REAL TIME DATA AS AN INSTRUCTIONAL TOOL: EXAMINING ENGAGEMENT AND

COMPREHENSION

By

Eric Glenn Blanton

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University

2017

REAL TIME DATA AS AN INSTRUCTIONAL TOOL: EXAMINING ENGAGEMENT AND

COMPREHENSION

by

Eric Glenn Blanton

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University, Lynchburg, VA

2017

APPROVED BY:

Nathan Putney, Ph.D., Committee Chair

Daniel Baer, Ph.D., Committee Member

Page McCraw, PhD., Committee Member

Scott Watson, Ph.D., Associate Dean, Advanced Programs

ABSTRACT

The integration of technology within the lives of all people has continued to expand and also impacts the education systems around the world. The purpose of this study was to study how real-time data impacted the educational achievement of students in a senior level economics class who participated in game-based learning through the Marketwatch Game. The sample for this study was 107 senior level economic students ranging from age 17 to 18 years old. Using a quasi-experimental pretest-posttest nonequivalent control group design (Patten, 2012), the students were divided into two groups and were to play the Marketwatch Game. The experimental group of students used iPads to play the game, while the control group used newspapers. The students using iPads were exposed to real-time data, while the newspaper group simply had access to the Wall Street Journal print edition. Engagement of students was analyzed for independent learning and the use of iPads when compared to print text using the High School Survey of Student Engagement. Student engagement were also measured on posttest scores using the Test of Economic Literacy within the same category of independent learning and iPads/print text. Engagement scores were analyzed using a one-way ANOVA, while the posttest scores were analyzed using a one-way ANCOVA. The results of the HSSSE indicated a significant difference in engagement; however, it was the control group that cited greater engagement as opposed to the experimental group. The results of the Test of Economic Literacy did not indicated a significant difference in the scores of the control and experimental groups. Future research should focus on another region of the country. It should also focus on this ethnic, gender and socio-economic makeup of the students, and should focus on upper level students.

Key words: Real-time data, game-based learning, Marketwatch, and independent learning.

Dedication

This experience is dedicated to my wife Gina and our son EJ. You have watched me work on this project, sacrificing our time together for what you thought was a greater good. I could not have completed this without your love, support, and prayers. I thank you both and love you so much.

Acknowledgements

I would first like to acknowledge my committee chair, Dr. Nathan Putney. I am sure that I caused you frustration along the way, but you were always there when I had questions and were supportive of my efforts. I would also like to thank Dr. Daniel Baer and Dr. Page McCraw for serving on my committee. Each of you helped tremendously in completing this program. I would also like to thank Dr. Phillip Alsup, my Research Consultant who was always willing to help at any point of this process.

I would also like to acknowledge those friends and colleagues who helped and sacrificed throughout this process to ensure my success; Michael Dalton, Dr. David Smith, Dr. Jennifer Parker, Trip Hartman, Todd Gardner, Ben Fuller, and Dr. Raashad Fitzpatrick.

I would also like to thank my parents Raymond and Delores Blanton who have always supported me and loved me in any endeavor that I have undertaken.

Table of Contents

List of Tables

List of Figures

CHAPTER ONE: INTRODUCTION

Background

Our current generation of students has been defined as "digital natives" and the remainder of society as "digital immigrants" Prensky (2001). There is still a difference between the students in our educational system and those who teach them. With the emersion of technology in our lives, a greater opportunity to provide students with mobile devices with instant access and real-time data has emerged. The majority of real-time data components studied in education have been tools used by teachers to assess student performance (Edmondson, 2016). Other studies were centered on live simulations or game-based simulations (Chen & Howard, 2010). In 2011, Collins and Dunn had students recognize their mistakes in real-time using recording devices to study the effects within the field of music. Deniz and Dulger analyzed fourth-grade students' graphing in mathematics by using a computer program to assist in 2012. By giving students access to real-time data, environments are opened that generate the students' abilities to access programs and simulations that were previously not available. The integration of technology within education has continued to grow as an integral part of shaping the lives of students. In our current educational environment, millions of dollars are being spent on technological upgrades (Fu, 2013). Validation of expenditures must not only be cost-effective, but must also meet the needs of the students in a technologically driven society. Technology is a dynamic device as a resource in the field of educational improvement (Fu, 2013). The Marketwatch game is an online game in which students can trade stocks in real-time by creating a virtual portfolio and providing talk strategies with others in the discussion groups for the game. This research sought to discover if access to real-time data through the use

of the Marketwatch game on iPads improved academic achievement of students in a public school setting.

The overarching theme of this study was the effects on what access to real-time data that was in the form of charts, graphs, data, and articles available online. This real-time data is not easily accessed through the use of traditional media (newspapers). Real-time data is accessed through the Marketwatch game, which is designed to help students learn economic principles using real world scenarios to enhance content covered within the classroom setting. The theoretical framework at the heart of this study revolved around the educational theory of information processing. This theory examines how the brain processes the information that it receives from the senses known as the input (Lancaster, 2012). The input is stored in the brain and is later used for recall or output. Two psychologists who have done extensive work in this area are Craik and Lockhart (2008). Specific to the current study, their work in levels of processing are known as shallow and deep processing. How information is stored based on physical appearance or phonemic process is known as shallow processing; deep processing is where the information being processed is related to something more meaningful, which should lead to greater recall (Craik & Lockhart, 2008). By engaging students in the experiences of buying and selling of stocks within the confines of the Marketwatch Game, students have been immersed in a more meaningful learning process. As students work on these tasks, there are three performance areas: their mental performance, assessment of their own progress, and their inner feelings of fulfillment (Schunk, 1998). The three major aspects of information processing theory are those involving memory: the sensory register, working memory, and long-term memory. Many studies are found in the literature that target the topics of game-based learning and technology (Carr, 2012; Kiger, Herro, & Prunty, 2012). Even though access to the Internet

has been around for several years now, the research involving real-time data and the use of iPads is still limited. Multiple school systems are implementing 1:1 initiatives (students to handheld devices) or are exploring these initiatives.

Problem Statement

There is extensive research on the use of technology including game-based learning simulations, and other programs (Chen & Howard, 2010; Chen, Pan, Sung, & Chang, 2013; Wu, Hsiao, Wu, Ling, & Huang, 2012; Wideman et al., 2007). There is also research in the realm of real-time data in the educational setting. Many studies involve teaching tools available to the teacher to retrieve real-time data to assess student progress. There is relatively little research on the effects of real-time data in an educational setting where students assess their own progress. Specifically a gap exists when incorporating real-time data into a game-based approach to education. Collins and Dunn (2011) focused on students' musical composition using real-time data while incorporating computer based programming and found that real-time data collection tools were useful in adding understandings of comprehension and gave further insight into the structuring of music at both a macro and micro level. Deniz and Dulger (2012) used a computer program of real-time graphing simulation to help students learn geography content and found that there was a significant advantage in using real-time graphing technology to support the fourth-grade students' abilities to interpret graphs. The use of technology has been shown to be effective in increasing student achievement in multiple subject areas. Research has also shown that active participation in activities, where the learners constructed their own meaning was effective in increasing student achievement (Deniz & Dulger, 2012). The research available on real-time data generally focuses on real-time feedback to students on assessments, but not on the availability of real-time data for students to study (Collins & Dunn, 2011; Deniz & Dulger, 2012;

Holowczak, 2005). There are many studies that involve the integration of technology in the classroom and game-based learning (Wideman et al., 2007, Chen, Pan, Sung, & Chang, 2013 and Wu, et al., 2012). By incorporating the use of technology and giving students access to real-time data in an educational setting, this study has furthered the research in educational technology while adding the component of real-time data.

The use of technology in society has come to the forefront with the incorporation of computing devices in the classroom over the past several years. As education has changed with evolving technology, the normalization for communicating, socialization, gathering of information, and the learning process itself have changed (Lutterbach & Brown, 2011). The incorporation of gaming into education has been in place for many years. Games that embed learning and educational theory without changing the construct of the game stand alone as effective (Wideman et al., 2007). Little, if any, information is available on research designed to determine if student achievement can be raised when incorporating real-time data. There is a lack of research on real-time data when incorporating game-based learning and student engagement while measuring student achievement.

Purpose Statement

The purpose of this quasi-experimental pretest-posttest nonequivalent design study was to determine if there is a significant difference in comprehension and engagement in students playing the Marketwatch Game using iPads who have access to real-time data, when compared to students using plain text (newspapers). A convenience sample of 107 senior economic students at a public high school in a southern state served as the sample for this study. Course-related enrichment material was the independent variable in this study. There were two levels of the independent variable. Group one was assigned to work playing the Marketwatch Game with

access to information using newspapers as its data source for research materials. Group two

participated in playing the Marketwatch Game as well. Rather than using newspapers, these

students used iPads to access real-time data in gameplay. The access to real-time data gave

students the ability to access data sources on the Internet such as stock trends, charts, graphs, and

articles. The two dependent variables measured in this study were student engagement and

student achievement. Student engagement has been defined as "how involved or interested the

students appear to be in their learning and how connected they are to their classes and each

other" (Axelson & Flick, 2011, p. 38). Achievement has been defined as students meeting the

standards set forth by the State Department of Education economic standards.

Significance of the Study

Past studies on real-time data have focused on the role of the teacher to assist students

with their achievement. Pertinent studies on real-time data from the students' aspect include

Deniz and Dulger (2012), where students' graphing techniques were analyzed using real-time

software, which not only benefitted the teacher, but the students as well. Collins and Dunn

(2011) used real-time data as a problem solving strategy in research on music composition.

Their study focused on real-time observations and music creation. The study of students using

real-time data is important in that this aspect of real-time data focused exclusively on students

and their ability to use the real-time data to make business decisions of buying and selling stocks

as suggested by Holowczak (2005) in his article on the incorporation of real-time into the

business curricula. Studies have shown that the incorporation of technology in the classroom

produces many benefits such as efficient access to digital information, student-centered and self-

directed learning, a creative learning environment, the promotion of collaborative learning, and

the development of higher order thinking (Fu, 2013). My research has contributed to the current

knowledge of the benefits of using real-time data in education by adding the dimension of the Marketwatch game as students used experiential learning. Chang, Chen, and Hsu, 2011, p. 1229 addressed that "Children's study should be from concrete experiences, such as direct experiences (real –life experiences), contrived experiences (interactive models), and dramatic participation (role play) to abstract thinking" (as cited in Dale, 1969). Ultimately, the way in which today's students process information in real-time with technology compared to print is the major gap this study addresses by combining with game-based learning through the use of the Marketwatch game. Therefore, information processing theory guided the study, with the goal that the new information about the cognitive aspects of learning would be revealed.

Research Questions

The research questions for this study included:

RQ1: Is there a difference in student engagement based on course enrichment materials of real-time data and print text in newspapers?

RQ2: Is there a difference in student economic literacy based on course enrichment materials of real-time data and print text in newspapers while controlling for pretest Economic Literacy scores?

Null Hypotheses

H01: There is no significant difference in student engagement based on course enrichment materials of real-time data and print text in newspapers.

H02: There is no significant difference in student Economic Literacy scores based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores.

Definitions

   The following terms used within this research are defined as follows:

Information Processing Theory: The learning process similar to how a computer processes information (Craik & Lockhart, 2008).

Experiential Learning Theory: "Learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38).

Student Engagement: Student engagement is "how involved or interested students appear to be in their learning and how connected they are to their classes, their instruction and each other" (Axelson & Flick, 2011, p. 38).

Game-Based Learning: Game-based learning is defined as "students use games to explore, discover, and question, ultimately constructing concepts and relationships in authentic contexts" (Yang, 2012, p. 365).

Best Practices: Best practices are the teaching and learning techniques within the classroom that provide the "substance, content, processes, methods, and dynamics of schooling" (Zemelman, Daniels, & Ryde, 1998, p. 4).

Real-Time Data: Real-time data for the purposes of this study is defined as when information is gathered, it is disseminated immediately after collection.

CHAPTER TWO: LITERATURE REVIEW

The purpose of this quasi-experimental pretest-posttest nonequivalent control group design was to determine if there is a significant difference in student engagement and academic performance in students participating in the Marketwatch Game using iPads and real-time data, when compared to students using print text. The research that follows indicates the effects of electronic devices on student engagement and academic performance. The framework of this study encompasses several components of literature. These components are the learning theories, student engagement, game-based learning, twenty-first century skills, and technology; however, there is little research that discusses the influences of real-time data on student engagement and academic achievement.

Theoretical Framework

The theoretical constructs of teaching and learning were identified as three areas by the National Research Council on How People Learn (Bransford, 2000). Those theories include behaviorist, cognitivist, and situated learning. According to Bransford, behaviorist theory focuses on how materials are presented to people in an educational setting. Cognitive learning places an emphasis on learning-by-doing and the interaction that takes place between the student and teacher. Cognitive learning applies the aspects of constructivism in which students are active participants within their learning (Hedin & Carroll, 2010). Information processing is how the mind processes information rather than simply responding to stimuli. Experiential learning is a community of practice where modeling and mentoring take place (Kolb, 1984). For this study, aspects of all three learning arenas were employed, with the focus on information processing theory. The emphasis of this study was directed in the cognitive domain using constructivist practices. By using the cognitive domain through constructivist practices and how both relate to

experiential learning by doing aspect, specifically the learning by doing, the classroom becomes a community in practice. Specific directions and the presentation of materials designed for the study of economics were an important feature of the behaviorist theory in this study. Students immersed themselves in the Marketwatch game, without an extensive knowledge of the stock market. Within the game setting, students participated by buying and selling stocks, with the aim that a community of active participants would emerge (Hedin & Carroll, 2010).

Information Processing Theory

In the late 1950s the theory of information processing was born out of an opposing view to behaviorists' theories of learning. Noteworthy at the time was the invention of the computer. These cognitivists viewed the learning process as similar to how a computer processed information (Lancaster, 2012). Atkinson and Shriffin's stage theory of how information forms in the brain from inception (Stanton, 2002) explained that the brain receives input, processes the information, and then delivers the output. The information that is gathered from each of the senses creates the input as it moves into the processor and is stored in each person's memory. Stage theory is relevant to the current research in that the information processed by the student participants was delivered in two distinct forms. The information was then called upon for a behavioral response or output.

In 1972 psychologists Craik and Lockhart (2008) developed a model of processing called levels of processing. In this model there are two basic processing tenets known as shallow processing and deep processing. This theory focuses on the process of how memory is stored rather than the structures of long term and short term memory. There are two components within the concept of shallow processing. Structural processing, which is the appearance or physical characteristics of an object or person, and phonemic processing, which occurs when sound is

encoded. Deep processing is semantic processing where the information being processed is related to something more meaningful. By implementing the techniques used in the current study, the researcher reasoned that a greater chance of deep processing would occur from all of the attributes used, which would hopefully lead to greater recall by linking the information to other associations.

In 1981, McClelland and Rumelhart developed the connectionist model. The premise of this model is that the input of information is stored simultaneously in the brain in different locations, thus the information is connected by various networks (Phaf, Van der Heiden, & Hudson, 1990). Ultimately the amount of connections that a piece of information contains will affect the ability to retrieve this information. This model is also supported by neuroscience research (Phaf, Van der Heiden, & Hudson, 1990).

An important theorist in information processing theory is Gagne, (1985). He described information processing as an organic process with four components:

- Registration of the body's sensory organs to pay attention to the stimulation

- Information coding is the job of short term memory to organize and store information. If organized into meaningful blocks, an increase in memory enhancement will occur

- Storing information in a particular way to the long term memory to enhance extraction

- Extracting information becomes more easily attained from memory clues and pattern matching (Gagne, 1985)

Experiential Learning Theory

Experiential learning is a concept that has been in place since ancient times. For example, Ancient Greeks used the Socratic Method as a part of the learning experience (Mulcahy, 1984); skilled laborers took on apprentices to give them experience to learn a trade. These methods have transformed in today's society, as technology centers send high school students to job sites to co-op with companies (Baker & Robinson, 2012; Mulcahy, 1984). In higher education, students often times complete internships as an accredited component of their educational experience (Montgomery, Brown, & Deery, 1997). There are two thoughts related to experiential learning. The first being that experiential learning is encompassed when a person changes their emotions, understanding, or skills as a result of a particular event (Itin, 1999, p. 91). The second thought is that experiential education is "a process through which a learner constructs knowledge, skill and value from direct experience" (Itin, 1999, p. 91). Kolb, Boyatzis, and Mainemelis (1999), defined experiential learning theory as transforming or creating knowledge through an experience. Yount (2001) defined experiential learning as active participation of individuals through events or activities that build knowledge. These experts have cited the roots of experiential learning to the writings of John Dewey, Kurt Lewin, and Jean Piaget (Baker & Robinson, 2012; Hedin & Carroll, 2010; Itin, 1999). Lewin, a prominent social psychologist, contributed the idea of group dynamics, which he termed T-group, which is a training group (Hedin & Carroll, 2010; Mainemelis, Boyatzis, & Kolb, 2002). Lewin's work specifically focused on the members of the groups saw each other as peers, which contributed to the dialect and collaboration. Piaget's significance was his contributions to the theory of cognitive development of children through the "process of assimilation and accommodation and how children use these to adapt within their world" (Hedin & Carroll, 2010, p. 110). It was the

researcher's goal that by using these experts' definitions and applying them to the study, they became relevant in participating in the Stock Market Game students were immersed in experiential learning.

Dewey (1938) wrote, as people are educated there will always be a connection between the process of learning and the organic experiences of that person. Dewey further explained that teaching the content itself is not enough. Students need tangible concrete examples to gain depth in the content of their studies. These experiences that Dewey spoke of have evolved full-circle to the experiential learning theory that continues to evoke much research (Baker & Robinson, 2012; Hedin & Carroll, 2010; Kolb, 1984; Mulcahy, 1984). Kolb (1984) identified six propositions that are the basis for experiential learning theory:

- Learning is conceived best as a process instead of a product.

- All learning is relearning.

- Learning requires the resolution of conflict between dialectically opposed modes of adaptation to the world.

- Learning is a holistic process of adaptation to the world that involves more than simple cognition.

- Learning results from synergistic transactions between the learner and his or her experiences.

- Learning is the process of creating knowledge (Kolb, 1984, p. 56).

Baker and Robinson (2012) further explained that in order to fully grasp the concept of experiential learning theory it may be divided into "two dialectically related modes of grasping experience, Concrete Experience and Abstract Conceptualization as well as two dialectically related modes of transforming experience, Reflective Observation and Active Engagement" (p.

3). Experiential learning has been described as taking place when all four previously mentioned

contexts take place in a learning cycle. Kolb (year) noted that experiential learning is not the

same for all individuals, but rather a unique experience for each person. The unique attributes of

the individual combined with the environment that surrounds that individual lead to that

individual's learning style.

Ethling (1993) placed experiential learning into informal, non-formal, and formal

processes. He described informal experiential learning as those instances of learning that take

place day-to-day while learning on one's own. Non-formal and formal processes are those that

would take place in a classroom led by a teacher using experiential education. Formal

experiential processes include more structured learning environments and tasks.

Authentic learning activities lead towards a constructivist approach to education.

Students have an opportunity to develop their own sense of meaning and learning through their

work. The basic tenents of constructivist learning include learners as active participants in their

learning, acknowledgement of prior learning as foundational to current learning, interaction with

others leading to greater understanding and shared meaning of concepts, and, as opposed to

abstract learning, a focus on "real world" tasks (Hedin, 2010, p. 109).

Twenty-First Century Skills

The focus of past generations of educators was on reading, writing, and arithmetic. As

our society has moved forward, the demand for the skills that will prepare our students for

college, the workforce, or the military are increasing (Romero, Usart, & Ott, 2015). According

to Prensky (2001), the greatest change that has taken place in education within the last several

decades is technology innovation. Prensky noted that technology is "an entire strategy for how

to live, survive and thrive in the 21st Century" (p. 2).

Education policy makers have not clearly defined the expectations for the 21st century skills. Within the state of South Carolina, 21st century skills are categorized by the following areas, which are in addition to the mastery of core areas:

- creativity and innovation

- critical thinking and problem solving

- communication and collaboration

- information, media, and technology skills

- ICT literacy

- initiative and self-direction

- social and cross cultural skills

- productivity and accountability

- leadership and responsibility (South Carolina Department of Education)

There is no consensus on a set of 21st century skills; however, there have been many frameworks set in place for these skills with varying classifications and definitions. A meta-analysis of 21st Century skills frameworks demonstrates the characteristics in place from six related frameworks. The frameworks were created by the following organizations:

- Partnership for 21st Century skills (2007)

- EnGauge 21st Century skills (Mertiri Group & North Central Regional Education Laboratory, 2003)

- Assessing and teaching 21st Century skills (ATCS)

- National Educational Technology Standards and International Society for Technology in Education (NETS/ISTE) framework

- Competencies for new millennium learners by the Organization for Economic

  Cooperation and Development (OECD, 2005)

- Center for Social and Economic Research (Gordon et al., 2009).

The relationships that exist between the frameworks are shown in Table 2.1.

Table 1

Summary of 21st Century Skills

Summary of 21st Century Skills Mentioned in Six Related Frameworks			
Mentioned in all	Mentioned in most	Mentioned in a few	Mentioned in only one
Communication	Creativity	Learning to learn	Risk taking
Collaboration	Critical thinking	Self-direction planning	Manage and solve conflicts
ICT literacy	Problem solving	Flexibility, and adaptability	Sense of initiative and entrepreneurship
Social and/or cultural skills	Develop quality products/productivity		

Table note. Romero et al., 2015, p. 153

To encourage states to adopt a framework of skills, the 21st Century Skills Incentive Fund Act (2009) was introduced. A framework entitled The Partnership for 21st Century Skills was developed that incorporated problem solving and creative thinking. The four major tenets of student outcomes are learning and innovation skills, life and career skills, core subjects and 21st Century themes, and information, media, and technology skills as shown in figure 2.

Learning and
Innovation Skills

Core Subjects
and 21st-Century
Themes

Life and Career
Skills

Information,
Media, and
Technology
Skills
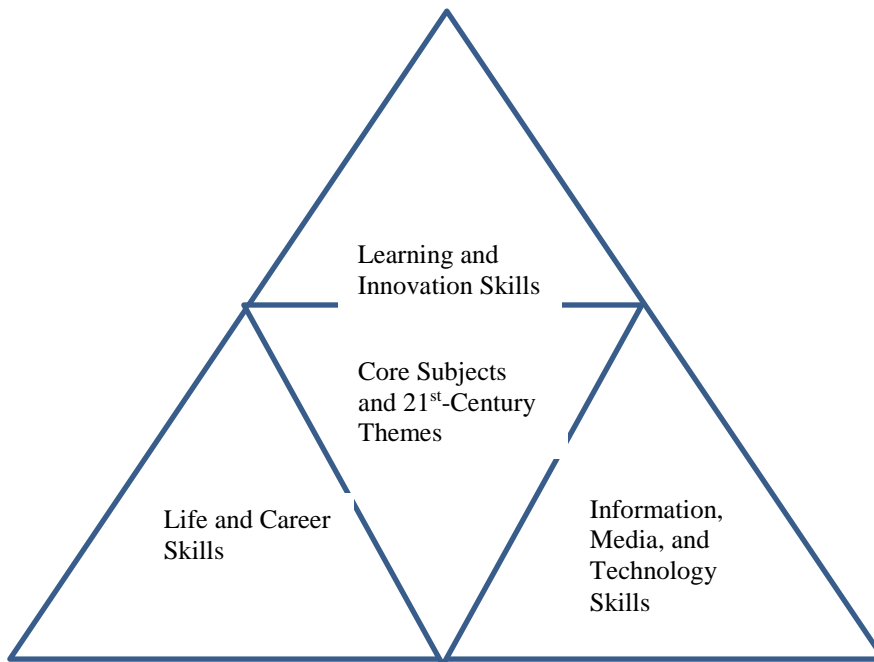
Figure 1. Twenty-first-century skills in the framework for 21st-century learning.

Communication, collaboration, information and communications technology (ICT) literacy, and social and cultural skills were the tenets described in all 21st Century skills frameworks (Romero et al., 2015). Each of these were at the core of the current research study. Along with these described frameworks, the items described within Figure 2 blend to create the foundation of 21st Century skills described within the current study.

Student Engagement

Student engagement is a broad term that has been defined in many ways over several decades. The U.S. National Survey of Student Engagement (2015) defined student engagement based upon four parameters: academic challenge, the learning that takes place with peers, relationships fostered with faculty members, and the environment of the school. Appleton, Christenson, Kim, & Reschly, (2006) described models of student engagement with four primary

components. These components are comprised of academics which are first representative of the time students spend working on specific assignments, or the gain of credit. Secondly, the behavioral aspect, which includes school attendance and participation in classroom activities on a voluntary basis. The third aspect is the cognitive domain, which also includes self-regulation and personal autonomy. The final component of student engagement is the psychological state, which refers to whether the student has feelings of belonging and includes the relationships that exists among others within the school.

Based on the works of Jones et al. (1994) and Schlechty (1997), the primary elements involved in student engagement are:

- Focused goals

- Challenging tasks

- Clear and compelling standards

- Protection from adverse consequences for initial failures

- Affirmation of performance

- Affiliation with others

- Novelty and variety

- Choice

- Authenticity

Review of the literature shows three primary dimensions of student engagement: behavioral, cognitive and emotional (Axelson & Flick, 2011; Lewis, Huebner, Malone, & Valois, 2011; Skinner, Marchand, Furrer, & Kindermann, 2008). Behavioral engagement is most typically thought of as measures such as school attendance, academic performance, participation within the school setting and earning units towards completion of a high school diploma (Finn,

1989). The cognitive domain of school engagement refers to self-regulation, an understanding of

the importance of school, and the desire for learning and being challenged (Fredricks,

Blumefields, & Paris, 2004). Research suggests that goal setting, self-evaluation, and

strategizing play a dramatic role in a student's motivation to learn. This cognitive concept is a

large contributor to the student's self-efficacy (Bandura, 1991). Bandura found that those

students who had a positive self-efficacy worked harder and were more persistent in their

academics and activities. Students can develop cognitively by the incorporation of computer

games in the classroom, which will also lead to a higher motivation of learning (Rondon, Sassi,

& Furquim de Andrade, 2013). Cognitive development includes three primary factors: the

increase of memory, student focus, and the ability to think critically through cognitive activities

such as game play (Rondon et al., 2013). Emotional engagement consists of the student's

affective thoughts about school. Research suggests that self-efficacy is a meaningful part of

cognitive student engagement. This efficacy refers to the belief that a student has in themselves

and their ability to execute the desired behaviors, which ultimately tie into the levels of

engagement. Examples of emotional engagement are the reactions of students towards school,

teachers, and school work (Epstein & McPartland, 1976). Emotional engagement of a student is

simply if the student has an emotional attachment to the school, there is a greater chance that the

student will be engaged in the activities of the school. Emotional engagement towards the

teacher is described as a type of connection. The student finds a connection within a relationship

that has manifested in the teacher-student relationship. The work that takes place within the

classroom creates an attachment in the student that engages the student to not only participate,

but fosters a desire to learn (Epstein & McPartland, 1976).

Another study on self-determination, specifically the quality of motivation, was found to be dependent on autonomy, competence, and relatedness (Ryan & Deci, 2000). These three tenets of the social environment within a classroom are rooted within a person's intrinsic motivation (Ryan & Deci, 2000). Teachers who embrace autonomy, competence and relatedness can facilitate intrinsic motivation within the classroom and by meeting these needs, Ryan and Deci found that students develop a greater sense of intrinsic motivation. Ryan and Deci described extrinsic motivation as occurring when an activity is performed, but the outcome is separable. Extrinsic motivation includes the external forces that are not contained within the student that motivate the student to complete a task. Ryan and Deci's study reinforced Bandura's (1977), findings within the confines of self-efficacy. Each of these key components are significant in combination with game-based learning to produce the desired results (Ryan & Deci, 2000). By creating autonomy, competence and relatedness within game-based learning, students may sustain motivation (Ryan & Deci, 2000). Autonomy is "regulating one's behavior and experience and governing the initiation and direction of action" (Ryan & Powelson, 1991). Students gain a sense of control when there are choices within their environment (Eseryel, Law, Ifenthaler, Ge, & Miller, 2014). In game-based learning environments, true control is not achieved with constraints, which can have a negative effect in regards to the learner's perceived autonomy (Eseryel et al., 2014, p. 45). By creating a sense of accomplishment, students generate a belief that they are moving towards an outcome. This outcome should be based within the skill level of the individual playing the game (Ryan & Powelson, 1991). The relatedness aspect of self-determination can refer to many things such as peer relationships or student and teacher relationships within the class. This can be whether students feel accepted, included within the confines of the class, and are given support within this setting (Reeve, 2006). In game-based

learning, students' sense of relatedness may be forged within the context of the players within the game itself (Ryan, Rigby, & Przybylski, 2006).

The engagement of students within the classroom can be traced to multiple theories within education, which include, behavioral learning, cognitive learning, and social learning (Buijs & Admiraal, 2013). These theories are based within the works of Dewey, Piaget, and Vygotsky. These theorist argued that "meaningful learning only occurs when learners are engaged in knowledge construction, conversation, articulation, collaboration, authentic context, and reflection" (Buijs & Admiraal, 2013, p. 768). In reviewing multiple learning theories, Barak (2006) concluded that there are four related instructional principles. The first principle is that learning is contextual. The learning taking place cannot be separated from the situation in which the learning has been acquired. The second concept is that learning is an active process. Students are no different than any others; they gain knowledge through their experiences. This can be through the incorporation of new material that is related to past experiences, which could create revision within what students previously accepted to be true. Barak (2006) constructed his third concept based on Vygotsky's (1978) work that learning is a social process. This social process is not limited to a teacher and student; rather it extends to their peers, experts, parents, and others with whom they come in contact. Barak's final concept is that reflective practice plays a central role in learning. Students should be able to demonstrate their skills through criticizing, restructuring, and testing their understanding. Engagement within game play has been defined differently than that of general classroom engagement. The focus of the engagement of gameplay is based within the experience of how the individual plays the game. One model of engagement within the context of video games developed by Przybylski et al. (2010) suggests that motivation within these games is based upon a person's sense of self, the

ability to be sociable within the environment, and the opportunity to act, all of which have common elements of cognitive and social engagement (Whitten & Moseley, 2014). Bouvier, Lavoue, Sehaba, and George (2013) have delineated four areas of engagement within gaming that include the environment, social, self, and action. Brown and Cairns (2004) suggested that there are three levels of engagement within a gaming environment. The lowest of these levels is engagement, followed by engrossment, and total immersion.

The ability to measure student engagement is complicated due to the multiple variables associated with it. In a report developed by Fredricks et al. (2011) for the Institute of Education and Sciences, 21 characteristics were identified as measurable means of engagement from grade four through grade twelve. Through the development of these characteristics, schools now have three measurable areas to focus on within the context of engagement. These areas are:

- Engagement in regards to school improvement

- Dropping out of school in terms of disengagement

- The program of engagement as a school intervention method

As schools are being held accountable for passage rates, drop-out rates, retention rates, and high stakes testing, engagement now, more than ever is a critical component of student success. Students who are engaged in class are far more likely to pass classes and graduate from high school (Fredricks et al., 2004). Underachievement, along with behavioral and emotional concerns may eventually lead to school dropouts for many students (Admiraal, Huizenga, Akkerman, & Dam, 2011). Among student who have finished their education requirements, research has shown high rates of boredom, alienation, and disconnection with schooling (Admiraal et al., 2011, p. 1185).

At Indiana University, a High School Survey of Student Engagement (HSSSE) study was conducted to research student engagement. This survey encompasses the three tenets of behavioral, cognitive, and emotional engagement in schools. Since 2005 more than 350,000 participants have engaged in the survey encompassing more than 40 states. From the survey, "Students rated most highly those methods that involve working and learning with their peers and active participation: discussion and debate (61%), group projects (60%), and projects and lessons involving technology (55%) all of which are components of the current study.

One area of continued growth which seems to engage students in the process of learning is the incorporation of technology into the classroom (Kovach & Revere, 2011). This may be accomplished via email, Twitter, Skype, web content, or playing games online. Twenty-first century students are seeking active instruction as learners and the traditional lecture method has increasingly become unappealing (Oigara & Keengwe, 2013). Active learning may best be described as students becoming cognitively engaged, as opposed to sitting and listening to a lecture. Lecture-based settings are often impersonal and students lack the ability to apply the theories within the classroom. Strategies employed to engage students within the classroom have been shown to be more effective than lecture-based classroom settings (Oigara & Keengwe, 2013).

Game-Based Learning

Game-based learning has been a part of educational practices for many years. In decades past, teachers have implemented games that were non-digital in order to engage students. Students participated in activities from games that involved puzzles, to those that used kinesthetic learning and strategies. With the advent of the Internet, students can now experience game-based learning via a digital forum.   These games can be single player games to

multiplayer games that involve multiple environments. The Entertainment Software Association (ESA) reported in 2014 that 59% of Americans played some form of video games (Harrington & O'Connell, 2016). Of this percentage of the population, 49% playing these games were women. According to the ESA, 64 million children and adolescents ranging from the ages of two to 17 were active video game players in 2014. The sale of digital games represented a total of 21 billion dollars in 2013. To adequately examine the history and development of game-based learning, the four frameworks of learning, including behaviorism, cognitivism, humanism, and constructivism should be analyzed.

Behaviorism is based on three main assumptions: (a) Learning is demonstrated by a change in behavior, (b) The environment develops behavior, and (c) The ideas of connection and reinforcement are paramount to explaining the process of learning (Wu, Hsiao, Wu, Ling, & Huang, 2012). Within game-based learning, three major tenants lie within the behaviorist model. Those theories are direct instruction, programmed instruction, and social learning theory. Engelmann developed direct instruction in 1964. He thought that teaching through lectures was most effective, rather than letting students explore their learning (Wu et al., 2012). Skinner introduced programmed instruction in 1954. This instruction was designed to teach students using specialized textbooks or machines in a specified order (Wu et al., 2012). The final component of the behaviorist model is social learning theory. Bandura developed this theory in 1965. He believed that students learn from each other by observation, imitation, and modeling (Bandura, 1989, 1993).

Cognitivists view learning as a thinking process (Wu et al., 2012). This is contrary to behaviorists, who enlist stimulation and reinforcement in the system of learning (Wu et al., 2012). The two main assumptions of cognitivism are how a person's memory processes

information and that prior knowledge is substantial in the learning process (Wu et al., 2012). The educational theories contained within the cognitive framework are attribution theory, elaboration theory, cognitive development, and conditional learning (Wu et al., 2012). Weiner developed attribution theory in 1974. The focus of this theory is that learners seek to determine causation within the world (Nasu, 1989). Reigeluth developed elaboration theory in 1983. This learning theory is founded within an argument that students should be taught in a system that begins at a simple level and develops into more complex situations as time goes on (Baker & Robinson, 2012). Cognitive development was theorized by Piaget in 1969. This theory defined stages of development for children. The four stages that entail this theory are sensorimotor, preoperational, concrete operational, and formal operational (Wu et al., 2012). These stages of development, like the theories of cognitivism, demonstrate a progression of learning for children/students. When students reach the formal operational stage, they have developed the ability to think abstractly and use higher-order reasoning. Another theory that coincides with cognitivism is conditional learning. Gagne developed this theory in 1965 (Wu et al., 2012). He described learning as occurring at different levels and that these levels require a different type of instruction.

Humanism was developed after the 1960s (Wu et al., 2012). This type of learning in its simplest form could be described as experiential learning. Students create learning from the experiences that are created or with which they come in contact. The "learning should be student centered and personalized, and the educator should act as a facilitator. Affective and cognitive needs are considered key aspects of learning, and the goal is to develop self-actualized individuals in a cooperative, supportive environment" (Wu et al., 2012, p. 267).

Constructivism's definition is alluded to within the word itself. Students create meaning from constructing and being active within the learning process (Neo, 2007). As students learn new information, those items are related to their prior learning. Social Learning Theory describes learning as the interactions and connections between people when they share experiences. Vygotsky also developed the idea of zone of proximal development (ZPD). This is defined as the distance between the student and teacher and the student's ability to solve problems individually or within a group setting. Furthermore, students with less ability will be given a boost from their peers within the group setting to allow them to reach a competent level within a task (Moll, 1992). Another theory that fits under the heading of constructivism is Problem-based learning (PBL). PBL was initially used in medical school in the 1960s. The theory contained within PBL is that students are given more control over their learning (Allen, Donham, & Bernhardt, 2011). Students generally work in small groups in this environment and learn content that is only needed to support their work (Allen et al., 2011). Discovery or inquiry based learning is another component of a constructivist learning environment in which students are free to discover or learn based on the activity within the classroom. Activity theory "is a very general philosophical framework for understanding the development of human culture and individual personality based on dialectical materialism" (Wu et al., 2012, p. 268). This can simply be described as the process of change within human culture and individual personality (Wu et al., 2012).

The ability to learn through games can create context where students experiment and learn through a safe environment that promotes opportunities and challenges for students to use higher order thinking skills (Wu et al., 2012). An important factor in game-based learning is the pedagogy within the game setting. The inherent problem of designing digital games for learners

is that the designers are not well versed in learning theories, and educators for the most part are not digital game designers. Game-based learning is learning a concept while playing the game, rather than learning how to play a game (Wu et al., 2012). The use of the learning theories along with game rules, play, and plot are the components that describe game-based learning (Wu et al., 2012).

Table 2

Differences in Teaching and Learning Paradigms

Traditional paradigms: Teaching	Constructivist paradigms: Learning
Memorization	Understanding
Recall	Discovery
One size fits all	Tailored; option rich
Talent via weeding out	Talent cultivated and sought out
Repetition	Transfer and construction
Acquisition of facts	Facts + conceptual framework
Isolated facts	Organized conceptual schemas
Transmission	Construction
Teacher = master and commander	Teacher = expert and mentor
Fixed roles	Mobile roles
Fixed classrooms	Mobile, convertible classrooms
Single location	Plurality of locations and space types
Summative assessment	Summative and formative assessments

Note. From "Learning Spaces," by M. Brown, 2005 in D.G. Oblinger and J.L. Oblinger (Eds), *Educating the Net Generation*, p. 126.

Game-based learning has been a key component of classroom instruction for many years. Through research and educational theory put into practice, evidence has shown that students are engaged in the classrooms when activities are performed that get away from lecture and skill and practice exercises (Black, 2004). Students are able to address problem-solving activities while

involved in game playing and use their cognitive skills to learn higher order thinking skills such as those described in the upper levels of Bloom's Taxonomy. "Lower-order thinking skills are termed as knowledge, understanding, and application in Bloom's taxonomy. Higher-order thinking skills are labeled as analysis, synthesis, and evaluation in Bloom's taxonomy. In recent years, a higher level has been added to Bloom's Taxonomy, that is, knowledge creation" (Wang, 2012, p. 6). "Gaming has created an entirely different learning style, one that:

- Aggressively ignores any hint of formal instruction

- Leans heavily on trial and error (after all, failure is nearly free; you just push "play again")

- Includes lots of learning from peers but virtually none from authority figures

- Is consumed in very small bits exactly when the learner wants, which is usually just before the skill is needed." (Beck & Wade, 2004, p. 159)

As our society has developed and technology has rapidly increased, the availability and cost of technology has decreased. Implementation of this technology within our classrooms has become accessible. As the learning theories were developed through the decades, technology was available, but it came with a tremendous price tag. Over the past several years with the increase of technology and the development of the Internet, technology enabling game-based learning is easily attained (Wu et al., 2012).

In years past research would have been conducted in a library or another place that had resources available. Students in current times have the ability to access information from the palm of their hand with the advent of smart phones. Computer labs and mobile computer labs are also available for today's students. These students are very different from students of past decades. Students born in the late 1980s through today have never known the world without

accessibility to the Internet (Prensky, 2001). Prensky describes these members of society as "digital natives." Those of us born in times prior to these are known as "digital immigrants." These students are constantly accessing information via the Internet. Instructional practices of the past, which are less stimulating, have less impact with these students. "The popular notion that children have a limited attention span falls apart when we see that they can spend hours playing a game without losing their concentration. The time spent gaming also can be an educational investment if applied carefully and that is where game-based learning becomes relevant" (Moreno-Ger, Martinez-Ortiz, Sierra, & Manjon, 2008, p. 24).

The world outside of education has been the leading champion of game-based technology. Industry and the military have seen the cost-effectiveness of implementing this type of practice into their environments (Wu et al., 2012). Industry leaders have seen the effectiveness of implementing game-based learning as a cost-effective tool (Wu et al., 2012). Business can simulate the implementation of a production line, a new product, or a business plan without spending any funds on the implementation. At the stage of implementation, companies know the risks involved and the procedures to carry out full implementation. The military has a far greater concern when implementing game-based instruction. They are interested in the strategies involved to accomplish their objectives, while preserving the lives of the soldiers involved. They use games to simulate flying and the use of cutting edge technologies to save lives (Wu et al., 2012).

Digital game-based learning has eventually grown in the educational setting. Just as non-digital game-based learning offers individual and multiplayer environments, digital game-based learning provides the ability to work in those same dynamics (Wu et al., 2012). The usability of these games depends on three dynamics (Ang, Anvi, & Zaphiris, 2008; Wideman et al., 2007;

Wu et al., 2012). These dynamics include game rules, gameplay, and game world. Game rules

are the rules that exist within the environment of the game. They define how the game operates

and how to win. A game can feature two foundations of game rules: ludus and paidea. Those

games that are ludus are defined as having a winner and a loser, and paidea games do not define

a winner (Wu et al., 2012). "Game playing is more than simply memorizing the game rules.

Game play is activities conducted within a framework of agreed rules that directly or indirectly

contribute to achieving goals" (Ang et al., 2008, p. 535). The game narrative is defined as

> … a mental image, or cognitive construct, which can be activated by various types of
>
> signs. This image consists of a world (setting) populated by intelligent agents
>
> (characters). These agents participate in actions and happenings (events, plots), which
>
> cause global changes in the narrative world. (Ang et al., 2008, p. 536)

As technology has evolved, so has digital game-based learning. When game-based

learning first began, students would typically use these games as a single player system

(Wideman et al., 2007). These games were behaviorist in nature in that students would

participate in drill and practice activities on the games to receive a reward that could be used

within the game. This practice is still common in some educational games, especially those

games that teach skills to younger elementary age students (Squire, 2006). With advances in the

Internet, a single player can experience the world of multiplayer by joining an online group

dynamic. These more advanced games, such as Second Life, Minecraft and other simulation

activities seek to give students not only an evolving education but also an experience within the

game. Students are able to access information and people all over the world. The educational

theory that is involved in the creation of some of these games is based on experiences,

simulations, and socialization of the students. The simulations that were only cost effective in

the world outside of education are now accessible within education. Students can perform

activities such as a virtual autopsy and chemistry experiments without the dangers involved in

these activities. The 2014 K-12 Horizon Report noted that games are continuing to gain in

popularity not only in the United States, but the entire world. "Gamified learning environments

in practice can motivate learners to engage with subjects in an emotionally stimulating way"

(Johnson, Adams, Estrada, & Freeman, 2014, p. 39). According to Mitchell and Savill-Smith

(2004) the benefits of educational gaming are that computer games are tools that enhance student

learning. These games are avenues for encouraging learners who may lack confidence or

interest. Computer games may also reduce learning time and the load on the instructor (Mitchell

& Savill-Smith, 2004). By playing these games students will enhance the acquisition of

knowledge and be able to retain information as well. While playing these games students have

the ability to manipulate objects, which allows for students to develop proficiency. These games

become even more effective when they are designed to address a specific skill or problem. The

games can be used to facilitate the learning of students at a particular skill or level of maturity.

These games are designed to generate a specific learning outcome, whether in the form of recall

or active involvement within a simulation. By embedding specific content into the games

themselves, students are able to visualize or manipulate ideas that become concrete to the

student. Mitchell and Savill-Smith also stated that students think creatively as well as critically.

These games have the potential to expand students' cognitive processing skills and develop

students' abilities to think critically. While participating in these games, students can gain a

greater sense of academic, social, and ICT skills. Each of these benefits aligns with the 21st

Century skills of information, media, learning, innovation, and technology.

Although the gaming industry and technology have continued to evolve and create opportunities for blending these types of digital learning activities into the educational setting, there are still precautions that need to be included when game-based learning is considered. Many educational games are not founded on principles of educational theory and are used for distinct purposes in education (Wu et al., 2012).

There is still a divide that takes place within our society of those who have access to computers and those without access. This divide takes on many shapes including "language, ethnicity, geopolitical boundaries, training and education, literacy, health, motivation, gender, age, physical and cognitive abilities" (Stevenson, 2009, p. 1). Gurstein noted back in 2004 that access to the Internet and ICTs in general were problematic for some segments of society with the rapid technology changes that were taking place.

As stated earlier, the ESA in 2014 reported that of the population playing digital games, 49%of those are females. The games often played by females differ from those played by males. The reported top three game types played by males are sports related games, action/adventure games, and simulations (ESA, 2014). Females reported that their top three digital games were puzzle-solving games, platform or jumping games, and sports games (Royse, Lee, Undrahbuyan, Hopson, & Consalvo, 2007). Past stereotypes have generated the feeling that gamers are generally males. This thinking was based on the environments and spaces that males frequented, such as arcades and other venues related to this type of atmosphere (Dickey, 2006). The influx of females to the video game world may be related to the games now designed specifically for females. The male dominance of play in video games is no longer the standard, specifically when discussing online gaming (Eden, Maloney, & Bowman, 2010).

There are many variables that influence the success of a school. One of these variables is the leadership personalities in place. A study by Leithwood, Patten, and Jantzi (2010) suggested there are four paths that school leadership follows. The first path is rational. This path is steeped in the knowledge and abilities of the faculty members about content, teaching, and learning. The second path is that of emotions. This path suggests that the feelings and attitudes of the faculty as individuals and collectively bear an important role in school-related matters. The organizational path is a path that sets the framework for the school. This path includes the interactions among the members of the organization; for example the "structures, cultures, policies, and standard operating procedures" (Leithwood, Patten, & Jantzi, 2010, p. 678). These are the conditions in which the employees work, that include the professionalism portrayed by the members of the faculty, along with their content knowledge, the day-to-day interactions among colleagues, the climate felt by the adults within the school, and direction of the school set by the school administration. The final path described by Leithwood et al. is the family path. These are the external factors that relate to the school; specifically what takes place within the lives of faculty outside of school and how this influences their professional performance. These factors are characterized as the unalterable and the alterable. These factors include "language, ethnicity, geopolitical boundaries, training and education, literacy, health, motivation, gender, age, physical and cognitive abilities" (Stevenson, 2009, p. 1).

Another study conducted by Kawar (2012) suggested that the three most important types of leadership are instructional leadership, which addresses the teaching skills within each classroom; transformational leadership, which works to improving learning holistically (Kawar, 2012); and participative leadership, which is making and pursuing priorities. Within the confines of these three types of leadership, the leader should be focused on the setting goals for the

organization, the development of the personnel within the organization, and the development of the organization as a whole.

One of the greatest components to learning is the dynamic of interpersonal relationships within the organization (Stewart, Williams, Smith-Gratto, Black, & Kane, 2011). Student interactions during game-based learning and learning in general result in a high level of information processing. Decanter (2005) noted that knowledge is "socially negotiated" (p. 27). Kolb (1984) described knowledge gained as acquisition and dissemination of the information. The behaviorist approach to education has prevailed through much of the twentieth-century (Wu et al., 2012).

A study presented by the National Training Laboratories (2005) noted the learning pyramid for sustained knowledge with differences in retention rates as shown in Table 3.

Table 3

Interactive learning strategies and the ability for sustained knowledge

The Power of Interactive Learning	
Teach others a skill	90%
Practice by doing	75%
Discussion among a group	50%
Watch a demonstration	30%
Audio/Visual learning	20%
Reading	10%
Lecture	5%

The idea of interactive gaming, including the competition, adaptivity, and communication among the players not only creates successful students, but workers as well (Decanter, 2005). "What traditional pedagogies cannot do, a pedagogy emphasizing social interaction, application, and reflection may" (Stewart et al., 2011, p. 7)

Best Practices

In the realm of best practices, it is suggested that good social studies teachings are those that make the content "come alive for kids" (Zemelman, Daniels, & Ryde, 1998, p. 135). These practices in secondary level schools can be different than lower level grades (Zemelman et al., 1998). Secondary schools generally follow schedules in which students transition from class to class, which can make for distinct and segmented learning that take place over students' school days. The foundational questions that must be answered when creating social studies content are:

- Are social studies taught from the perspective of the citizens, lawmakers, or decision-makers?

- Is the content of social studies taught from the basis of our ancestors, or is the content taught from the basis of activity? (Zemelman et al., 1998, p. 136)

Students' personal autonomy should be at the heart of their decision making when reflecting on their expectations, responsibilities and consequences for themselves and others (Zemelman et al., 1998).

The recommendations for best practices in social studies are that students need regular opportunities to inquire deeply within a topic (Zemelman et al., 1998). Specifically, rather than relying merely on a textbook to cover a topic, an instructor should present other views, documents, and interpretations that create other opinions of the content or the events that take

place (Zemelman et al., 1998). Students should have the opportunity to choose their own topics,

as the teacher creates a sense of engagement among the students and gives them the ability to

research these topics on their own (Zemelman et al., 1998). By creating open ended questioning,

the teacher will challenge the student's ability to use the upper levels of Bloom's taxonomy

(Zemelman et al., 1998). By inquiring deeply within a topic rather than covering the surface, the

opportunity is provided for students to think critically on a topic (Zemelman et al., 1998). This

can also be attained in small group settings, where content is discussed within the groups to

formulate opinions on the questions posed.

Students should have access to active participation within the school and the community

(Zemelman et al., 1998). This can be achieved within a collaborative setting or independently.

A constructivist approach can be used to attain the desired outcome for students. By

participating in activities with the school and the community, a greater social health of the school

may be achieved. Independent and collaborative learning should be implemented to provide

students with the skills they will need in society. A balance should be established of students

working in small groups and individual settings. For students who have not worked in a small

group setting, the teacher must provide training and also provide the group processing

expectations for each student. Students should be involved in a variety of activities that include

reading, writing, observing, discussing, and debating. This will ensure that all students are active

participants in their learning. All of these learning activities may be used to remove the

constructs of lectures and quizzes. Learning within the social studies classroom should be based

on the students' lives and prior knowledge (Zemelman et al., 1998). A teacher should not

assume that students know nothing about a topic; rather, the teacher should find links of

students' knowledge of past life experiences and these links should be the precursors to build

upon. Social studies teachers should expand upon a broad variety of cultures when teaching.

These cultures should include the background of the students within the classroom (Zemelman et

al., 1998). Other principles of teaching social studies according to Zemelman include:

- Social studies is not memorization.

- Social studies prepares students to be responsible citizens through thinking.

- Best practices within the classroom are student centered including

  - Collaborative and independent work environments

  - Expressive and reflective students

  - Authentic and challenging cognitively

  - Independent thinking

  - Engaging content

  - Upper levels of Bloom's Taxonomy.

Real-time data

In the 2011 Horizon report it was stated that the iPad and Samsung Galaxy represented a

new type of educational tool (Hoover, 2012). These tools present the ability to e-read, access the

Internet, access creative applications, and engage in visual interfaces that include multimedia.

Past studies incorporating real-time data within education have mainly included teacher friendly

tools designed to assess student knowledge rather than giving students access to real-time data

for learning purposes (Collins & Dunn, 2011; Deniz & Dulger, 2012; Holowczak, 2005).

Specifically, these tools have been used by the teacher to assess student knowledge in real-time,

such as clickers where a student clicks on an answer and the teacher receives real-time feedback

about the student's knowledge of the content (Deniz & Dulger, 2012). The essence of these tools

are teacher driven forms of feedback, which assist the teacher in assessing student content

knowledge rather than student centered forms of feedback. The current study implemented the

use of real-time data, which gave students the opportunity to view what was taking place in

economic markets in real-time. An important aspect in the incorporation of real-time data into

the classroom is effective teacher implementation of the technology. Bitner and Bitner (2002)

stated that in order to effectively use technology in the classroom, the teacher should not have

any fear of using the devices. By incorporating personal use and training a teacher can be

adequately prepared to use the devices. The teacher should implement appropriate teaching

models within the classroom and the devices should be used as learning tools. The teacher will

be more motivated to move forward with the use of the technology and support of instruction is

critical if problems are encountered with the devices.

     As the Internet has continued to expand and schools have continued to implement low-

cost computing in the classroom, access to real-time data is more convenient than ever. The final

criteria for offering real-time data to students is their ability to use the products offered once

access is gained. Through the use of the Marketwatch Game students have access to charts,

graphs, interviews, and articles. Figure 2.2 displays an example of real-time data from the

Marketwatch game.

http://www.marketwatch.com/help /portfolio

Figure 2: www.marketwatch.com

     According to Lenhart (2015), a researcher from the Pew Research Center, 24% of teens

aged 13-19 years go online constantly and92% of teenagers reported that they accessed the

Internet daily. Lenhart et al. (2010) stressed that the teaching methods that are facilitated to

students must incorporate the Internet to produce a technology proficient and well-rounded person. In 1991, Kulik reported that small but positive effects were encountered in learning with a computer-based approach. Research has also shown that students create a greater sense of understanding when they are active participants in learning activities (Black, 2004). There is much evidence that points to technology being an effective component in the classroom (Manuguerra & Petocz, 2011;Mifsud & Morch, 2010;Sajjanhar, 2012); however, there are opposing opinions that traditional methods can be just as effective (Axelson & Flick, 2011; Black, 2004; Lewis, Huebner, Malone, & Valois, 2011; Skinner, Marchand, Furrer, & Kindermann, 2008). Deniz and Dulger (2011) researched the topic of students' acquisition of graphing skills through real-time graphing. The findings revealed that gains were made in student learning with micro-based computer learning. These findings aligned with the results of a previous study by Zucker, Tinker, Staudt, Mansfield, and Metcalf (2008), which suggested that student graphing skills increased by watching the graph being produced, observation, discussion, and reflection.

There is much research on information processing theory and how memory is stored in the brain. The current study incorporated game-based learning using best practices as a means to research not only this theory, but student engagement in this setting. The gap which this study is intended to address is the effect of real-time data on game-based learning, by using iPads when compared to newspapers while utilizing the Marketwatch stock game.

CHAPTER THREE: METHODS

The purpose of this chapter is to explain the methodology used to complete this quasi-experimental research study. This study examined the use of course enrichment materials to measure engagement and achievement in a senior level economics classroom. This chapter includes a description of the research design, context, instrumentation, participants, and how the data was analyzed to answer the research questions.

Design

This study implemented a quasi-experimental pretest-posttest nonequivalent control group design (Patten, 2012). In this quasi-experimental design, the student participants were assigned to the instructor for the semester; therefore, the sample was a convenience sample (Gall, Gall, & Borg, 2007). Given this convenience sample, a quasi-experiment was most fitting due to the lack of randomness (Gall et al., 2007). Given that all students were not equivalent in their content knowledge of economics, a nonequivalent pretest-posttest design was chosen (Gall et al., 2007).

The dependent variables of this study were engagement measured by the High School Survey of Student Engagement (High School Survey of Student Engagement, n.d.) scores in Research Question One, and achievement measured by students' scores on the Test of Economic Literacy (4th Edition; Council for Economic Education, n.d.) in Research Question Two. The independent variable in this study was the course related enrichment due to the manipulation of the medium (Warner, 2008). The course related enrichment was the use of newspapers in the control group and the use of iPads in the experimental group.

This study explored the effects of access to real-time data via an iPad during play of the Marketwatch Game as compared to non-real-time data play of the Marketwatch game via print

media in the form of a newspaper. Data were generated in two forms; a pretest and a posttest measured literacy within the areas of economic content knowledge. A student engagement survey followed at the end of the research to measure engagement. In addition, the researcher implemented the study with two distinct groups. These two groups were assigned students from six senior level economics classes at the high school in which the study was conducted. Group one was assigned to work playing the Marketwatch Game with access to information using newspapers as its data source for research materials. Group two participated in playing the Marketwatch Game as well; however, rather than using newspapers, these students used iPads to access real-time data in gameplay. The access to real-time data gave students the ability to access data sources on the Internet such as stock trends, charts, graphs, and articles. After the groups were randomly assigned, group two was given the treatment of access to real-time data that included reports, trends within the stock exchange, and charts and graphs through the use of iPads, while group one received the traditional medium of newspapers, with the access they provide. Once the treatment was complete, a posttest was given to evaluate students on the dependent variable of economic proficiency. The HSSSE survey was also given to measure the dependent variable of student engagement (see Appendix B). In both settings, research-based methods of teaching were used to ensure that each student received compatible and appropriate instruction in the classroom.

Research Questions

The research questions for this study included:

RQ1: Is there a difference in student engagement based on course enrichment materials of real-time data and print text in newspapers?

RQ2: Is there a difference in student Economic Literacy based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores?

Null Hypotheses

H01: There is no significant difference in student engagement based on course enrichment materials of real-time data and print text in newspapers.

H02: There is no significant difference in student Economic Literacy scores based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores.

Participants and Setting

The population for this study consisted of the students at a large rural high school in South Carolina that includes grades 9-12. This school of 2,100 students is located in a small town with a population of approximately 25,000 people. This school has an ethnic makeup of approximately 49% Caucasian, 42% African-American, 7% Hispanic, and 2% other nationalities. Of this population, approximately 44% are on free or reduced lunch. The demographics of the school reflect the population of the community as a whole, which is predominantly middle class and below. The participants within this study were seventeen to eighteen years old, public high school seniors, who were enrolled in a senior-level college preparatory economics class. These statistics were gathered from the South Carolina Department of Education website.

The economics class was divided into various sections by the school administration prior to the study. Six sections were selected to be included in the study from those qualifying classes that met the criteria of a college preparatory economics class and those who were assigned to the cooperating teacher who was a male, licensed social studies teacher with a Master's Degree in

secondary social studies education. Using one teacher helped to ensure the validity of the research by imposing consistency within the tested classrooms.

A convenience sample was used for the study in that students within the chosen sections were allowed to volunteer to be included in the study. The sampling goal for this study was 150 students; however, due to attrition, the sample totaled 107 students. This number satisfied the needs of the study in that it had a medium effect size with a statistical power above .90, and an alpha level of .05 (Warner, 2008).

The curriculum used during this study was college preparatory economics disseminated to senior level students in a public high school setting. Furthermore, the specific curriculum involved the buying and selling of stocks and the content associated with this economics concept incorporated within the implementation of the Marketwatch Game. The participants in this study were the students of one senior level economics teacher. Each of the students prior to the study had already been assigned to this instructor; therefore using a quasi-experimental nonequivalent control group design was the best method (Gall et al., 2007). All classes were labeled by their section number and placed in a hat. Sections were drawn from a hat and labeled as classes one through six. As they were drawn, classes one, three, and five were the recipients of the iPads for the study and classes two, four, and six were the newspaper groups. The participants for the study were divided into two distinct groups with three sections per group. The experimental group received the treatment of using iPads to retrieve real-time data via the Internet to participate in the Marketwatch game. All tasks performed within the game were web based activities. The control group received the same instruction and activities as the first group; however, they worked exclusively with newspapers in regards to the game itself. There were no real-time data available to this group. The instructional practices of the teacher were the same

whether using iPads in class or newspapers. The teacher presented the content of the lessons to each group of students by incorporating research-based methods of teaching. The only difference in the settings were that one group of students (the control group) worked using the newspapers only, and the other group (the experimental group) worked using iPads, giving them access to real-time data. The following are features that were available to both groups:

- Investigation of topics in depth

- Students had the opportunity to exercise choice

- Active participation in the classroom and community

- Independent learning and cooperative learning

- Incorporation of reading, writing, observing, discussion to ensure active participation

- Learning based on prior knowledge, their lives, and community

- Incorporation of cultures, including background and understanding of others, found in America. (Zemelman, Daniels, & Hyde, 1998)

To ensure the equivalence, a pretest on prior economics content knowledge was given to control the threats to validity. The results of the pretest showed an 18-point difference in the mean. An ANCOVA analysis of covariance was performed for the quasi-experimental nonequivalent pretest posttest design to analyze the data for differences in the means, while controlling for the differences in the groups' pretest scores. The age of the students ranged from 17 to 18 years old. In the control group there were 53 students: 27 males and 26 females. The ethnic makeup of the control group was 25 Caucasians, 18 African Americans, 7 Hispanics, and 3 other nationalities. In the experimental group there were 54 students: 24 males and 30 females.

The ethnic makeup of the experimental group was 27 Caucasians, 18 African Americans, 7 Hispanics, and 2 other nationalities.

Instrumentation

There were two instruments used to evaluate the variables. These two validated instruments were administered separately within the same setting. At the conclusion of the study, the High School Survey of Student Engagement (HSSSE) was used to evaluate student engagement. The Test of Economic Literacy, 4th Edition for Grades 11-12, Form A was administered to students to assess economics content knowledge as a pretest. Students were assessed on the entire Test of Economic Literacy (TEL); however, the content for this study focused only on a particular set of standards. At the end of the study the Test of Economic Literacy, 4th Edition, for Grades 11-12, Form B was given to determine achievement in economic content knowledge.

The instrument used to evaluate engagement was the High School Survey of Student Engagement (HSSSE; see Appendix B). The HSSSE was developed at Indiana University and piloted in 2003. This instrument was developed specifically for measuring engagement at the high school level. There have been over 450,000 student participants who have used this engagement survey (High School Survey of Student Engagement, n.d.). Three of the most recent studies using the HSSSE instrumentation were conducted by Yourechko (2016); Robinson (2016); and Sassen (2015). The study most related to this research was Yourechko's (2016), who studied the effects of Twitter on student engagement. In this study, four secondary level biology classes were divided into two groups to measure engagement. Two groups used Twitter, while two did not in conjunction with classwork. The results demonstrated that engagement was significant for the group that used Twitter, although academic performance was not. Robinson

(2016) used the HSSSE to examine 11th- and 12th-grade student dropout rates in an urban area at two high schools. The study focused on the three components (cognitive, social, and emotional) of the HSSSE. The results indicated that engagement of students was the most crucial component to prevent dropout, while the effect of socioeconomic factors was not significant. Sassen (2015) used the HSSSE to focus on students and their culture of belonging. He examined scores from the HSSSE of multiple high school students and chose four schools to evaluate using a mixed methods study to see how engagement related to school leaders and program changes within the four schools. The school leaders cited the ethics of profession and care when evaluating, creating, and sustaining programs.

Permission was granted to use the HSSSE by the Center for Evaluation & Education Policy at Indiana University (see Appendix E). The HSSSE is a paper and pencil questionnaire that includes directions for administration and took the students approximately 30 minutes to complete. The survey measures three types of engagement. Cognitive/Intellectual/Academic engagement assesses students on their perceptions of their efforts. The cognitive area of the survey accounts for 65 of the 121 test questions. The minimum score for this category is 10.75, with a maximum score of 43.00. Social/Behavioral/Participatory engagement is the second portion of the survey, which captures students' engagement in school life. This section of the survey accounts for 17 of the 121 survey questions. The minimum score in this category is 1.75, while the maximum score could be 7.00.

The last component of the survey is Emotional Engagement, which assesses students' feelings of connection to their school. Emotional engagement accounts for 39 of the 121 question of the survey. The minimum score in this category is 7.00, with a maximum score of 28.00.

The HSSSE was performed to evaluate Research Question one and Null Hypothesis one. The HSSSE has been validated to perform research on student engagement of high school students (High School Survey of Student Engagement, n.d.). The HSSSE survey instrument incorporates a four-point Likert scale on some questions, with varied responses, while other questions are a yes and no response. The time to complete this survey was limited to one 50-minute class period. In its original form the HSSSE was reported on an item by item basis; however, it has since begun reporting items by the three components (i.e. Cognitive/Intellectual/Academic, Social/Behavioral/Participatory and Emotional engagement). In 2012-13, modifications were made to the instrument to reflect today's high school student. The changes were reviewed by the technical advisory panel, which included experts in the fields of survey research, education, curriculum development and assessment, information management and institutional research. Cronbach alpha was .71 -.91 for the subscales of cognitive engagement, .73 -.89 for the subscale of emotional engagement, and .70 for behavioral engagement (High School Survey of Student Engagement, n.d.). The scoring of this instrument can range from 19.5-78.00 (High School Survey of Student Engagement, n.d.).

The Test of Economic Literacy,(TEL), 4th Edition, Tests A and B for grades 11-12 (see Appendix A) was administered to measure research question two and null hypothesis two. Content knowledge was gained through the study of economics and the stock market, through content covered within the Marketwatch Game, and class content. The purpose of the Test of Economic Literacy 4th Edition is for measuring the achievement of high school students in economics (Council for Economic Education, n.d.). The origins of the test began in 1964 as the Test of Economic Understanding. The original concept of the test was to assess gains in economic knowledge. In 1979, the test became known as the Test of Economic Literacy

(Council for Economic Education, n.d.). Three revisions have been made to the test since the original test. The test itself was validated by academic experts, sources in economics and economic education, and used in over 200 high schools with more than 8,000 participants taking the test.

Revisions of the content of the test were begun in 2010 and completed in 2012, focusing on the revisions of the current economic content standards that replaced the frameworks from the early 2000s. The test is a norm reference based test. Substantial evidence exists from the norming sample of construct validity (Council for Economic Education, n.d.). The reliability of the test is confirmed with a coefficient alpha of .91 on Form A and .90 on Form B (Council for Economic Education, n.d.). The test is comprised of 45 multiple choice questions with four answer choices. This specific assessment focused on the standards relating to economics of the United States. The content validity was determined by comparing test questions with content that was deemed important by the authoritative academic experts and sources in economics and economics education (Council for Economic Education, n.d.). The scoring of the Test of Economic Literacy 4th Edition was based on the students' scores of how many correct choices out of the possible 45 questions. The time to complete this evaluation was limited to one 50-minute class period, given that the instrument prescribes approximately one minute per question. The instrument was administered five minutes after class began. The pretest instrument (Test A) along with the posttest instrument (Test B) were centered on the prescribed curriculum for senior level economics students in high schools. The two test forms were designed to ensure that they were as parallel as possible. The test items were written so that corresponding questions from each test would be considered a matched pair covering the same content (Council for Economic Education, n.d.). There are 10 anchor questions on the two tests that are the same. Scoring of

the TEL should be based on the raw score of questions answered correctly as stated in the manual, given that all questions are answered. Any questions left blank are considered incorrect. This is the prescribed measure of scoring by the authors of the assessment.

Prior research studies that have used the TEL instrument were conducted by Butters and Asarta (2011) and Gill and Gratton-Lavoie (2011). These researchers used the TEL for measuring content knowledge in economics classroom settings. Specifically, Butters and Asarta (2011) compared the economic understanding of regular economics education to that of advanced economics classrooms. The results indicated that advanced students significantly outperformed students in regular economics classes. Gill and Gratton-Lavoie (2011) used the TEL to examine retention rates of economics as students entered college. This was compared between two states, one that mandated economics in high school and one that did not. Both studies used the TEL in the same manner as the current study, administering Test A as a pretest and Test B as a posttest. The testing examiners' manual states that at the end of testing, this tool is particularly useful to examine students' pretest and posttest scores on the type of treatments of instruction within the economics classroom setting.

Procedures

After gaining IRB approval (see Appendix C) and district approval (see Appendix G and Appendix H) for the study, the researcher submitted informed consent forms to students to be signed and returned to the teacher prior to the start of the research. After receiving all permission forms, the research began. After reaching agreement with the cooperating teacher to complete the study, the researcher asked for parental permission for the senior level students, although some students were already 18 years old. The consent letter informed each parent or guardian of the importance of the study and that the participation of each student would be

greatly appreciated (see Appendix F). Parents were also informed that all of the research would be conducted anonymously and that their child would not be in danger at any time. The students who received permission also had to sign a letter of assent in order to participate. The students who received both parental permission and signed the assent letter were still given the opportunity to not participate in the study if they made the request. All IRB rules and regulations were followed throughout the study. All research data were used for educational research purposes only.

Prior to the research study, extensive in-service training took place for the instructor assisting in the research. The instructor for this class was a male, age 35, licensed social studies teacher with a Master's Degree in secondary social studies education. The instructor had nine years of teaching experience. The instructor received two days of training with the use of iPads and newspapers during his planning time. This planning time lasted for a total of 100 minutes. The specifics of the training included the basic functions of the iPad using youtube.com videos. These videos included three components, how to use an iPad, how to use Safari on an iPad, and how to use apps on an iPad. Training on the use of the newspaper was specific to how stocks were listed in a newspaper, the different markets available for students to buy stocks, and the incorporation of the Marketwatch game. Furthermore, the teacher was also trained on best practices within the setting of a social studies classroom. The teacher practiced with the use of iPads and newspapers in class as an experiential learning situation for the teacher to learn any problematic areas of concern that needed to be addressed prior to the beginning of the study. Another teacher with prior experience trained the teacher participant in how to play the Marketwatch Game. The researcher reviewed the state standards of economics with the teacher. Finally, the teacher understood that the student participants had to be presented the same content

each day so that the learning was as equivalent as possible. The researcher ensured through training with the instructor that equal instruction took place in each setting. Lesson plans were developed collaboratively by the teacher and researcher to ensure that student learning was equivalent in each setting. The lesson plans served as a script for each class to receive the same material each day over the course of the study.

Students underwent training in the use of the iPad in the experimental group. This included the ability to access proper websites and understand the dimension of stock prices and basic use of the iPad. Prior use of a newspaper was a prerequisite for the students in the control group. This prerequisite was accomplished through prior learning in the economics classroom.

Students in six classes were assigned to one of two groups; this randomization depended exclusively on the class they were in which were taught by the same teacher. The experimental group used iPads in playing the Marketwatch Game. The control group also played the Marketwatch Game; however, they played the game by using newspapers. The game was played within the context of the designers of the game until the conclusion of the study, which lasted for eight weeks.

The research began with a validated pretest of the Test of Economic Literacy 4th Edition (Test A), to assess group equivalency. The first instrument used to evaluate research question one on student engagement was the High School Survey of Student Engagement (HSSSE). The second instrument used was the Test of Economic Literacy 4th Edition (Test B) to measure research question two dealing with content knowledge gained through the study of economics and the stock market, through content covered within The Marketwatch Game. The instruments were implemented in the following order. A pretest of the Test of Economic Literacy 4th Edition (Test A) was given at the beginning of the study. This was followed by eight weeks of course

lessons and the incorporation of the Marketwatch game. At the end of the eight weeks, students were then given a posttest of the Test of Economic Literacy 4th Edition (Test B), along with the HSSSE survey. Permission was granted to use the instrument given that it was administered in a research setting (See Appendix D and E). Scoring of the instruments was completed by the cooperating teacher and then again by the researcher to reduce the threat of errors.

One day after the two groups participated in the Marketwatch Game for eight weeks, the cooperating teacher administered the validated posttest on content knowledge, the Test of Economic Literacy 4th Edition (Test B). Two days after completing the Marketwatch Game, students completed the HSSSE. This completed the data collection portion of the study.

Analysis

This quasi-experimental, non-equivalent groups, pretest/posttest design incorporated both a one-way analysis of variance (ANOVA) and a one-way analysis of covariance. An ANOVA is used when comparing the means between subjects in quantitative outcome variables and an ANCOVA is used when comparing the means between subjects when the groups are not equivalent (Warner, 2008). A quasi-experimental design was chosen because of the lack of true randomization at the beginning of the research. The researcher also sought to measure growth over time, so a pretest/posttest design was chosen (Warner, 2008). The ANOVA was chosen because the dependent variable was not highly correlated (Gall et al., 2007). The dependent variables of this study were engagement measured by the High School Survey of Student Engagement (High School Survey of Student Engagement, n.d.) scores in research question one and achievement measured by students' scores on the Test of Economic Literacy (4th Edition; Council for Economic Education, n.d.) in research question two. The independent variable in

this study was the course related enrichment due to the manipulation of the medium (Warner, 2008). The course related enrichment was the use of newspapers in the control group and the use of iPads in the experimental group.

Research question one was analyzed by using a one-way ANOVA to evaluate the dependent variable, student engagement (Warner, 2008). In order to ensure proper use of analysis of variance (ANOVA) as the statistical instrument, several assumptions were evaluated (Gall et al., 2007). The alpha level of .05 was used to determine statistical significance, and effect size was measured using η^2 (Rovai et al., 2013). Data screening took place with all assumptions as follows for the ANOVA and ANCOVA: The first assumption was that the dependent variables of engagement and achievement were measured on a continuous scale. The second assumption was that the independent variable had two or more categorical groups. Assumption three was met because students had independence of observations, which were different participants in each group. Assumption four was absence of outliers, which was screened using boxplots. Assumption five was that normality existed in the data. This was screened by the use of histograms. The final assumption was homogeneity of variance, which was accomplished by Levene's test of homogeneity of variance (Warner, 2008). This was used to evaluate the hypothesis that there is a difference in student engagement based on instructional medium (print vs. digital).

Research question two was analyzed by using ANCOVA to evaluate the dependent variable, which was test scores (Warner, 2008). An ANCOVA was chosen because of the research situation where the mean scores were compared across groups that were not equivalent (Gall et al., 2007). Nonequivalent groups are often encountered in quasi-experimental research (Warner, 2008). The alpha level of .05 was used to determine statistical significance, and effect

size was measured using η^2 (Rovai et al., 2013). The data were screened for the first six

assumption in the same way as the ANOVA. An additional three assumptions needed to be met

for the ANCOVA, which included: covariate is linear related to the dependent variable at each

level of the independent variable, homoscedasticity, and homogeneity of regression slopes. The

covariate was linear and was tested by plotting a group scatterplot of the covariate. The next

assumption met was homoscedasticity. This was tested by plotting a scatterplot of the

standardized residuals against the predicted value. The final assumption for the ANCOVA was

homogeneity of the regression slopes to ensure no interaction between the covariate and the

independent variable. Assumptions were confirmed by analysis using Statistical Package for the

Social Sciences (SPSS).

CHAPTER FOUR: FINDINGS

Research Questions

The research questions for this study were:

RQ1: Is there a difference in student engagement based on course enrichment materials of real-time data and print text in newspapers?

RQ2: Is there a difference in student Economic Literacy based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores?

Null Hypotheses

H01: There is no significant difference in student engagement based on course enrichment materials of real-time data and print text in newspapers.

H02: There is no significant difference in student Economic Literacy scores based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores.

Descriptive Statistics

There were two dependent variables evaluated in this study: student engagement and student knowledge of economic content. The High School Survey of Student Engagement (HSSSE) was used to evaluate student engagement. The Test of Economic Literacy 4th Edition was used to evaluate student knowledge of economic content. The dependent variables within this study were the scores of the Test of Economic Literacy (4th Edition), and the High School Survey of Student Engagement (HSSSE). The independent variable in this study was the method of game play of the Marketwatch game. The experimental group used iPads to gain access to

real-time data, while the control group relied solely upon information gathered from newspapers.

Table 4 and 5 compare the newspaper and iPad groups for engagement using the HSSSE.

Table 4

Control Group using Newspapers results of Engagement

Paper Group	*N*	*M*	*SD*
RQ1 HSSSE	53	55.51	7.26

Table 5

Experimental Group using iPads results of Engagement

iPad Group	*N*	*M*	*SD*
RQ1 HSSSE	54	52.07	5.67

Results

The subsequent section includes a discussion of the data screening process. Also included are the results from both null hypotheses.

Research Question One

The first research question is stated as: Is there a difference in student engagement based on course enrichment materials of real-time data and print text in newspapers? A one-way ANOVA was used to test the first null hypothesis.

While conducting an ANOVA analysis, there are six assumptions that must be met (Warner, 2008). The first assumption is that a continuous dependent variable is present. In this study, the continuous dependent variable was the student's score on the High School Survey of

Student Engagement (HSSSE). Assumption two is that the independent variable includes two or

more distinct groups. The independent variables within this research were the students using

newspapers only while playing the Marketwatch game and students playing the Marketwatch

game using iPads, who had access to real-time data. Assumption three was met in that there was

independence of observations in each group. There were two distinct groups within this study.

One group used newspapers to participate in the Marketwatch Game and take the Test of

Economic Literacy and another group used iPads to participate in the Marketwatch Game and

take the Test of Economic Literacy. There were no individuals who participated in both groups.

Students were assigned to either the newspaper group or the iPad group. Assumption four states

that there should be no significant outliers in the groups of the independent variable in terms of

the dependent variable (Gall et al., 2007). The data entered from the High School Survey of

Student Engagement (HSSSE) showed the presence of no extreme outliers. Boxplots were used

in SPSS to identify possible outliers. There were two outliers present, case 14 and 19, but they

were not removed.
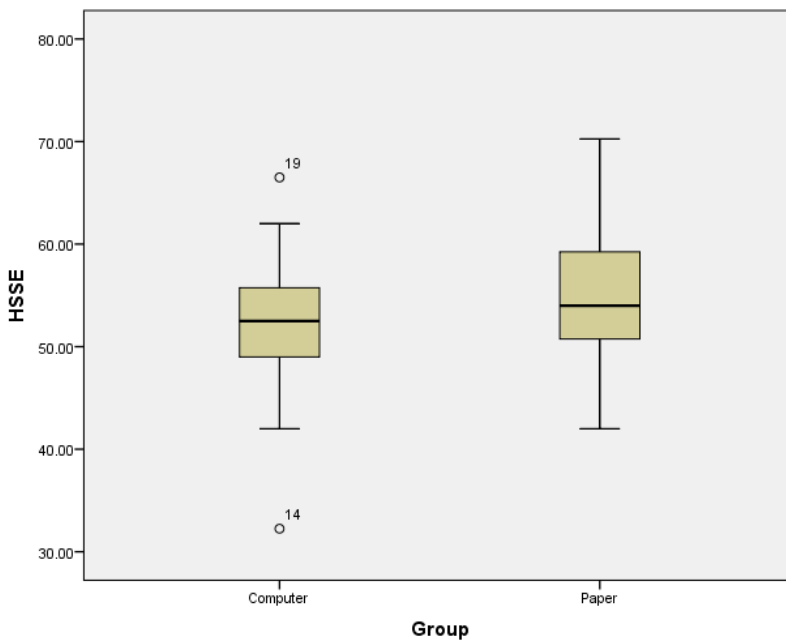
Figure 3. HSSSE Scatter Plot iPad and Paper

The dependent variable should be approximately normally distributed for each group of the

independent variable. Assumption five, normal distribution, was examined by the Kolmogrov-

Smirnov test to ascertain normality for the dependent variables (Warner, 2008).
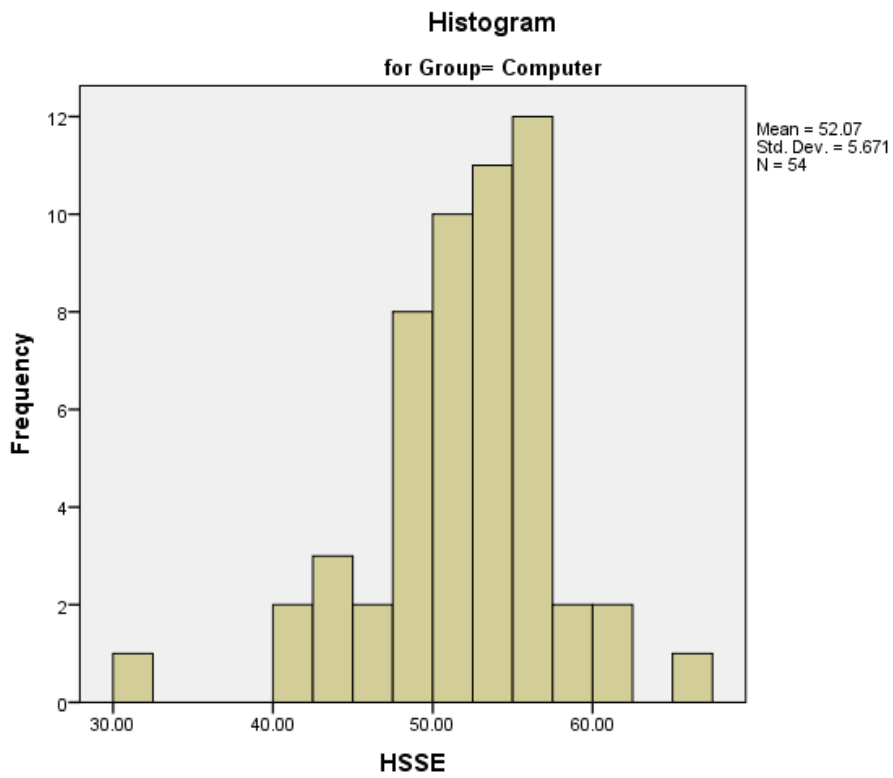
Figure 4.   HSSSE Histogram iPad Group

Group		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Posttest	Computer	.151	54	.004	.946	54	.017
	Paper	.154	53	.003	.908	53	.001
HSSE	Computer	.088	54	.200[*]	.965	54	.118
	Paper	.092	53	.200[*]	.973	53	.278
Pretest	Computer	.195	54	.000	.897	54	.000
	Paper	.227	53	.000	.919	53	.001

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Figure 5. Tests of Normality

The Kolmogorov-Smirnov test was used to further evaluate normality. The results indicated that

$p = .118$, which indicates normality.

The final assumption to be met in using an ANOVA is that homogeneity of variance

exists in the independent variable. To meet this assumption, Levene's test revealed that the

assumption of homogeneity of variances was not tenable ($F = 5.437, p = .022$). Therefore, a

non-parametric Welch ANOVA was conducted (Gall et al., 2007; Warner, 2008).

Table 6.

Welch ANOVA HSSSE

Welch	Statistic[a]	df1	df2	Sig.
HSSSE	7.446	1	98	.008

When unequal variances and sample size are present, Welch ANOVA becomes the more

reliable instrument to indicate statistical significance $F(1, 98) = 7.45\ p = 0.008$ (Warner, 2008).

A $p < 0.05$ indicates a statistical significance between the enrichment course materials of iPads

and newspapers when measuring engagement.

A data cleaning process was conducted. The final results yielded 107 students

completing the research. Six students' data were removed due to attrition. During the research,

one student was hospitalized, two students transferred out of the class, two students were

withdrawn from the school, and one student was expelled. All data were entered and analyzed

using IBM Statistical Package for the Social Sciences 23 (SPSS).

The histograms created within SPSS displayed normal distribution for the independent

variables. The histograms displayed a bell-shaped curve that visually represents normal

distribution.
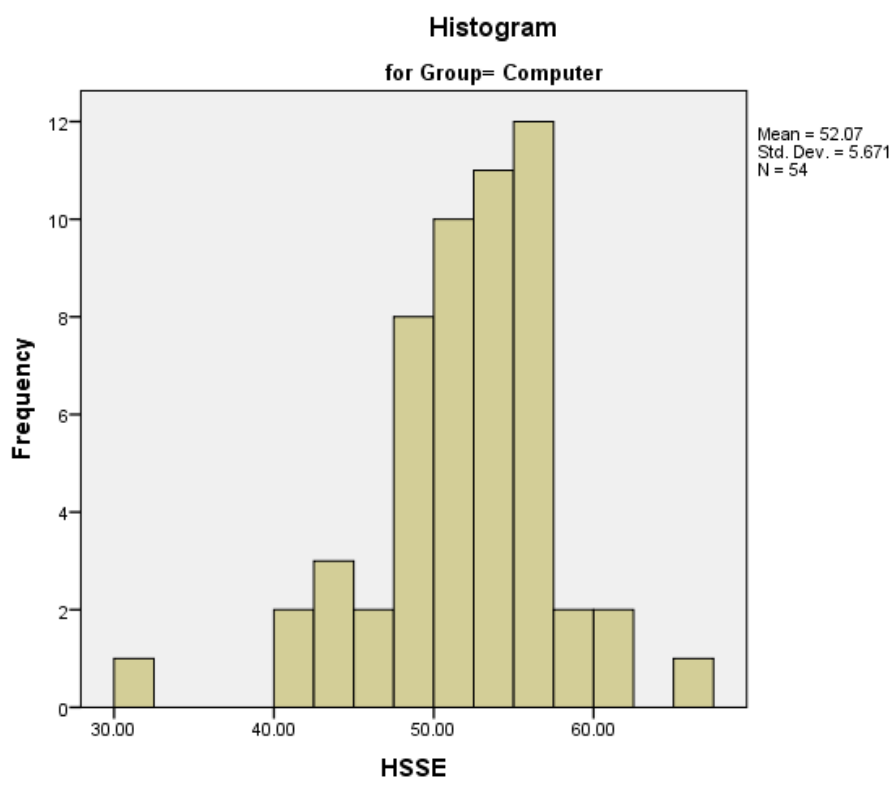
Figure 6. HSSSE Histogram iPad Group
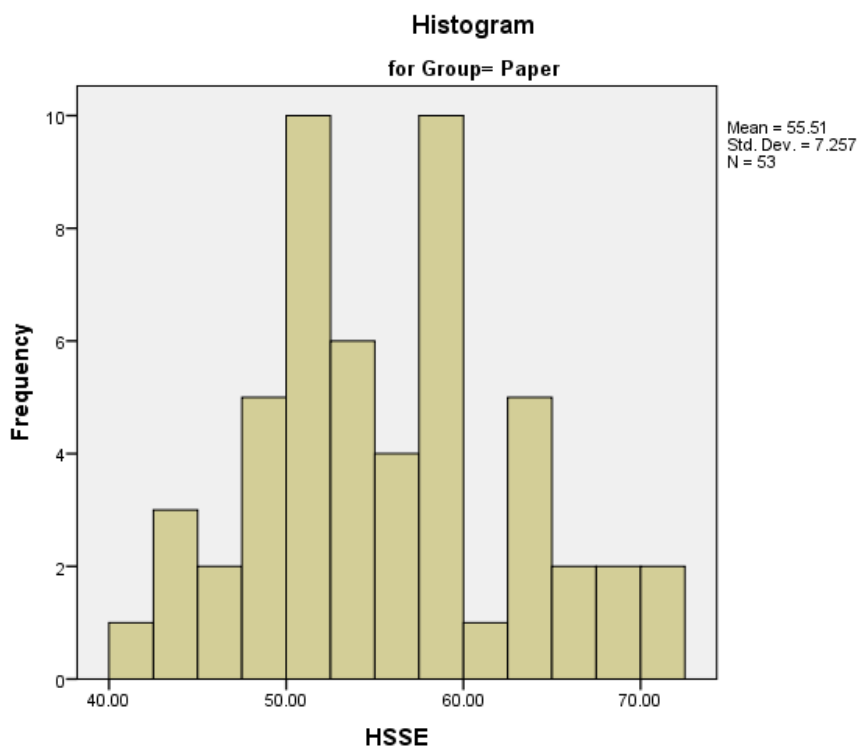
Figure 7. HSSSE Histogram Paper Group

When conducting the Levene Statistic for the HSSSE, homogeneity of variance was not met (0.022). The generation of $p < 0.05$ revealed statistical significance that the two groups were unequal. See Table 7.

	Levene Statistic	df1	df2	Sig.
HSSSE	5.437	1	105	.022

Table 7. *Levene Statistic HSSSE*

To calculate the effect size of the ANOVA, Eta-squared was used to analyze the groups. A calculation of .06 indicated that this research was considered to have a medium effect size,

with an alpha level of 0.05. Given that a significant value of the Welch ANOVA, $F(1, 98) =$ 7.45, $p = .008$, the null hypothesis, "There is no significant statistical difference in student engagement based on method access to real time data," was rejected. In fact, the control group scores ($M = 52.07$, $SD = 5.67$) were significantly lower than the experimental group ($M = 55.51$, $SD = 7.26$).

Research Question Two

The second research question is stated as: Is there a difference in student Economic Literacy based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores? A one-way ANCOVA was used to test the second null hypothesis. The following assumptions must hold true for a one-way ANCOVA to be valid: a continuous dependent variable, independent variable is categorical with two or more groups, independence of observation, no significant outliers, normal distribution, and homogeneity of variance (Gall et al., 2007; Warner, 2008). An additional three assumptions must be met for the ANCOVA, which are homoscedasticity, homogeneity of regression slopes, and normality of distribution. All data were entered and analyzed using SPSS 23.

Table 8.

Levene Statistic Post Test

	Levene Statistic	df1	df2	Sig.
HSSSE	.375	1	115	.541

Levene's statistic reveals a significance of ($F = .375$, $p = .541$)
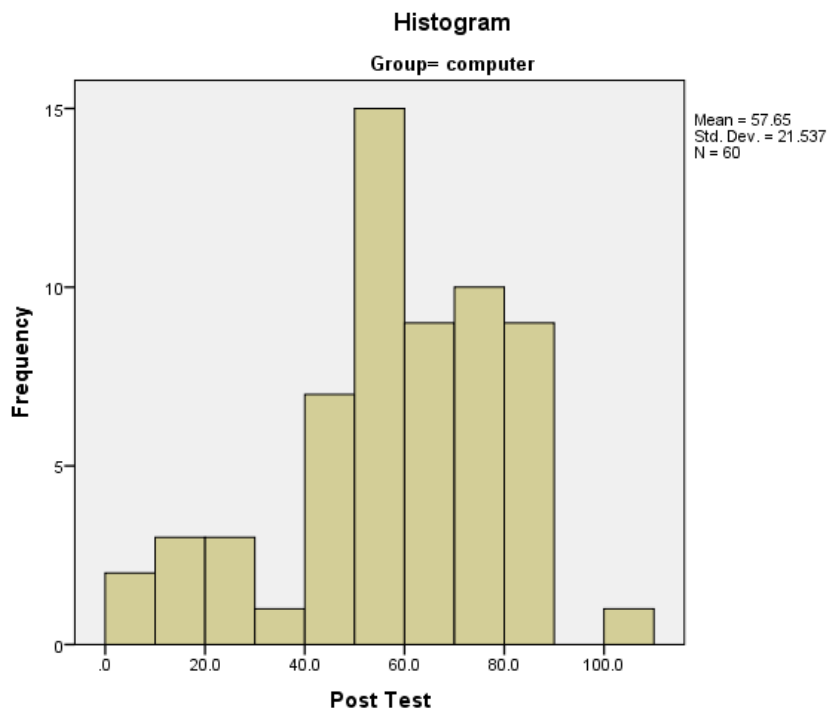
Figure 8. Posttest Histogram Computer Group

Table 9.

Test of Normality Computer Group

Tests of Normality[a]

	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Post Test	.151	60	.002	.941	60	.006

*. This is a lower bound of the true significance.

a. Group = computer

b. Lilliefors Significance Correction
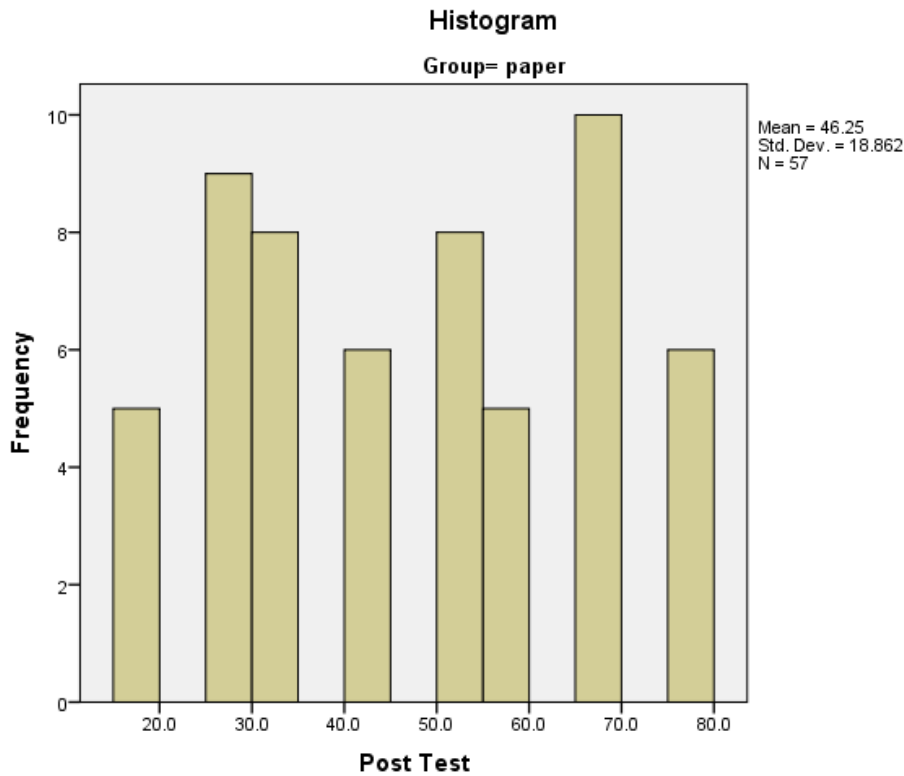
Figure 9. Posttest Histogram Paper Group

Table 10

Test of Normality Paper Group

	Tests of Normality[a]					
	Kolmogorov-Smirnov[b]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Post Test	.145	57	.004	.921	57	.001

*. This is a lower bound of the true significance.

a. Group = paper

b. Lilliefors Significance Correction

The Kolmogorov-Smirnov test of normality along with histograms indicate normal data with the computer and paper groups, $p = .006$ and $p = .001$ respectively. The assumption for homogeneity of regression slopes was not met.

An ANCOVA was performed to control for the differences in pretest scores of the two groups. The ANCOVA controlled for the pretest mean score of both groups to be 15.19. The dependent variable of the posttest scores analysis through the use of the ANCOVA determined a ($M = 23.20$, $SD = 1.00$) for the independent variable of course enrichment materials using the newspapers and ($M = 25.54$, $SD = .99$) for the group using iPads.

Table 11.

Test of Economic Literacy 4th Adjusted Means Posttest Scores

Estimates				
Dependent Variable: Post Test				
Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
computer	25.541[a]	.990	23.577	27.505
paper	23.204[a]	1.000	21.220	25.187
a. Covariates appearing in the model are evaluated at the following values: Pretest = 15.1963.				

An analysis of the data utilizing an ANCOVA indicated no significant difference between the groups with an alpha level of 0.05 $F(1, 98) = 2.58$, $p = .111$.

Table 12.

Test of Economic Literacy 4th Edition Test of Between-Subjects Effects

Tests of Between-Subjects Effects						
Dependent Variable: Post Test						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1890.235ᵃ	2	945.117	19.149	.000	.269
Intercept	9847.373	1	9847.373	199.516	.000	.657
Pretest	1235.766	1	1235.766	25.038	.000	.194
Group	127.293	1	127.293	2.579	.111	.024
Error	5133.055	104	49.356			
Total	70639.000	107				
Corrected Total	7023.290	106				
a. R Squared = .269 (Adjusted R Squared = .255)						

The second null hypothesis "There is no significant statistical difference in student Economic Literacy scores based on method access to real-time data while controlling for pretest Economic Literacy scores" failed to be rejected. The mean scores for the iPad group was 25.54, while the newspaper mean score was 23.20, with a difference of the two means of 2.34.

CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Discussion

The purpose of this quasi-experimental pretest-posttest design was to test information processing theory by using real-time data in a social studies high school classroom; specifically, the levels of processing that Craik and Lockhart (2008) researched. Their focus was on two tenets of processing information, retention of shallow and deep processing of information. Their research focused on how memory is stored rather than the structures of long and short term memory. Their research revealed that deep processing occurs when the information being stored is related to something more meaningful. Two research questions guided the current research study. During this study, two research groups were examined. Treatment group one was assigned to work playing the Marketwatch Game using newspapers. Treatment group two participated in playing the Marketwatch Game as well. Rather than using newspapers, these students used iPads to access real-time data in play. The effect of access to real-time data on student achievement and student engagement was analyzed by comparing measures of engagement and literacy of students who used iPads with those who used newspapers. At the inception of the study, the Test of Economic Literacy 4th Edition was given as a pretest to evaluate students' prior knowledge of the content. Once the treatment was complete, a posttest was given to evaluate students on the dependent variable of economic proficiency. The HSSSE survey was also given to measure the dependent variable of students' engagement.   There were two hypotheses that originated from the research questions that guided this study.

Null Hypothesis One

The first research question for this study was:

RQ1: Is there a difference in student engagement based on course enrichment materials of real-time data and print text in newspapers?

The first null hypothesis was stated as "There is no significant difference in student engagement based on course enrichment materials of real-time data and print text in newspapers." The data suggest there was a significant difference between the paper group and the iPad group scores on the HSSSE in terms of engagement. The minimum score for a student on this survey was a 19.5. The maximum score attainable for a student was a 78. The paper group had a mean score of 55.51, while the iPad group's mean score was a 52.07. Both groups scored above the middle and on the verge of the third quartile.

The HSSSE was developed to measure three areas of student engagement: Cognitive/Intellectual/Academic engagement, Social/Behavioral/Participatory engagement, and Emotional engagement. These items were self-reported by the students. Although this research was confined to the setting of a senior level economics class, the questions posed to the students encompassed their feelings about high school in general.

In researching the HSSSE, the data show that students involved with the iPad scored higher in classroom engagement when compared to students who used newspapers. The HSSSE does not account for real-time data access. The HSSSE accounts merely for student engagement in the three previously mentioned areas. The data show a greater mean score in students who participated in the game using newspapers (55.51) to those using iPads (52.07). Prior studies using the HSSSE have shown similar results. Yourechko (2016) found that the use of Twitter increased student engagement, but had little effect on academic performance. Robinson (2016)

examined dropout rates among eleventh- and twelfth-grade students and found that engagement was a key component to prevent dropout.

"In game-based learning environments, any constraints may limit true control, which in turn have a negative effect on learners' perceived autonomy" (Eseryel et al., 2014, p. 45). By creating a sense of accomplishment, students will generate a belief that they are moving towards an outcome (Ryan & Powelson, 1991). Given the form of the questioning, I postulate that students not only considered the economics class in which this study was based, but considered their entire high school experience, including other teachers and feelings about school.

The implications for educators concerning this hypothesis are that whether students are involved in gaming, regardless of real-time data or not, students seemed to score at an upper-level of engagement. This continues the trend of information released from Indiana University (2013) and the HSSSE findings. Excessively high numbers of students reported that they were bored in the classroom. When responding to this particular instrument, students reported they enjoyed debates, group projects, and technology as teaching tools implemented by teachers.

Null Hypothesis Two

The second research question stated:

RQ2: Is there a difference in student Economic Literacy based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores?

The second null hypothesis was stated as "There is no significant difference in student Economic Literacy scores based on course enrichment materials of real-time data and print text in newspapers while controlling for pre-test Economic Literacy scores."

The minimum score for a student on the Test of Economic Literacy 4th Edition is a zero; the maximum score attainable for a student is a 45. Prior studies incorporating the use of the TEL used similar research designs. Butters and Asarta (2011) used the TEL to examine regular economics classrooms and compared them to advanced economics classrooms using the same testing format. The results demonstrated that advanced students had greater insight and understanding of economic principles. Gill and Gratton-Lavoie (2011) used the TEL to monitor students who were required to take economics in high school and compared their scores with students who did not have an economics requirement. In the current study the newspaper and iPad groups had an adjusted mean pretest score of 15.19. After participating in the Marketwatch game, the newspaper group's posttest mean score rose to 23.20, while the mean posttest score of the iPad group who used real-time data during the game play rose to 25.54. The real-time data components demonstrate that the students in the experimental group reached a higher total mean score on the posttest when compared to their counterparts who were only exposed to newspapers during game play; however, this could have occurred by chance alone and is not deemed significant.

There was a noticeable discrepancy in the pretest scores of the paper group when compared to the iPad group, therefore an ANCOVA was used to control for the differences of the means. Six classes of students were divided; three of the six classes were chosen for the newspaper group and three were chosen for the iPad group. The possibilities to account for this scoring are that the iPad group could have scored higher than normal on the pretest content. This could be attributed to the students' prior content knowledge. Another explanation may be that the students in the iPad group could have taken the pretest more seriously than the newspaper

group. According to Warner (2008) and Gall, Gall and Borg (2007), the ANCOVA was the

appropriate test to measure the impact of a treatment on a dependent variable.

Given that there was no significant value of the one factor ANCOVA of $F(1, 105) = 2.58$,

$p = .11$, the second null hypothesis, "There is no significant statistical difference in student

Economic Literacy scores based on method access to real-time data while controlling for pre-test

Economic Literacy scores" failed to be rejected.

Conclusion

This research sought to determine if there were significant differences in students'

economic content scores and engagement while participating in the Marketwatch Game. One

group participated in the game using newspapers and the other participated in the game with

iPads while having access to real-time data. Data collection and analysis were completed using

the HSSSE and the Test of Economic Literacy 4th Edition. Prior research using the HSSSE has

focused on the three constructs of the HSSSE, which are the behavioral, emotional, and cognitive

aspects (Robinson, 2016; Sassen, 2015; Yourechko, 2016). Specifically, Yourechko (2016)

used the HSSSE to investigate the effects of Twitter on students in the classroom, which is

similar to the current research that investigated another aspect of technology, accessing real-time

data. Prior research has been conducted using the Test of Economic Literacy as well (Bushati,

2010; Gill & Gratton-Lavoie, 2011). These studies reviewed the effectiveness of an economics

program where the focus was centered on the curriculum. The current research focused on how

the content was delivered, specifically incorporating the access of real-time data. The basis of

this research was grounded in information processing theory. The information that is gathered

from each of the senses, creates the input as it moves into the processor and is stored in each

person's memory. This theory focuses on the process of how memory is stored rather than the

structures of long term and short term memory. Specifically, the relationship of processing information through a more meaningful occurrence is emphasized, such as participation in the experience of learning through game play.

By playing the Marketwatch Game, students were immersed in actual game play while learning the key components of the stock market. What this research has sought to do is incorporate the element of real-time data when compared to non-real-time data. The pretest and posttest analysis of economics content knowledge did not yield a significant difference in the two methods of instruction. The second component analyzed was student engagement. The data showed that students who used the newspapers tended to be more engaged than those students who used the iPads, with mean scores of 55.51 and 52.07 respectively. In researching studies that incorporated the HSSSE, results indicated that students involved with gaming alone and computer usage scored high in classroom engagement, when compared to other forms of classroom instruction. The HSSSE does not account for real-time data access, but accounts merely for student engagement in the three areas of Cognitive/Intellectual/Academic engagement, Social/Behavioral/Participatory engagement, and Emotional engagement.

Although the newspaper group showed a slight increase in the mean score in student engagement when compared to the iPad group, the iPad group showed a greater mean score in student economics content knowledge when compared to the newspaper group. The HSSSE did not specifically target the economics classroom, but focused on the whole school approach to engagement, which could have influenced scores from both groups. However, the TEL focused exclusively on the content taught in the economics classroom.

Implications

The greatest implication in this study is that as the Internet has continued to expand along with bandwidths, a greater opportunity to provide students with mobile devices with instant access and real-time data has emerged, which may be beneficial to student learning. The group using the iPads increased their average achievement score to 25.54, which was 2.34 points higher than the newspaper group. The only difference in the instruction between the two groups was the access to real-time data. By giving students access to real-time data, environments are opened that generate the students' abilities to access programs and simulations that were previously not available. The integration of technology within education has continued to grow as an integral part of shaping the lives of students. By incorporating experiential learning into classroom lessons, students can not only experience, but experience in real-time, real world tasks and become active participants in this learning environment.

Based upon the results of this study, although the TEL scores did not reflect significant gains, schools should at a minimum be offering students access to the Internet and lessons that incorporate some level of technology. The HSSSE scores reflect that students are more engaged when involved in activities such as computer-based learning, game play, and experiential learning. By incorporating access to real-time data, students are also given the ability to make decisions based on their interpretation of the data. This decision making helps students function at the upper levels of Bloom's Taxonomy of analysis and evaluation (Bloemsma, 2013; Neo, 2007).

Limitations

Rovai et al. (2013) discussed the threats to internal validity as "testing, instrumentation, selection, interaction with selection, and experimental mortality" (p. 90). Because this study

focused solely on one school, there are several limitations that resulted. The sample size, although adequate at 107 students, if larger would have added robustness to the study (Gall, Gall, & Borg, 2007). The demographics of the participants were diverse; however, they were limited to a specific geographic region. Gender and ethnicity were not aspects of this study, as evaluations were based purely on students' scores on the HSSSE and Test of Economic Literacy 4th Edition. By using a convenience sample, the students participating had different levels of economics content knowledge. Of the selected classes, all were functioning at the college preparatory level; none of the evaluations were done at an honors or gifted level. The scope of the TEL covered all facets of economic content, while the study itself was centered on the stock market and Marketwatch game. During data analysis, it was revealed that homogeneity of regression slopes was not met. Finally the use of one instructor may have been problematic, in that he may have disseminated information presented from one class to another.

Recommendations for Future Research

With the results of this research, new questions arise. My first recommendation is that this research should be conducted in a different geographic region to see if similar results are attained. The findings of this study show there is no measurable difference in students who have access to real-time data. These data show a snapshot of access to real-time. A longitudinal study might generate a more measurable benefit.

Secondly, no attention was given to the gender or ethnic makeup of students in these classes. In this study, students were evaluated using the HSSSE and the Test of Economic Literacy 4th Edition scores. It would be interesting to find out if there are differences in distinguished groups that are exposed to real-time data and if greater gains are attainable within

the specific groups of students. This could be achieved by studying specific groups based on gender, ethnicity, or socioeconomic status.

My next recommendation is that this research be performed with students who work at a higher level of academic skill. These students would not only have the resources, but the skill to expand their depth of knowledge into the content and research their findings.

My final recommendation for future research is rather than conducting a quantitative study, that this research be examined from a qualitative aspect. Over the course of the study, the teacher who performed the day-to-day task of the research made remarks of how enthused and engaged the students were while participating. These comments seemed to stem from the iPad group, but enthusiasm existed in both groups.

REFERENCES

Admiraal, W., Huizenga, J., Akkerman, S., & Dam, G. T. (20*11*). The concept of flow in collaborative game-based learning. *Computers in Human Behavior*, 11(3), 1185-1194.

Ahmed, A. A. (2011). *A framework for interoperability of virtual reality and simulation models in support of training* (Doctoral dissertation). Retrieved from http://search.proquest.com.ezproxy.liberty.edu:2048/docview/1034189752?pq-origsite=summon

Allen, D. E., Donham, R. S., & Bernhardt, S. A. (*2011*). Problem-based learning. *New Directions for Teaching and Learning*, 2011(128), 21.

Appleton, J., Christenson, S., Kim, D., & Reschly, A. (2006). Measuring cognitive and psychological engagement: Validation of the student engagement instrument. *Journal of School Psychology*, *44*(), 427-445.

Axelson, R. D., & Flick, A. (2011). Defining student engagement. *Change*, 38-43.

Baker, M. A., & Robinson, J. S. (2012). Aligning Kolb's Experiential Learning Theory with a comprehensive agricultural education model. *Journal of Agricultural Education*, *53*(4), 1-16.

Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology*, *25*(5), 729-735.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist*, *28*(2), 117-148.

Beck, J. C., & Wade, M. (2004). *Got game: How the gamer generation is reshaping business forever*. Boston, MA: Harvard Business School Press.

Bitner, N., & Bitner, J. (2002). Integrating technology into the classroom: Eight keys to success. *Journal of Technology and Teacher Education*, *10*(1), 95-100.

Black, S. (2004). Teachers can engage disengaged students. *The Education Digest*, *69*(7), 58-61.

Buijs, M., & Admiraal, W. (2013). Homework assignments to enhance student engagement in secondary education. *European Journal of Psychology of Education*, *28*(3), 767-779.

Bushati, D. (2010). *Economics understanding of Albanian high school students: Factors related to achievement as measured by test scores on the test of economic literacy* (Doctoral dissertation). Retrieved from http://search.proquest.com.ezproxy.liberty.edu/docview/275946350?pq-origsite=summon&accountid=12085

Carr, J. M. (2012). Does math achievement "hAPPen" when ipads and game-based learning are incorporated into fifth-grade mathematics instruction. *Journal of Information Technology Education Research*, *11*, 269-286.

Chang, C. S., Chen, T. S., & Hsu, W. H. (2011). The study of integrating webquest with mobile learning for environmental education. *Computers & Education*, *57*(1), 1228-1239. DOI: 2048/10.1016/j.compedu.2010.12.005

Chao, J. T., & Parker, K. R. (2011). Developing an interactive social media based learning environment. *Issues in Informing Science & Information Technology*, *8*, 323-334. Retrieved from http://go.galegroup.com.ezproxy.liberty.edu:2048/ps/i.do?action=interpret&id=GALE%7CA292088069&v=2.1&u=vic_liberty&it=r&p=AONE&sw=w&authCount=1

Chen, C., & Howard, B. (2010). Effect of live simulation on middle school students' attitudes and learning towards science. *Education Technology & Society*, *13*(1), 133-139.

Chen, Y. L., Pan, P., Sung, Y., & Chang, K. (2013). Correcting misconceptions on electronics:

    Effects of a simulation-based learning environment backed by a conceptual change

    model. *Educational Technology & Society*, *16*(2), 212-228.

Cohen, V. L. (2001). Learning styles in a ninth-grade high school population. *Journal of*

    Research on Technology in Education, *33*(4), 355-366.

Collins, D., & Dunn, M. (2011). Problem-solving strategies and processes in musical

    composition: Observations in real time. *Technology and Education*, *4*(1), 47-76.

Council for Economic Education. (n.d.). Retrieved from http://councilforeconed.org/

Craik, F., & Lockhart, R. (2008). Levels of processing and Zinchenko's approach to memory

    research. *Journal of Russian & East European Psychology*, *46*(6), 52-60.

Decanter, N. (2005). Gaming redefines interactivity for learning. *TechTrends*, *49*(3), 26-31.

Deniz, H., & Dulger, M. F. (2012). Supporting fourth graders' ability to interpret graphs through

    real-time graphing technology: A preliminary study. *Journal of Science Education and*

    Technology, *21*(1), 652-660.

Dickey, M. (2006). Girl gamers: The controversy of girl gamers and the relevance of female-

    oriented game design for instructional design. *British Journal of Educational Technology*,

    37(5), 785-793.

Eden, A., Maloney, E., & Bowman, N. D. (2010). Gender attribution in online video games.

    Journal of Media Psychology, *22*(3), 114-124.

Epstein, J., & McPartland, J. (1976). The concept and measurement of the quality of school life.

    American Educational Research Journal, *13*(1), 15-30.

Eseryel, D., Law, V., Ifenthaler, D., Ge, X., & Miller, R. (2014). An investigation of the interrelationships between motivation, engagement, and complex problem solving in game-based learning. *Educational Technology & Society*, *17*(1), 42-60.

Fu, J. S. (2013). ICT in education: A critical literature review and its implications. *International Journal of Education and Development using Information and Communication Technology*, *9*(1), 112-125. Retrieved from http://search.proquest.com.ezproxy.liberty.edu:2048/docview/1353086729

Gagne, E. (1985). *The cognitive psychology of school learning*. Boston: Little, Brown and Company.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research* (8th ed.). New York, NY: Allyn & Bacon.

Gill, A., & Gratton-Lavoie, C. (2011). Retention of high school economics knowledge and the effect of the California state mandate. *The Journal of Economic Education*, *42*(4), . DOI:10.1080/00220485.2011.606083

Harrington, B., & O'Connell, M. (2016). Video games as virtual teachers: Prosocial video game use by children and adolescents from different socioeconomic groups with increased empathy and prosocial behaviour. *Computers in Human Behavior*, *63*, 650-658. DOI: 10.1016/j.chb.2016.05.062

Hedin, N., & Carroll, B. H. (2010). Experiential learning: Theory and challenges. *Christian Education Journal*, *7*(1), 107-117.

High School Survey of Student Engagement. (n.d.). Retrieved from http://ceep.indiana.edu/hssse/nais/

Holowczak, R. (2005). Incorporating real-time financial data into business curricula. *Journal of Education for Business*, *81*(1), 3-8.

Hoover, L. (2012). The 2011 horizon report: Challenges and innovations in the classroom: Conference report. *Journal of Electronic Resources Librarianship*, *24*(1), 55-57.

Itin, C. M. (1999). Reasserting the philosophy of experiential education: A vehicle for change in the 21st century. *The Journal of Experiential Education*, *22*(2), 91-98.

Johnson, L., Adams, B., Estrada, V., & Freeman, A. (2014). *NMC horizon report: 2014 k-12 edition*. Austin, TX: New Media Consortium.

Kawar, T. (2012). The impact of leadership on student learning. *International Journal of Business and Social Science*, *3*(8), 319-322.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Retrieved from http://academic.regis.edu/ed205/kolb.pdf

Kovach, J. V., & Revere, L. (2011). Online technologies for engaged learning: A meaningful synthesis for educators. *Quarterly Review of Distance Education*, *12*(2), 113-129.

Lancaster, A. (2012). *The influence of frequency of emails from instructors and sustained email communication between teachers and students on students' success and academic outcomes* (Master's thesis). Retrieved from http://search.proquest.com.ezproxy.liberty.edu/docview/1033784346?pq-origsite=summon&accountid=12085

Leithwood, K., Patten, S., & Jantzi, D. (2010). Testing a conception of how school leadership influences student learning. *Educational Administration Quarterly*, *46*(5), 671-706.

Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010). *Teens and mobile phones*. Retrieved from: http://pewinternet.org/~/media//Files/Reports/2010/PIP-Teens-and-Mobile-2010-with-topline.pdf

Lewis, A. D., Huebner, E. S., Malone, P. S., & Valois, R. F. (2011). Life satisfaction and student engagement in adolescents. *Journal of Youth Adolescence*, *40*, 249-262.

Lutterbach, K. J., & Brown, C. (2011, August). Education for the 21st century. *International Journal of Applied Educational Studies*, *11*(1), 14-30.

Mainemelis, C., Boyatzis, R. E., & Kolb, D. A. (2002). Learning styles and adaptive flexibility: Testing experiential learning theory. *Management Learning*, *33*(1), 5-33.

Manuguerra, M., & Petocz, P. (2011). Promoting student engagement by integrating new technology into tertiary education: The role of the iPad. *Asian Social Science*, *7*(11), 61-65.

Mifsud, L., & Morch, A. I. (2010). Reconsidering off-task: A comparative study of PDA-mediated activities in four classrooms. *Journal of Computer Assisted Learning*, *26*(3), 190-201.

Mitchell, A., & Savill-Smith, C. (2004). *The use of computer and video games for learning: A review of the literature*. Retrieved from http://www.m-learning.org/docs/The%20use%20of%20computer%20and%20video%20games%20for%20learning.pdf

Moll, L. C. (1992). *Vygotsky and education: Instructional implications and applications of sociohistorical psychology*. New York, NY: Cambridge University Press.

Mulcahy, K. (1984). Experiential learning theory and cooperative education: A case study. *Studies in Educational Evaluation*, *10*, 39-48.

Nasu, M. (1989). A study of Weiner's attribution theory of achievement motivation. *The Japanese Journal of Educational Psychology*, *37*(1), 84-95.

Neo, M. (2007). Learning with multimedia: Engaging students in constructivist learning. *International Journal of Instructional Media*, *34*(2), 149-158.

Oigara, J., & Keengwe, J. (2013). Students' perceptions of clickers as an instructional tool to promote active learning. *Education and Information Technologies*, *18*(1), 15-28.

Patten, M. L. (2012). *Understanding research methods* (8th ed.). Glendale, CA: Pyrczak Publishing.

Phaf, H., Van der Heiden, A. H., & Hudson, P. (1990). SLAM: A connectionist model forattention in visual selection tasks. *Cognitive Psychology*, *22*(3), 273-341. Retrieved from http://www.sciencedirect.com.ezproxy.liberty.edu/science/article/pii/001002859090006P

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, *9*(5), 1-6.

Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and why their students benefit. *The Elementary School Journal*, *106*(3), 225-236.

Robinson, M. (2016). *An investigation of behavioral, emotional, and cognitive engagement as predictors of the intent to drop out of eleventh-and twelfth-grade students* (Doctoral dissertation). Retrieved from http://liberty.summon.serialssolutions.com/search?s.cmd=addFacetValueFilters%28ContentType%2CJournal+Article%29&s.fvf%5B%5D=ContentType%2CNewspaper+Article%2Ct&s.q=%22HSSSE%22#!/search?ho=t&fvf=ContentType,Newspaper%20Article,t%7CContentType,Journal%20Article,t%7CContentType,Book%20%2F%20eBook,t%7CC

ontentType,Magazine%20Article,t&l=en&q=%22high%20school%20survey%20of%20s

tudent%20engagement%22

Romero, M., Usart, M., & Ott, M. (2015). Can serious games contribute to developing and

sustaining 21st century skills. *Games and Culture*, *10*(2), 148-176.

Rondon, S., Sassi, F. C., & Furquim de Andrade, C. R. (20*13*). Computer game-based and

traditional learning method: A comparison regarding students' knowledge retention.

BMC Medical Education, 13(1), 30-38.

Rovai, A. P., Baker, J. D., & Ponton, M. K. (2013). *Social science research design and statistics:*

A practitioner's guide to research methods and SPSS analysis. Chesapeake, VA:

Watertree Press LLC.

Royse, P., Lee, J., Undrahbuyan, B., Hopson, M., & Consalvo, M. (2007). Women and games:

Technologies of the gendered self. *New Media & Society*, *9*(4), 555-576.

Ryan, R., & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic

motivation, social-development, and well-being. *American Psychologist*, *55*(1), 68-78.

Ryan, R., & Powelson, C. (1991). Autonomy and relatedness as fundamental to motivation and

education. *The Journal of Experiential Education*, *60*(1), 49-66.

Ryan, R., Rigby, C. S., & Przybylski, A. (2006). The motivational pull of video games: A self-

determination theory approach. *Motivation and Emotion*, *30*(4), 344-360.

Sassen, P. (2015). *Creating a culture of belonging: The significance of student belonging and the*

ethical frameworks that influence high school leaders (Doctoral dissertation). Retrieved

from

http://liberty.summon.serialssolutions.com/search?s.cmd=addFacetValueFilters%28Cont

entType%2CJournal+Article%29&s.fvf%5B%5D=ContentType%2CNewspaper+Article

%2Ct&s.q=%22HSSSE%22#!/search?ho=t&fvf=ContentType,Newspaper%20Article,t%
7CContentType,Journal%20Article,t%7CContentType,Magazine%20Article,t%7CConte
ntType,Book%20%2F%20eBook,t&l=en&q=%22high%20school%20survey%20of%20s
tudent%20engagement%22

Schunk, D. H. (1998). An educational psychologist's perspective on cognitive neuroscience.
Educational Psychology Review, *10*(4), 411-417. Retrieved from
http://search.proquest.com.ezproxy.liberty.edu:2048/docview/758510544

Skinner, E., Marchand, G., Furrer, C., & Kindermann, T. (2008). Engagement and disaffection in
the classroom: Part of a larger motivational dynamic. *Journal of Educational Psychology*,
100(4), 765-781.

Squire, K. (2006). From content to context: Videogames as designed experience. *Educational
Researcher*, *35*(8), 19-29.

Stanton, W. (2002). The dimensions of stage theories. *Current Psychology*, *21*(2), 176-198.
Retrieved from http://search.proquest.com.ezproxy.liberty.edu/docview/850830226?pq-
origsite=summon&http://search.proquest.com/psychology?accountId=12085

Stevenson, S. (2009). Digital Divide: A discursive move away from the real inequities. *The
Information Society*, *25*(1), 1-22.

Stewart, A., Williams, J., Smith-Gratto, K., Black, S., & Kane, B. (2011). Examining the impact
of pedagogy on student application of learning: Acquiring, sharing, and using knowledge
for organizational decision making. *Decision Sciences Journal of Innovative Education*,
9(1), 3-26.

Wang, V. C. (2012). Understanding and promoting learning theories. *International Forum of
Teaching and Studies*, *8*(2), 5-11.

Warner, R. M. (2008). *Applied statistics* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Whitten, N., & Moseley, A. (2014). Deconstructing engagement: Rethinking involvement in learning. *Simulation & Gaming*, *45*(4-5), 433-449.

Wideman, H. H., Owston, R. D., Brown, C., Kushniruk, A., Ho, F., & Pitts, K. C. (2007). Unpacking the potential of educational gaming: A new tool for gaming research. *Simulation & Gaming*, *38*(1), 10-30. DOI: 10.1177/1046878106297650

Wu, W. H., Hsiao, H. C., Wu, P. L., Ling, C. H., & Huang, S. H. (2012). Investigating the learning-theory foundations of game-based learning: A meta-analysis. *Journal of Computer Assisted Learning*, *28*(3), 265-279. DOI: 10.1111/j.1365-2729.2011.00437.x

Yang, Y. C. (2012). Building virtual cities, inspiring intelligent citizens: Digital games for developing students' problem solving and learning motivation. *Computers & Education*, *59*, 365-377.

Yourechko, A. (2016). *The effect of Twitter on secondary student engagement and academic performance* (Doctoral dissertation). Retrieved from http://liberty.summon.serialssolutions.com/search?s.cmd=addFacetValueFilters%28Cont entType%2CJournal+Article%29&s.fvf%5B%5D=ContentType%2CNewspaper+Article %2Ct&s.q=%22HSSSE%22#!/search?ho=t&fvf=ContentType,Newspaper%20Article,t% 7CContentType,Journal%20Article,t%7CContentType,Book%20%2F%20eBook,t%7CC ontentType,Magazine%20Article,t&l=en&q=%22high%20school%20survey%20of%20s tudent%20engagement%22

Zemelman, S., Daniels, H., & Ryde, A. (1998). *Best Practices: New standards for teaching and learning in America's schools* (2nd ed.). Portsmouth, NH: Heinemann.

APPENDIX A: TEST OF ECONOMIC LITERACY (4th EDITION)

- Log In
- Cart: (Empty)
- Contact Us
- Help/FAQ
- CEE Home
- Store Home

- Search

COUNCIL FOR
Economic
Education

Teaching Opportunity

Test of Economic Literacy 4th Edition: Grades 11-12, Test Booklets Forms A & B
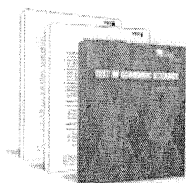
The Test of Economic Literacy will help to measure the economic understanding of your 11th-12th grade students. This new 4th edition includes the Examiner's Manual and two companion test booklets, and has been updated based on new norming data from over 8,000 students at more than 200 schools.

Responding to recent changes in the Voluntary National Content Standards in Economics, this edition introduces significant changes to many of the old test items, adds new items to reflect changes in the content of economics, places tighter controls over the norming sample, increases documentation of test reliability and validity, and establishes better procedures for equating test forms.

The Examiner's Manual provides the test administrator with detailed information on the test and instructions for administering the test. Also, because the test has been normed using different norming populations, it gives teacher or school administrators information to compare their students' performance with that of similar students across the nation.

The two test booklets, Form A and Form B, each contains 45 questions covering: fundamental economics concepts, microeconomics, and macroeconomics.

It is permissible to reproduce test booklets for student use.

Price
$0.00

1

Add To Cart
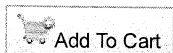
Thanks again for your inquiry. You can use this
link: http://www.econedlink.org/resources/241638-TEL-Manual.pdf

OR you can keep it as is in its entirety and use this notice, including a link to the resource. In advance of the reproduction:

Please let me know if you have additional questions.

Best,

Sally

FORM **A**

TEST OF ECONOMIC LITERACY
FOURTH EDITION

Directions

1. Please fill out the information requested on the answer sheet before beginning your test.

2. Do not write in this booklet or make other marks in it unless your teacher tells you to do so.

3. When marking your answer sheet, use *only* a regular No. 2 pencil. DO NOT USE A BALLPOINT PEN. Do not make any stray marks on the answer sheet. If you make a mistake, erase *completely* the answer you wish to change.

4. This test is designed to measure your understanding of economics. Not all students will have taken a separate course in economics, but most have learned something about the subject in their other courses, through reading newspapers, listening to the radio, and watching television or from some other source. These questions will measure how well you understand the principles of economics and the way our economy works.

5. You should try to answer *every* question by marking what you think is the best choice. You might not know the answers to some questions, but use the information you *do* have to eliminate those you think are incorrect and select your best answer. Work at a comfortable speed, but do not spend too much time on any one item. The test consists of 40 questions or incomplete statements, for which you should choose the **one best answer**. With some items, more than one answer may appear to be correct, but your task is to choose the *best* answer.

Sample Question 1

In our economy, income is usually received in the form of

    A. basic necessities.
    B. services.
    C. money.
    D. wealth.

Sample of Answer Sheet

    A   B   C   D
1. ○   ○   ●   ○

Sample Question 2

The federal government exercises the closest control over

    A. the money supply.
    B. computer sales.
    C. food distribution.
    D. oil companies.

Sample of Answer Sheet

    A   B   C   D
2. ●   ○   ○   ○

DO NOT TURN THE PAGE AND BEGIN THE TEST UNTIL YOU ARE TOLD TO DO SO.

Prepared by William B. Walstad, Ken Rebeck, and Roger B. Butters
for the Council for Economic Education

TEST OF ECONOMIC LITERACY, Form A

1. The opportunity cost of a new public high school is the

    A. money cost of hiring teachers for the new school.
    B. cost of constructing the new school at a later date.
    C. change in the annual tax rate to pay for the new school.
    D. other goods and services that must be given up for the new school.

2. Which one of the following do economists consider to be an example of capital goods?

    A. Money in a bank.
    B. Machines in an auto plant.
    C. Corporate bonds of an oil company.
    D. Common stocks in a computer business.

3. What is meant by the statement that every economic system faces the problem of scarcity?

    A. The additional benefits of goods and services are greater than their additional costs.
    B. There are times when some products can be purchased only at high prices.
    C. There are never enough productive resources to satisfy all human wants.
    D. All economies have recessions during which scarcities exist.

4. From an economic point of view, which approach to controlling pollution is most efficient?

    A. Abolish the use of toxic chemicals in all production.
    B. Use economic resources to eliminate all pollution.
    C. Adopt laws and regulations that prohibit economic activities that cause pollution problems.
    D. Reduce pollution as long as the additional benefits are greater than the additional costs.

5. The essential difference between a command economy and a market economy is that in a market economy

    A. shortages occur more often than surpluses.
    B. buyers and sellers determine resource allocation.
    C. central planning creates an effective incentive system for consumers and producers.
    D. the prices of products and resources are largely determined by government regulation of businesses.

6. Which is a basic economic question that must be answered by all economic systems?

    A. What will be the share of profits that go to businesses?
    B. What will be the amount of the minimum wage for workers?
    C. How will goods and services be produced?
    D. How will government collect income taxes?

7. Profits are equal to total

    A. revenue minus total cost.
    B. assets minus total liabilities.
    C. sales minus wages and salaries.
    D. sales minus taxes and depreciation.

8. If the government decides to reduce the payroll taxes on the wages and salaries of workers, then there will most likely be:

    A. a decrease in saving.
    B. a decrease in investment.
    C. an increase in consumption.
    D. an increase in unemployment.

9. A high school student buys a sweatshirt from a store. The sweatshirt is on sale at a 20 percent discount off the regular price. In this exchange,

    A. the student and the store benefit.
    B. the student benefits, but the store does not.
    C. the store benefits, but the student does not.
    D. neither the student nor the store benefits.

10. If Nation A adopts public policies that restrict imports from another nation that is a major trading partner, then in Nation A

    A. the cost of producing products will decrease.
    B. job opportunities in export industries will increase.
    C. consumers will pay higher prices for products.
    D. saving and investment will increase.

11. Specialization and division of labor by nations followed by increasing international trade probably would

    A. increase the level of worldwide unemployment.
    B. increase total world production of goods and services.
    C. lower living standards in the poor nations of the world.
    D. eliminate differences in standards of living among nations.

12. If Britain has a comparative advantage over France in the production of cars, then

    A. the opportunity cost of producing cars in Britain is lower than in France.
    B. the opportunity cost of producing cars in Britain is higher than in France.
    C. there are no gains from specialization and trade in cars between Britain and France.
    D. only Britain will gain from specialization and trade in cars between Britain and France.

13. When there is a shortage of a product in a competitive market, it is usually the case that the

    A. market price of the product will eventually increase.
    B. market price of the product will eventually decrease.
    C. quantity of the product exchanged in the market will eventually decrease.
    D. quantity of the product exchanged in the market will not change, but demand will increase.

14. The exchange rate between the U.S. dollar and the euro changes from $1=1.50 euros to $1=1.25 euros. Germany uses the euro as its currency. This change means that

    A. U.S. goods will be more expensive for Germans.
    B. German goods will be more expensive for Americans.
    C. there will be an increase in U.S. imports from Germany.
    D. there will be a decrease in German imports from the U.S.

15. In a competitive market, the price of a product is $5.00. If the government passes a law that sets a minimum price of the product at $6.00, this change will most likely result in

    A. a surplus of the product.
    B. a shortage of the product.
    C. a decrease in the supply of the product.
    D. an increase in the demand for the product.

16. Which would most likely increase the quantity of gasoline sold in a competitive market?

    A. An increase in the price of crude oil.
    B. A decrease in the price of automobiles.
    C. A decrease in the income of consumers.
    D. An increase in taxes on gasoline products.

17. In a competitive market, the price of wheat is likely to be increased by

    A. a decrease in the supply of wheat.
    B. a decrease in the demand for wheat.
    C. more capital investment in wheat farms.
    D. new machines reducing the cost of producing wheat.

18. Business firms wish to sell their products at high prices. Households wish to buy products at low prices. In a market economy, this conflict of interest is resolved by

    A. lawsuits.
    B. competition.
    C. collective bargaining.
    D. government regulation.

19. A newspaper reports, "COFFEE GROWERS' MONOPOLY BROKEN INTO SEVERAL COMPETING FIRMS." If this is true, we would expect the coffee-growing industry to

   A. decrease output and decrease prices.
   B. increase output and increase prices.
   C. decrease output and increase prices.
   D. increase output and decrease prices.

20. In a market economy, the public interest is likely to be served even when individuals pursue their personal economic goals because of

   A. the operation of competitive markets.
   B. the social responsibility of business leaders.
   C. central planning and coordination of market activity.
   D. individuals' understanding of what is in the public interest.

21. Which characteristic makes the most positive contribution to people's incentive to produce and exchange goods and services in a market economy?

   A. An equal distribution of income.
   B. Controls on the supply of gold.
   C. Restrictions on consumer choice.
   D. The right to own private property.

22. Common stocks, limited liability, and unlimited life are basic characteristics of

   A. cartels.
   B. partnerships.
   C. corporations.
   D. proprietorships.

23. What primary function is money serving when it is used to buy a ticket to a movie?

   A. Store of value.
   B. Flow of funds.
   C. Unit of account.
   D. Medium of exchange.

24. When commercial banks increase their loans to businesses and consumers, this usually results in

   A. a decrease in the spending power of consumers and businesses.
   B. an increase in government control over the economy.
   C. an increase in the banks' excess reserves.
   D. an increase in the nation's money supply.

25. Inflation is an increase in

    A. interest rates over time.
    B. the standard of living over time.
    C. the general level of prices over time.
    D. real gross domestic product over time.

26. An increase in real interest rates provides an incentive for people to save

    A. less and borrow less.
    B. more and borrow less.
    C. less and borrow more.
    D. more and borrow more.

27. Which would likely increase the average level of interest rates for auto loans?

    A. An increase in inflation.
    B. An increase in the unemployment rate.
    C. A decrease in the level of business investment.
    D. A decrease in the amount of consumer spending.

28. Over time the economic condition that would most likely lead to an increase in worker wages is an increase in

    A. the payroll taxes of the workers who make the product.
    B. the demand for the product that is made by the workers.
    C. the cost of the materials for the product the workers make.
    D. government regulation of the product the workers make.

29. Why do medical doctors generally earn more than farmers?

    A. Medical doctors are more efficient than farmers.
    B. Medical doctors provide a service rather than make a product.
    C. There are fewer medical doctors than farmers in our economy.
    D. Medical doctors are scarcer, given the demand for their services.

30. A basic role of entrepreneurs in the economy is to

    A. create dividends for investors in new businesses.
    B. buy and sell the common stocks of new corporations.
    C. take the risks associated with starting new businesses.
    D. show government what new products the economy can produce and sell.

31. Which would most likely increase the productivity of labor?

    A. An increase in capital investment.
    B. A decrease in the pay of corporate executives.
    C. An increase in interest rates for business loans.
    D. A decrease in the use of laborsaving technology.

32. How does a nation typically acquire more capital goods and increase productivity?

    A. By increasing the money supply and the rate of inflation.
    B. By increasing private saving and business investment.
    C. By decreasing the length of the workweek for the labor force.
    D. By increasing the growth rate of the population in the nation.

33. Government rather than private business provides national defense because

    A. it is a benefit and not a cost.
    B. it is a cost and not a benefit.
    C. not all who benefit from it would pay for it.
    D. if some benefit from it, less is available for others.

34. The tax described in the table below is a

    A. flat tax on income.
    B. progressive income tax.
    C. proportional income tax.
    D. regressive income tax.

STATE TAX TABLE	
Income	Percentage Tax Rate
$0 – $10,000	0
$10,001 – $40,000	10
$40,001 – $90,000	20
$90,001 and above	30

35. Which statement about tariffs is true?

    A. Tariffs increase the market for exports.
    B. Tariffs decrease employment in protected industries.
    C. Tariffs benefit some groups at the expense of others.
    D. Tariffs encourage the growth of a nation's most efficient industries.

36. Gross domestic product (GDP) is a measure of

    A. the price level of goods and services sold.
    B. total spending by federal, state, and local governments.
    C. the quantity of goods and services produced by private businesses.
    D. the market value of the nation's output of final goods and services.

37. A nation has an international trade deficit when

    A. its imports are greater than its exports.
    B. its exports are greater than its imports.
    C. its government expenditures are greater than its tax revenues.
    D. its gold reserves are greater than the gold reserves of its trading partners.

38. Which best measures a nation's standard of living over time?

    A. Rate of inflation.
    B. Rate of unemployment.
    C. Real income per capita.
    D. Money income per capita.

39. An economy's potential output at any time is limited by

    A. the amount of money in circulation.
    B. government regulations and spending.
    C. business demand for final goods and services.
    D. the quantity and quality of labor, capital, and natural resources.

40. Which would usually reduce total spending in the economy?

    A. A fall in interest rates.
    B. A decrease in business taxes.
    C. A decline in consumer incomes.
    D. A reduction in personal income tax rates.

41. An economy will typically experience a decline in its unemployment rate when there is

    A. an increase in population.
    B. a decrease in consumer incomes.
    C. an increase in economic growth.
    D. a decrease in business investment.

42. If your annual income rises by 50% while prices of the things you buy rise by 100%, then your

    A. real income has risen.
    B. real income has fallen.
    C. money income has fallen.
    D. real income is not affected.

43. One reason the federal government might reduce taxes is to

    A. slow the rate of inflation.
    B. slow a rapid rise in interest rates.
    C. decrease business spending on plant and equipment.
    D. increase consumer spending and stimulate the economy.

44. A government budget deficit exists when

    A. tax revenues are falling.
    B. government spending is rising.
    C. the national debt is decreasing.
    D. government spending is greater than tax revenues.

45. Which monetary policy would the Federal Reserve most likely adopt as the economy moves into recession during a period of low inflation?

    A. Lower the federal funds rate.
    B. Increase federal income tax rates.
    C. Decrease purchases of government bonds.
    D. Raise the reserve requirements for banks.

STOP

IF YOU FINISH BEFORE TIME IS CALLED,
YOU SHOULD CHECK YOUR WORK ON THIS TEST.

FORM **B**

TEST OF ECONOMIC LITERACY
FOURTH EDITION

Directions

1. Please fill out the information requested on the answer sheet before beginning your test.

2. Do not write in this booklet or make other marks in it unless your teacher tells you to do so.

3. When marking your answer sheet, use *only* a regular No. 2 pencil. DO NOT USE A BALLPOINT PEN. Do not make any stray marks on the answer sheet. If you make a mistake, erase *completely* the answer you wish to change.

4. This test is designed to measure your understanding of economics. Not all students will have taken a separate course in economics, but most have learned something about the subject in their other courses, through reading newspapers, listening to the radio, and watching television, or from some other source. These questions will measure how well you understand the principles of economics and the way our economy works.

5. You should try to answer *every* question by marking what you think is the best choice. You might not know the answers to some questions, but use the information you *do* have to eliminate those you think are incorrect and select your best answer. Work at a comfortable speed, but do not spend too much time on any one item. The test consists of 40 questions or incomplete statements, for which you should choose the **one best answer**. With some items, more than one answer may appear to be correct, but your task is to choose the *best* answer.

Sample Question 1

In our economy, income is usually received in the form of

Sample of Answer Sheet

    A   B   C   D
1. ○   ○   ●   ○

  A. basic necessities.
  B. services.
  C. money.
  D. wealth.

Sample Question 2

The federal government exercises the closest control over

Sample of Answer Sheet

    A   B   C   D
2. ●   ○   ○   ○

  A. the money supply.
  B. computer sales.
  C. food distribution.
  D. oil companies.

DO NOT TURN THE PAGE AND BEGIN THE TEST UNTIL YOU ARE TOLD TO DO SO.

TEST OF ECONOMIC LITERACY, Form B

1. The opportunity cost of a new city park is the

    A. cost of staff and maintenance for the park.
    B. increased congestion from traffic around the park.
    C. best alternative use of resources given up for the park.
    D. lack of personal incentive for people to take care of a public park.

2. Which do economists consider to be a productive resource (factor of production)?

    A. Labor.
    B. Profit.
    C. Money.
    D. Interest.

3. In every economic system, people must choose how to

    A. satisfy all of the wants of society.
    B. make the best use of scarce resources.
    C. create an equal distribution of income.
    D. save money to reduce the national debt.

4. A small business would like to hire more workers. Each additional worker hired costs the business $100 a day. The additional revenue the business receives from having more workers is $150 per day for the first worker, $130 per day for the second worker, $110 per day for the third worker, and $90 for the fourth worker. How many workers in total should the business hire to maximize its profits?

    A. One worker.
    B. Two workers.
    C. Three workers.
    D. Four workers.

5. The essential difference between a command economy and a market economy is that in a market economy

    A. shortages occur more often than surpluses.
    B. buyers and sellers determine resource allocation.
    C. central planning creates an effective incentive system for consumers and producers.
    D. the prices of products and resources are largely determined by government regulation of businesses.

6. Which is a basic economic question that must be answered by all economic systems?

    A. How will corporations be organized?
    B. How can markets be kept competitive?
    C. Which goods and services will be produced?
    D. Which form of central planning will the government use?

7. Profits are equal to total

   A. revenue minus total cost.
   B. assets minus total liabilities.
   C. sales minus wages and salaries.
   D. sales minus taxes and depreciation.

8. If the government decides to increase the payroll taxes on the wages and salaries of workers, then there will most likely be:

   A. an increase in saving.
   B. an increase in investment.
   C. a decrease in unemployment.
   D. a decrease in consumption.

9. A high school student buys a dinner at a restaurant. The restaurant offers a special price that takes 20 percent off the regular price of the dinner. In this exchange,

   A. the student and the restaurant benefit.
   B. the student benefits, but the restaurant does not.
   C. the restaurant benefits, but the student does not.
   D. neither the student nor the restaurant benefits.

10. Some members of Congress want to increase the general level of tariffs. If this increase occurs, then we should expect

   A. a decrease in U.S. inflation.
   B. a decrease in U.S. import quotas.
   C. a decrease in imports into the U.S.
   D. an increase in U.S. exports to other nations.

11. The specialization of labor usually results in

   A. an increase in inflation.
   B. a more equal distribution of income.
   C. an increase in output per hour worked.
   D. a decrease in economic interdependence.

12. Which best describes what the law of comparative advantage means for trading nations? Each trading nation can benefit by exporting goods that

   A. it produces at low opportunity costs and importing goods it produces at high opportunity costs.
   B. it produces at high opportunity costs and importing goods it produces at low opportunity costs.
   C. people enjoy least and importing goods that they enjoy most.
   D. people enjoy most and importing goods that they enjoy least.

13. When there is a surplus of a product in a competitive market, it is usually the case that the

    A. market price of the product will eventually decrease.
    B. market price of the product will eventually increase.
    C. quantity of the product exchanged in the market will eventually decrease.
    D. quantity of the product exchanged in the market will not change, but supply will increase.

14. The exchange rate between the U.S. dollar and the Japanese yen changes from $1=100 yen to $1=125 yen. This change means that

    A. there will be an increase in U.S. exports to Japan.
    B. there will be a decrease in U.S. exports to Japan.
    C. Japanese goods will be more expensive for Americans.
    D. U.S. goods will be less expensive for Japanese.

15. If the government charges a new tax of $1 on every pair of blue jeans sold, which would most likely result?

    A. Consumers would pay a higher price for blue jeans and buy fewer pairs of blue jeans.
    B. Consumers would pay a higher price for blue jeans and blue jeans sellers would make larger profits.
    C. Consumers would pay a higher price and blue jeans sellers would limit the number blue jeans consumer could buy.
    D. Blue jeans sellers would increase the quantity sold in order to make up for the taxes paid to the government.

16. Which would most likely decrease the quantity of corn sold in a competitive market?

    A. An increase in the price of fertilizer.
    B. An increase in the incomes of consumers.
    C. A decrease in the price of farm equipment.
    D. An improvement in the technology of growing corn.

17. A newspaper reports that the price of oranges increased and the quantity sold decreased. In a competitive market, this situation would most likely be the result of

    A. a decrease in demand.
    B. an increase in demand.
    C. an increase in supply.
    D. a decrease in supply.

18. Business firms wish to sell their products at high prices. Households wish to buy products at low prices. In a market economy this conflict of interest is resolved by

    A. lawsuits.
    B. competition.
    C. collective bargaining.
    D. government regulation.

19. A newspaper reports, "COFFEE GROWERS' MONOPOLY BROKEN INTO SEVERAL COMPETING FIRMS." If this is true, we would expect the coffee-growing industry to

   A. decrease output and decrease prices.
   B. increase output and increase prices.
   C. decrease output and increase prices.
   D. increase output and decrease prices.

20. Which is most essential for an efficient market economy?

   A. Effective labor unions.
   B. Strong government regulation.
   C. Active competition in the marketplace.
   D. Responsible decisions by business leaders.

21. The major purpose of the commercial banking system in the economy is to

   A. sell corporate stocks and bonds.
   B. hold financial assets for the Federal Reserve System.
   C. loan funds from depositors to credit-worthy borrowers.
   D. earn a rate of return on money invested with government agencies.

22. When workers join unions and elect representatives to negotiate with their employers, this is referred to as

   A. a closed shop.
   B. the seniority system.
   C. collective bargaining.
   D. right to work legislation.

23. Which item is included in the basic money supply in the United States?

   A. Gold.
   B. Silver.
   C. Corporate bonds.
   D. Checking account deposits.

24. When commercial banks increase their loans to businesses and consumers, this usually results in

   A. a decrease in the spending power of consumers and businesses.
   B. an increase in government control over the economy.
   C. an increase in the banks' excess reserves.
   D. an increase in the nation's money supply.

25. Inflation is a

    A. sharp rise in the price of a major product.
    B. substantial decline in the consumer price index.
    C. sustained increase in the general level of prices.
    D. rapid movement of the economy toward full-employment.

26. A decrease in real interest rates provides an incentive for people to save

    A. more and borrow more.
    B. less and borrow less.
    C. more and borrow less.
    D. less and borrow more.

27. Which best describes the general relationship between the risk that a business will default on a loan and the interest rate charged for the loan?

    A. A lower interest rate is charged on loans with more risk of default.
    B. A higher interest rate is charged on loans with less risk of default.
    C. A lower interest rate is charged on loans with less risk of default.
    D. The interest rate charged on loans is the same regardless of the risk of default.

28. In a market economy, high wages depend mostly on

    A. responsible business leaders.
    B. high output per worker.
    C. actions of government.
    D. minimum wage laws.

29. Why do medical doctors generally earn more than farmers?

    A. Medical doctors are more efficient than farmers.
    B. Medical doctors provide a service rather than make a product.
    C. There are fewer medical doctors than farmers in our economy.
    D. Medical doctors are scarcer, given the demand for their services.

30. People who take the risks of organizing productive resources to produce goods and services in the expectation of making profits are

    A. economists.
    B. stockbrokers.
    C. entrepreneurs.
    D. business managers.

31. Which would most likely decrease the productivity of labor?

    A. A rise in the pay of workers.
    B. A fall in the rate of interest.
    C. A reduction in the tax rates on income.
    D. A decline in the amount of capital goods.

32. Economies that grow rapidly over time usually have a high rate of

   A. growth in gold reserves.
   B. capital investment.
   C. unemployment.
   D. tariffs.

33. Government rather than private business provides a public good such as flood control because

   A. private businesses do not like to produce services for the government.
   B. those who do not pay for a public good still receive the benefits.
   C. when a person uses a public good, less is available for others.
   D. a public good does not benefit individuals.

34. The tax described in the table below is a

   A. flat tax on income.
   B. progressive income tax.
   C. proportional income tax.
   D. regressive income tax.

STATE TAX TABLE	
Income	Percentage Tax Rate
$0 – $10,000	0
$10,001 – $40,000	10
$40,001 – $90,000	20
$90,001 and above	30

35. Suppose that the U.S. Congress sets up a program to provide financial assistance to banks to prevent them from failing. This action will likely create a moral hazard problem because it may:

   A. restrict bank investments in real estate.
   B. encourage bank officials to make riskier loans.
   C. reduce the amount of deposits made by bank customers.
   D. increase the screening by banks of deposits from bank customer.

36. Gross domestic product (GDP) is a measure of

   A. the price level of goods and services sold.
   B. total spending by federal, state, and local governments.
   C. the quantity of goods and services produced by private businesses.
   D. the market value of the nation's output of final goods and services.

37. A nation has an international trade surplus when

   A. its exports are greater than its imports.
   B. its imports are greater than its exports.
   C. its tax revenues are greater than its government expenditures.
   D. its gold reserves are greater than gold reserves of its trading partners.

38. Which best measures a nation's standard of living over time?

   A. Rate of inflation.
   B. Rate of unemployment.
   C. Real income per capita.
   D. Money income per capita.

39. The maximum output a nation could possibly produce in any one year is limited by its

   A. productive resources.
   B. business investment.
   C. unemployment rate.
   D. consumer income.

40. Which would usually increase total spending in the economy?

   A. An increase in tax rates.
   B. An increase in interest rates.
   C. An increase in the savings rate.
   D. An increase in business investment.

41. During a recession in an economy, there will be an increase in

   A. imports.
   B. unemployment.
   C. economic growth.
   D. business spending.

42. Unexpected inflation is most likely to <u>benefit</u> people

   A. saving money in accounts at financial institutions.
   B. owing money on loans at fixed interest rates.
   C. living on fixed incomes and pensions.
   D. holding life insurance policies.

43. One reason the federal government might reduce taxes is to

   A. slow the rate of inflation.
   B. slow a rapid rise in interest rates.
   C. decrease business spending on plant and equipment.
   D. increase consumer spending and stimulate the economy.

44. A government budget surplus exists when

    A. tax revenues are greater than government spending.
    B. government spending is decreased.
    C. the national debt is increasing.
    D. taxes are increased.

45. Which monetary policy would the Federal Reserve most likely adopt to fight high inflation during a period of low unemployment?

    A. Raise the federal funds rate.
    B. Increase the supply of money.
    C. Increase federal government spending.
    D. Lower the reserve requirements for banks.

STOP

IF YOU FINISH BEFORE TIME IS CALLED,
YOU SHOULD CHECK YOUR WORK ON THIS TEST.

APPENDIX B: HIGH SCHOOL SURVEY OF STUDENT ENGAGEMENT

High School Survey of Student Engagement

Thank you for your participation in this survey! **Engagement** is a term often used to mean "*involvement*" or "*participation*." Your responses, along with responses from other students, will help your school better understand your needs as a student in order to create a school environment that is engaging, challenging, and productive for you. Please answer thoughtfully and honestly - we appreciate the time and energy you put into this survey.

This survey is administered by the Center for Evaluation and Education Policy, 1900 East Tenth Street, Bloomington, Indiana, 47406.

HSSSE

Marking Instructions

- Use black or blue pen or a number 2 pencil.
- Make dark marks that fill the oval completely.
- Do not use pens with ink that soaks through the paper.
- Make no stray marks.
- Fill in only one response per question, except where indicated.

WRONG MARKS

RIGHT MARK

---

1. **What is your current grade?** ○ 9th   ○ 10th   ○ 11th   ○ 12th

2. **Select the highest level of education you expect to complete**

   ○ Will not finish high school
   ○ GED
   ○ High school diploma
   ○ Community college degree (Associate's), technical school, or vocational/trade certificate
   ○ Four-year college degree (Bachelor's)
   ○ Master's, Doctorate, or other advanced degree

3. **What is your sex?**   ○ Male   ○ Female

4. **To what extent do you agree or disagree with the following statements related to your high school?**

	Strongly disagree	Disagree	Agree	Strongly agree
a. Overall, I feel good about being in this high school	○	○	○	○
b. I care about this school	○	○	○	○
c. I feel safe in this school	○	○	○	○
d. My opinions are respected in this school	○	○	○	○
e. There is at least one adult in this school who knows me well	○	○	○	○
f. I feel supported by the following people at this school:				
i. teachers	○	○	○	○
ii. administrators (principal, head of school, assistant/vice principal, dean)	○	○	○	○
iii. counselors	○	○	○	○
iv. other adults (secretaries, librarians/media specialists, coaches etc.)	○	○	○	○
v. other students	○	○	○	○
g. Teachers engage me in classroom discussions	○	○	○	○
h. I can be creative in classroom assignments and projects	○	○	○	○
i. I am comfortable being myself at this school	○	○	○	○
j. I am an important part of my high school community	○	○	○	○
k. This school's rules are fair	○	○	○	○
l. This school's rules are applied and enforced consistently	○	○	○	○
m. If I could choose a high school right now, I would choose this school	○	○	○	○

5. **How much do each of the following classroom activities and assignments interest or engage you?**

	Not at all	Very little	Some	Very much
a. Teacher lectures	○	○	○	○
b. Discussions and debates	○	○	○	○
c. Individual readings	○	○	○	○
d. Writing projects	○	○	○	○
e. Research projects	○	○	○	○
f. Group projects	○	○	○	○
g. Giving presentations and speeches	○	○	○	○
h. Art, drama activities, and role plays	○	○	○	○
i. Projects and lessons involving technology	○	○	○	○

SCANTRON   EliteView™ EM-265283-6:654321   ED06   © Copyright 2012 Indiana University

PLEASE DO NOT WRITE IN THIS AREA

6. How much does your high school emphasize each of the following?

	Not at all	Very little	Some	Very much
a. Memorizing facts and figures for classes	○	○	○	○
b. Understanding information and ideas for classes	○	○	○	○
c. Analyzing ideas in depth for classes	○	○	○	○
d. Studying and completing school work at home	○	○	○	○
e. Spending time preparing for state and district standardized tests	○	○	○	○
f. Participating in school events and activities (athletics, plays, performances, academic competitions)	○	○	○	○
g. Using computers or other technology for class work	○	○	○	○
h. Furthering education or training beyond high school	○	○	○	○
i. Building positive relationships with students of different backgrounds (religious, ethnic/racial, political, and economic)	○	○	○	○

7. How much has your experience at this school contributed to your development in the following areas?

	Not at all	Very little	Some	Very much
a. Acquiring skills for a job after completing high school	○	○	○	○
b. Writing effectively	○	○	○	○
c. Speaking effectively	○	○	○	○
d. Thinking critically (reasoning, asking "Why?")	○	○	○	○
e. Developing creative ideas and solutions	○	○	○	○
f. Reading and understanding challenging materials	○	○	○	○
g. Using technology to gather and communicate information	○	○	○	○
h. Working well with others to complete a task	○	○	○	○
i. Learning independently	○	○	○	○
j. Applying school-based knowledge to everyday life	○	○	○	○
k. Learning what life is like for other people in your community outside of school	○	○	○	○
l. Developing career goals	○	○	○	○
m. Understanding why what you learn in school will be important for life after high school	○	○	○	○
n. Understanding yourself	○	○	○	○
o. Treating people with respect	○	○	○	○
p. Developing personal beliefs and values	○	○	○	○

8. In a typical 7-day week during the school year, about how many hours do you do the following outside of school? (Number of hours per week)

	Hours per Week			
	1 or less	2-3	4-7	8 or more
a. Completing homework for class	○	○	○	○
b. Studying for tests or quizzes	○	○	○	○
c. Using technology for school assignments	○	○	○	○
d. Reading for your own personal interest (books, magazines, newspapers, online articles, etc.)	○	○	○	○
e. Participating in school-sponsored activities (clubs, athletics, student government, etc.)	○	○	○	○
f. Participating in non-school sponsored activities or hobbies (clubs, athletics, community theater, church-related activities, or other personal interests)	○	○	○	○
g. Working for pay	○	○	○	○
h. Doing volunteer work	○	○	○	○
i. Exercising for personal fitness	○	○	○	○
j. Watching television, playing video games	○	○	○	○
k. Using technology for personal interest (including talking on the phone, texting, and social media)	○	○	○	○
l. Spending time with friends in person	○	○	○	○
m. Participating in family commitments (chores, caring for siblings or relatives, etc.)	○	○	○	○

9. During this school year, about how often have you done each of the following?

	Never	Rarely	Sometimes	Often
a. Asked or answered questions in class	○	○	○	○
b. Talked to a teacher about your class work	○	○	○	○
c. Made a class presentation	○	○	○	○
d. Prepared a draft of a paper or assignment before turning it in	○	○	○	○
e. Completed a creative writing assignment (reflections, journaling, short stories, poetry)	○	○	○	○
f. Completed a formal writing assignment (research paper, speech, lab report, position paper)	○	○	○	○
g. Received feedback from teachers on assignments or other class work	○	○	○	○
h. Attended class with all assignments completed	○	○	○	○
i. Worked on a paper or project that required you to do research outside of assigned text	○	○	○	○
j. Worked on a paper or project that required you to interact with people outside of school (for interviews, observations, etc.)	○	○	○	○
k. Worked with other students on projects/assignments	○	○	○	○
l. Discussed questions in class that have no clear answers	○	○	○	○
m. Connected ideas or concepts from one class (or subject area) to another in classroom assignments or discussions	○	○	○	○
n. Discussed grades with teachers	○	○	○	○

CONTINUED

9. During this school year, about how often have you done each of the following?

	Never	Rarely	Sometimes	Often
o. Discussed ideas from readings or classes with teachers outside of class	○	○	○	○
p. Discussed ideas from readings or classes with others outside of class (friends, family members, coworkers, etc.)	○	○	○	○
q. Talked to an adult in the school about career goals	○	○	○	○
r. Talked to an adult in the school about how to apply to college	○	○	○	○

	Never	Rarely	Sometimes	Often
10. During this school year, how often have you been picked on or bullied by another student?	○	○	○	○
11. During this school year, how often have you witnessed an act of bullying?	○	○	○	○
12. How often have you skipped school, faked an illness to stay home, or deliberately come to school late because of disinterest in school?	○	○	○	○

13. Have you ever been bored in class?

○ Never (Go to question 14)
○ Rarely
○ Sometimes
○ Often

If you have been bored in class, why? *Fill in all that apply.*

○ Work wasn't challenging enough
○ Work was too difficult
○ Material wasn't interesting
○ Teaching methods not interesting

○ Material wasn't relevant to me
○ No interaction with teacher
○ No interaction with classmates

14. Have you ever considered transferring from *this* school?

○ Never (Go to question 15)
○ Rarely
○ Sometimes
○ Often

If you thought about transferring schools, what type of school would you prefer? *Fill in all that apply.*

○ a charter school
○ a magnet school
○ a religious school
○ home school

○ a private independent school
○ a public high school
○ an online high school

Why have you considered transferring to another school?

_____

15. Have you ever considered dropping out of *this* high school?

○ Never (Go to question 16)
○ Rarely
○ Sometimes
○ Often

If you have thought about dropping out of *this* high school, why? *Fill in all that apply.*

○ The work was too hard
○ The work was too easy
○ I didn't like the school
○ I didn't like the teachers
○ I didn't see the value in the work I was being asked to do
○ I was picked on or bullied
○ I needed to work for money

○ No adults in the school cared about me
○ I felt I was too far behind in credits to graduate
○ I failed required standardized tests for graduation
○ Adults in school encouraged me to drop out
○ Personal or family medical issues
○ Other family issues

○ Other: specify reason _____

	Yes	No
16. Have you ever repeated a class or course for credit in high school?	○	○
17. Do you believe you might have to repeat a class or course taken this year?	○	○

18. How much do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Agree	Strongly agree
a. I have the skills and ability to complete my work	○	○	○	○
b. I put forth a great deal of effort when doing my school work	○	○	○	○
c. I am motivated by my desire to learn	○	○	○	○
d. I am motivated by my desire to get good grades	○	○	○	○
e. I am motivated by teachers who encourage me	○	○	○	○
f. I am motivated by my desire to succeed in the world outside of school	○	○	○	○
g. I take pride in the quality of my school work	○	○	○	○
h. I have worked harder than I expected to in school	○	○	○	○
i. I like discussions in which there are no clear answers	○	○	○	○
j. I enjoy being creative in school	○	○	○	○
k. I enjoy working on tasks that require a lot of thinking and mental effort	○	○	○	○
l. My school work makes me curious to learn other things	○	○	○	○
m. In general, I am excited about my classes	○	○	○	○
n. I see how the work I am doing now will help me after high school	○	○	○	○
o. I feel good about who I am as a student	○	○	○	○

	None	Some	Most	All
19. About how many of your classes challenge you to your full academic potential?	○	○	○	○
20. In about how many classes do you give your maximum effort?	○	○	○	○
21. In about how many classes do you put forth very little effort?	○	○	○	○

22. Which of the following have you done or are currently doing during high school? *Fill in all that apply.*
- ○ Participated in a work-study program or internship
- ○ Participated in job shadowing
- ○ Taken one or more courses online
- ○ Participated in a performing or fine arts program in school

23. To what extent do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Agree	Strongly agree
a. I go to school because I enjoy being in school	○	○	○	○
b. I go to school because of what I learn in classes	○	○	○	○
c. I go to school because of my teacher(s)	○	○	○	○
d. I go to school because of my friends	○	○	○	○
e. I go to school because of my parent(s)/guardian(s)	○	○	○	○
f. I go to school because it's the law	○	○	○	○
g. I go to school to participate in athletics	○	○	○	○
h. I go to school to participate in band, orchestra, and/or choir	○	○	○	○
i. I go to school because I want to graduate and go to college	○	○	○	○
j. I go to school because I want to learn skills to get a good job	○	○	○	○
k. I go to school because there's nothing else to do	○	○	○	○
l. I go to school to stay out of trouble	○	○	○	○
m. I go to school to get out of the house	○	○	○	○

24. How old are you today?
- ○ 13 or younger
- ○ 14
- ○ 15
- ○ 16
- ○ 17
- ○ 18
- ○ 19 or older

25. What language(s) is spoken in your home? *Fill in all that apply.*
- ○ English
- ○ Spanish
- ○ Other language(s) - specify: _____

26. What is your racial or ethnic background? *Fill in all that apply.*
- ○ American Indian/Alaska Native
- ○ Asian or Asian American
- ○ Native Hawaiian or Other Pacific Islander
- ○ Black or African American
- ○ Hispanic, Latino, or Spanish origin
- ○ White
- ○ Other
- ○ I prefer not to respond

27. Are you eligible for free or reduced-price lunch at your high school?
- ○ No
- ○ Yes
- ○ Don't know
- ○ Prefer not to answer

28. What is the highest level of schooling that either of your parents or guardians completed?
- ○ Did not finish high school
- ○ GED
- ○ High school diploma
- ○ Community college or trade school degree
- ○ Four-year college degree (Bachelor's)
- ○ Master's, Doctorate, or other advanced degree
- ○ Don't know/Not applicable

29. Which one of the following categories best describes most of your high school grades?
- ○ Mostly As
- ○ Mostly As and Bs
- ○ Mostly Bs and Cs
- ○ Mostly Cs and Ds
- ○ Mostly Ds and below
- ○ Grades not used/Don't know

30. Which one of the following categories best describes most of the classes that you take?
- ○ Career/Vocational/Trade
- ○ ELL/ESL/Bilingual
- ○ General/Regular
- ○ Honors
- ○ Dual Credit/Advanced Placement/International Baccalaureate
- ○ Special Education
- ○ Don't know

31. Would you like to say more about any of your answers to these survey questions or provide any other comments about your experience at this school? Please do so in the space provided here.

_____

_____

PLEASE DO NOT WRITE IN THIS AREA

APPENDIX C: IRB APPROVAL

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

April 1, 2016

Eric G. Blanton
IRB Approval 2475.040116: Comparing Instructional Media through Game-Based Learning:
Examining Engagement and Comprehension

Dear Eric,

We are pleased to inform you that your study has been approved by the Liberty IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

LIBERTY
UNIVERSITY.

Liberty University | Training Champions for Christ since 1971

APPENDIX D: HSSSE APPROVAL

Gmail   More

COMPOSE

Inbox
Starred
Important
Sent Mail
Drafts
Circles

[Gmail]Trash

More labels

Eric

No Hangouts Contacts
Find someone

HSSSE <hssse@indiana.edu>
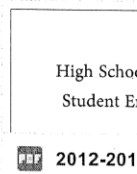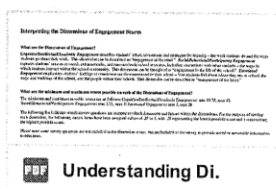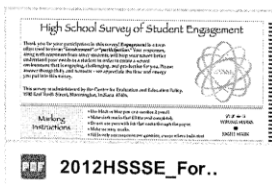to me

Good Afternoon Eric-

Attached is a copy of the HSSSE instrument, codebook, and a

Please be sure to cite the Center for Evaluation and Education

Sincerely,

Kathleen Lorenzen
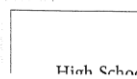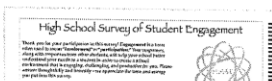HSSSE Project Associate

3 Attachments

PDF 2012HSSSE_For..   PDF Understanding Di.   PDF 2012-201:

Eric Blanton <blantone@gmail.com>
to ben.fuller

3 Attachments

123

6/7/2014   HSSSE: CEEP: Indiana University Bloomington

INDIANA UNIVERSITY
BLOOMINGTON

HSSSE
High School Survey of Student Engagement

CEEP CENTER FOR EVALUATION
&-EDUCATION POLICY

HSSSE Home

High School Survey of Student Engagement!

The High School Survey of Student Engagement (HSSSE, pronounced "hessee") is a comprehensive survey on student engagement and school climate issues. Previously, HSSSE was administered by the Center for Evaluation and Education Policy (CEEP) at Indiana University as a fee-for-service to schools, districts and other groups who wanted to examine high school student engagement. Since 2003, HSSSE has been used to measure the engagement of secondary students, with more than 400,000 students in over 40 states completing the survey between 2006 and 2013.

Starting in Fall 2013, the Center for Evaluation and Education Policy (CEEP) no longer administers HSSSE as a fee-for-service. Going forward, the use of HSSSE survey items by schools, districts, and researchers is permitted without charge. HSSSE and the Center for Evaluation and Education Policy (CEEP) must be cited/referenced in documentation and publications.

In addition, CEEP will work with interested school districts, state departments of education, state and national organizations, and foundations to develop larger-scale research and evaluation studies that evaluate high school student engagement. These studies may include HSSSE, as well as other data collection methods developed by CEEP in collaboration with relevant stakeholders. Costs for these studies will be commensurate with the methodology and scope of the study.

You are invited to explore the HSSSE website to learn more about measuring and strengthening the engagement of your students.

HESSE Survey Sample

Copyright © 2014HSSSE | Privacy Notice

High School Survey of Student Engagement, CEEP
1900 East Tenth Street, Bloomington, IN 47406
Phone: 812-856-1813 Email: HSSSE@indiana.edu

http://ceep.indiana.edu/hssse/index.shtml   1/1

APPENDIX E: **PARENT CONSENT FORM**

CONSENT FORM

Comparing instructional media through game-based learning: Examining engagement and comprehension

Mr. Eric Blanton
Liberty University
Education Department

Dear Parent/Guardian:

Your child has been invited to be in a research study about real-time data and game-based learning. He/she was selected as a possible participant because of being a first time 12th grader. I ask that you read this form and ask any questions you may have before agreeing for your child to be in the study.

This study is being conducted by Mr. Eric Blanton who is the 11th grade principal. I am currently fulfilling requirements for an Ed.D.

Background Information:

The purpose of this study is to determine if there is a significant difference in economic comprehension and engagement in students playing the Marketwatch Game using iPads who have access to real-time data, when compared to students using plain text (newspapers).

Procedures:

If you agree to allow your child to be in this study, I would ask him/her to do the following things:
- Take part in the High School Survey on Student Engagement (HSSSE Take a survey on cyberbullying
- Take a pretest on the Test of Economic Literacy 4th Edition (TEL) and to follow this with a posttest on the same content following classroom instruction

Risks and Benefits of being in the Study:

The risks of this study are no more than would be encountered in everyday life. The participants in this study will be taking an anonymous survey through their economics classes. The survey will be completely anonymous and there will be no identifying questions (e.g. Name, birthday, Social Security number, Power School number, address, etc...) asked of the students. The survey will take approximately one class period. The test of economic literacy will take less than one class period for the pretest and less than one class period for the posttest.

The major benefit from participating in this study will be the fact that is has never been attempted. There has never been a study on real-time data and game-based learning. The results of this study may lead to further research on the topic of real-time data and game-based learning.

Compensation:

There will be no compensation given for being a participant in this study.

Confidentiality:

The records of this study will be kept private. There will be no identifying factors or questions in the survey or the test of economic literacy that will be asked of the participants.   In any sort of report I might publish, I will not be able to include any information that will make it possible to identify a subject because there will be no personal

identifying factors within the data. Research records will be stored securely and only the researcher will have access to the records. All records of the study must be kept in a secure location for a minimum of three years based on IRB regulations. All records will be destroyed after the three year time period has lapsed.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect his/her current or future relations with their teacher or Mr. Blanton. If you decide to allow your child to participate, then he/she will be free to not answer any question or withdraw from the study at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is Mr. Eric Blanton. You may ask any questions you have now. If you have questions later, **you** ████**rage**█████████ or email at .██████

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Suite 1837, Lynchburg, VA 24502 or email at irb@liberty.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers. I consent to allow my child to participate in the study.

Signature of Child: _____ Date: _____

Signature of Parent/Guardian: _____ Date: _____

Signature of Investigator: _____ Date: _____

IRB Code Numbers: IRB Approval 2475.040116: Comparing Instructional Media through Game-Based Learning:

IRB Expiration Date: March 31, 2017

APPENDIX F: SCHOOL CONSENT

CONSENT TO CONDUCT RESEARCH STUDY

COMPARING INSTRUCTIONAL MEDIA THROUGH GAME BASED LEARNING:

EXAMINING ENGAGEMENT AND COMPREHENSION

Mr. Eric Blanton
Liberty University
Education Department

Your school, specifically the 12th Grade senior students of ███████████, is invited to be in a research study about real time-data and game-based learning. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Mr. Eric Blanton, Educational Doctorate Candidate.

Dear Dr. Fitzpatrick:

As a graduate student in the Education Department at Liberty University, I am conducting research as part of the requirements for an Ed.D in Curriculum and Instruction. The title of my research project is, "Comparing instructional media through game-based learning: Examining engagement and comprehension." The purpose of my research will be to determine if there is a significant difference in economic comprehension and engagement in students playing the Marketwatch Game using iPads who have access to real-time data, when compared to students using plain text (newspapers).

I am writing to request your permission to conduct my research in the economics classes in the main campus of ███████████. The target age of the participants will be 17-18. The economic classes will be the target population of this study because all first time seniors are enrolled in this course. All seniors enrolled in Michael Dalton's senior level economics classes will have an equal opportunity to participate in the study if they so choose and if they are granted parental permission.

Participants will be asked to take part in the High School Survey on Student Engagement (HSSSE) and the Test of Economic Literacy 4th Edition (TEL). Students will take a pretest of the (TEL) 4th Edition. This will be followed by multiple weeks of classroom instruction. Students will then be given a posttest using a different form of the (TEL) 4th Edition. This will be followed by a student survey, the (HSSSE) which will identify student engagement. The data will be used to identify economic proficiency among students when comparing their use to real-time data, as opposed to print material. Students will be presented with informed consent information prior to participating. Each student will also have to sign an assent letter in order to

take part in the study. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact Mr. Blanton at ███████. You may also contact Dr. Nathan Putney, advisor to Mr. Blanton, ███ 434) 582-2559 or email at nputney@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Suite 1837, Lynchburg, VA 24502 or email at irb@liberty.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers. I consent to allow the researcher to conduct this study in ███████████████ ███████████████████████

Printed Name of Superintendent of Cherokee County School District #1
_____

Signature: _____ Date: _____

Signature of Investigator: _____Date: _____

APPENDIX G: DISTRICT CONSENT

CONSENT TO CONDUCT RESEARCH STUDY

COMPARING INSTRUCTIONAL MEDIA THROUGH GAME BASED LEARNING:

EXAMINING ENGAGEMENT AND COMPREHENSION

Mr. Eric Blanton
Liberty University
Education Department

Your school district, specifically the 12th Grade senior students of ███████████, is invited to be in a research study about real time-data and game-based learning. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

This study is being conducted by Mr. Eric Blanton, Educational Doctorate Candidate.

Dear Dr. Moore:

As a graduate student in the Education Department at Liberty University, I am conducting research as part of the requirements for an Ed.D in Curriculum and Instruction. The title of my research project is, "Comparing instructional media through game-based learning: Examining engagement and comprehension." The purpose of my research will be to determine if there is a significant difference in economic comprehension and engagement in students playing the Marketwatch Game using iPads who have access to real-time data, when compared to students using plain text (newspapers).

I am writing to request your permission to conduct my research in the economics classes in the main campus of ███████████. The target age of the participants will be 17-18. The economic classes will be the target population of this study because all first time seniors are enrolled in this course. All seniors enrolled in Michael Dalton's senior level economics classes will have an equal opportunity to participate in the study if they so choose and if they are granted parental permission.

Participants will be asked to take part in the High School Survey on Student Engagement (HSSSE) and the Test of Economic Literacy 4th Edition (TEL). Students will take a pretest of the (TEL) 4th Edition. This will be followed by multiple weeks of classroom instruction. Students will then be given a posttest using a different form of the (TEL) 4th Edition. This will be followed by a student survey, the (HSSSE) which will identify student engagement. The data will be used to identify economic proficiency among students when comparing their use to real-time data, as opposed to print material. Students will be presented with informed consent information prior to participating. Each student will also have to sign an assent letter in order to

take part in the study. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact Mr. Blanton ██████████. You may also contact Dr. Nathan Putney, advisor to Mr. Blanton, at ██████████ or email at nputney@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Suite 1837, Lynchburg, VA 24502 or email at irb@liberty.edu.

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers. I consent to allow the researcher to conduct this study in █████████████████ ██████████████████████████

Printed Name of Superintendent of ████████ County School District #1

_____

Signature: _____ Date: _____

Signature of Investigator: _____Date: _____

APPENDIX H: TEACHER AND STUDENT TRAINING

Teacher Training using the iPad included the following videos accessed from www.youtube.com:

- How to use an iPad - How to get started with your new iPad - iPad Basics Tutorial

- How to use the Safari Browser on your iPad - Overview of Safari

- Apple iPad : Using the Apps Store on the iPad

Teacher training of using the newspaper for stock listing:

- Investment Tips & Financial Planning : How to Read Stocks in the Newspaper from

  www.youtube.com

- How to look up stock symbols on Marketwatch

  http://www.marketwatch.com/tools/quotes/lookup.asp

Teacher was also trained on the Market Watch Game using http://www.marketwatch.com/game/

Teacher reviewed the elements of best practices within a social studies classroom using the text

(Zemelman et al., 1998).

Student training followed the same prescription as the teacher training with the exception of best

practices.