiration</u> Date: November 1, 2011

"What Impact Does the Software Study Island have on 4-sight,PSSA, and NOCTI Assessments for Part-Time CTE Students?"

The Institutional Review Board (IRB) has reviewed and approved your proposal for use of human participants in your research. By accepting this decision, you agree to notify the Office for Research Protections (ORP) of any additions or changes in your study procedures that would alter participant risk.

If this study will extend beyond the above noted approval expiration date, it is the principal investigator's responsibility to submit a completed Continuing Progress Report to the ORP to continue approval of this research.

On behalf of the IRB and the University, thank you for your efforts to conduct your research in

compliance with the federal regulations that have been established for the protection of human

participants.

<u>Please Note</u>: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information.   Send   a   blank   email   to: <u>L-ORP-Research-L-subscribe-request@lists.psu.edu</u>

DWM/d

VITA

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Ph.D. in Workforce Education and Development
Dissertation: "What Impact Does the Software Study Island have on 4Sight, PSSA, and NOCTI
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M.S. Applied Technology   **2001**
Thesis: "What Happens When Computer Software is used to
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Temple University
Magna Cum Laude   **1995**
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Middle Bucks Institute of Technology
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RELATED EXPERIENCE
Instructor for new teachers in the Temple Teacher Education Program   **2001-2005**
Temple University

PUBLICATIONS AND PAPERS

Viviano, T.A. "Self-Assessment versus Other's Perception of One's Mental Health"
Social Science Research Network, http://ssrn.com/abstract=1633582

PRESENTATIONS
Guest Speaker at the Pennsylvania Association of Career and Technical Education Conference
on National Board Certification   **2002**

Poster presentation: "What Impact Does the Software Study Island have on 4Sight, PSSA,
and NOCTI Assessments have on Part-time CTE Students". Pennsylvania State University   **2010**