

THE EFFECTS OF PERCEIVED LEARNING ON OPEN SOURCED CLASSROOMS  
WITHIN THE COMMUNITY COLLEGES IN THE SOUTHEASTERN REGION OF THE  
UNITED STATES

by

Amanda Kay Carpenter-Horning

Liberty University

A Dissertation Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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APPROVED BY:

Eric Lovik, PhD, Committee Chair

Murray Williams, EdD, Committee Member

Hope George, EdD, Committee Member

## ABSTRACT

This study examined the perceived learning of students using open educational resources in face-to-face and distance education courses at nine community colleges in the southeastern region of the United States. The purpose of this causal-comparative study was to determine if students using open educational resources perceive learning differently from those using traditional textbooks as measured by the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale (Rovai, Wighting, Baker, & Grooms, 2009). Students at nine community colleges in the southeastern region of the United States completed the CAP Perceived Learning Scale following the successful completion of a first-year seminar course. The researcher collected data from the student population that included the learning materials used by the students as part of the course. Students received the CAP Perceived Learning Scale via their official student email accounts issued to them by their respective college. This study sample size was 5,644; the researcher completed a series of t-tests on the data and analyzed the results. The results of this study found a statistically significant difference in the perceived learning scores of students enrolled in courses using open educational resources and students enrolled in classes using traditional textbooks. However, a statistically significant difference was not found in the affective learning scores of students using open educational resources and students enrolled in courses using traditional textbooks. The results of this study will assist educators in making data-informed decisions regarding the implementation of open educational resources in college classrooms. The researcher included future research suggestions in the manuscript.

*Keywords:* open educational resources, textbook costs, traditional textbooks, perceived learning, and affective learning

## **Dedication**

Lao Tzu once said, “The journey of a thousand miles begins with a single step.” Tzu’s words are not only an accurate description of a long journey but also the dissertation experience. For me, the dissertation journey began with a summer class and ended with a completed dissertation. Each step along the way was difficult, but the process was a growing experience. An immense amount of support, encouragement, and patience from my immediate family assisted me in completing this work. I dedicate the dissertation to my family, friends, and colleagues who supported me during this long journey. I will always be thankful for their support and love.

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### **List of Abbreviations**

Classroom and School Inventory (CSCI)

Cognitive, Affective, and Psychomotor (CAP)

Massive Open Online Courses (MOOCs)

Massachusetts Institute of Technology (MIT)

Kaleidoscope Open Course Initiative (KOCI)

Massive Open Online Courses (MOOCs)

Open Educational Resources (OER)

Open Publication License (OPL)

Student Public Interest Research Groups (PIRGs)

United Nations Educational, Scientific, and Cultural Organization (UNESCO)

## **CHAPTER ONE: INTRODUCTION**

### **Overview**

This section provides a summary of background related to the development of open educational resources, their use in college classrooms, and theories related to open educational resources. The cognitive, affective, and psychomotor (CAP) perceived learning theory was the underlying theory used in supporting this study. Furthermore, this chapter will provide readers with the problem this study hopes to answer, the purpose of the study, and the significance of the research to education.

### **Background**

As Grasgreen explained, open educational resources were a current and innovative topic of discussion in higher education (2014). Conceived as an instructional instrument designed for use in online and distance learning courses, the resources role in education has since expanded (Grasgreen, 2014). Open educational resources were useful alternatives to traditional learning materials such as textbooks and were attractive to educators due to the cost saving opportunities they provided for students (Baum, Ma, & Payea, 2012). These cost-saving opportunities reduced the overall cost of education for students and expanded access to education (Wen & Liu, 2016). Eliminating textbook costs or significantly decreasing textbook costs allows students to spend more of their education budget on tuition. Furthermore, surveys found that low-income students' success in education was related to the cost of textbooks (Hill, 2016). Low-income students saw the high cost of textbooks as a deterrent to enrolling in college or pursuing higher education. Increasing monies available to students to spend on tuition dollars ultimately expands the number of credits a college student can enroll in while pursuing their college degree. During the time of this study, educational scholars with interests in the topic areas of student satisfaction,

teacher satisfaction, and engagement were actively researching open educational resources. However, researchers had yet to study the long-term use of open educational resources and impact of those resources on student learning (Wen & Liu, 2016). Open educational resources are fragile and have a limited lifespan, usually two to five years (Atkins, Brown, & Hammond, 2007). This short lifespan of materials meant that educators using open educational resources would potentially need to replace elements on a regular basis and continuously curate a collection of materials appropriate for their course curriculum. This continuous curation of materials would add additional work for instructors that traditional learning materials such as conventional textbooks would not require. However, the recurrently updating of open educational resources has minimal cost associations for students and educators. This continuous updating of resources is a strength of open educational resources. As the materials are continuously updated, the content remains up to date, and the resources used in a course remain accurate. Traditional textbooks, on the other hand, require students to purchase updated text volumes every few years, even when the content changes are minimal (Grasgreen, 2014). However, unlike the updating of open educational resources, the updates to traditional textbooks increase educational costs for students using the materials.

The overall costs associated with attending college had increased dramatically in recent years, including a considerable rise in textbook costs. Book prices rose 89% from 2002 to 2012 for the average college student, and this dramatic increase in price dramatically influenced students' ability to purchase necessary learning materials needed to be successful in college coursework (Chismar, 2015). However, it was reported in 2016 that textbook costs for students had decreased by 53% since 2007 (Hill, 2016). It can be inferred that the lowering of textbook costs was related to rental programs and the expansion of open educational resources. In 2012,

65% of college students opted against buying a textbook, with their decisions directly related to the cost of the book (Baum et al., 2012). During the 2011-2012 academic year, the average American college student reported that he or she spent over \$1,000 per year on textbooks and other necessary supplies (Baum et al., 2012). In 2016, the average two-year college student spent \$1,390 on textbooks and other necessary supplies; in comparison, these students spent \$3,520 on tuition (CollegeBoard). Community colleges have stated that textbooks costs could total more than a student's tuition (Grasgreen, 2014). To help offset textbook costs and thereby reduce the overall cost of education for students, various faculty at institutions of higher education have begun to use open educational resources as an alternative to traditional textbooks (Baum et al., 2012; Grasgreen, 2014; Zalaznick, 2014). Open educational resources were instrumental in the efforts to lower the cost of education for college students. Researchers found that students enjoy openly sourced courses and perceived value in open educational resources (Hilton, Gaudet, Clark, Robinson, & Wiley, 2013; Lindshield & Adhikari, 2013). It is unknown to researchers how individual students perceive their learning in openly sourced courses or how open educational resources affect student learning. Open educational resources influence the curriculum development of college courses (Atkins et al., 2007). Scholars defined open educational resources (OER) as an educational or learning material that was is available for educational use, and the user may adapt, share, and reuse (Atkins et al., 2007). The increased usage of the open educational resources changes the landscape of higher education (Atkins et al., 2007). Open educational resources mean that learning materials used in college classrooms are no longer limited to traditional, printed textbooks that are purchased or rented from college bookstores; instead, learning materials can take any form from electronic to print and can be authored by any individual with knowledge of the course content and access to a computer.

Open content is both an exciting and a concerning turn of events, as educators want to ensure that student learning experiences remain the same whether a student uses open educational resources or traditional textbooks (Wiley & Green, 2012). Primarily designed for use in online courses, open educational resources are adaptable for seated, in-person, and hybrid courses. The content of open educational resources is a useful supplement to traditional learning materials and an alternative to conventional textbooks (Wiley & Green, 2012).

Massachusetts Institute of Technology (MIT) spearheaded the first rendition of open educational resources by sharing information in an open or free format in 2001. In 2001, MIT invested 100 million dollars into the Open Course Ware project. This project would see the university offer 500 courses over a two-year period to the public free (Goldberg, 2001). At its inception, the Open Course Ware project was revolutionary, and MIT felt the plan was the best way for their institution to meet the demands for online education. Open Course Ware students would not receive college credit for their work, and faculty participation took place on a voluntary basis (Goldberg, 2001). While MIT was finalizing their Open Course Ware project, The United Nations Educational, Scientific and Cultural Organization (UNESCO) developed a formal definition for open educational resources. UNESCO defined open educational resources as “the open provision of educational resources, enabled by information and communication technologies, for consultation, use, and adoption by a community of users for non-commercial purposes” (UNESCO, 2002, p. 26).

The steady expansion of open educational resources meant it became imperative that educators and curriculum developers copyright materials they developed. The Creative Commons license met these needs and, assisted teachers, and curriculum developers in copyrighting the open educational resources that they created (Willems & Bossu, 2012). This

license was the first copyright or patent license explicitly designed for learning materials developed using open educational resources and quickly became the standard license for these learning materials (Willems & Bossu, 2012). The Creative Commons license was flexible and easy for users and educators to understand. The simplicity and ease of use assisted the permit in gaining momentum and remaining the standard license for open educational resources for the last twenty years (Willems & Bossu, 2012). Under the Creative Commons license, teachers could share their personally developed learning materials with confidence, knowing they would maintain ownership of their content (Bissell, 2009). Educators' believed that their ideas, learning materials, and resources were safe under the Creative Commons license also increased the license's stature in the world of education (Bissell, 2009). The development and increased usage of the Creative Commons license allowed for the expansion of free content; the expansion of open material played a critical role in effectiveness and success of Massive Open Online Courses (Miyazoe & Anderson, 2013).

Massive Open Online Courses (MOOCs) enroll students in an online curriculum that contains content similar to that taught in college credit-bearing courses. The Massachusetts Institute of Technology founded the MOOC, allowing students to enroll in virtual versions of credit-bearing courses free of charge under their Open Course Ware project. The open content method was widely used to launch the openly sourced courses that evolved into MOOCs. MIT was already very well versed in the development and use of open software. They took their knowledge of open software development and applied to it to the development and advancement of open education (Goldberg, 2001). By 2012, the New York Times declared 2012 the year of MOOCs (Miyazoe & Anderson, 2013).

The advancement of open educational resources called into question the strength of

educational pedagogies used in relation to open educational resources. Scholars believed that strict pedagogies were needed for open educational resources to remain at the forefront of higher education. Pedagogy should not be lost because a format or learning material changed (Ribble & Miller, 2013). Pedagogies demonstrated in online classrooms should be equivalent to those pedagogies used in seated courses; the use of pedagogies ensures that similar student experiences take place in the online class as in the traditional seated classroom. Furthermore, appropriate use of pedagogy assists in the continued proper use of open educational resources. Ribble and Miller (2013) believed that pedagogy must remain at the front of conversations related to education given the rising use of technology in college classrooms. Ribble and Miller were concerned that increased use of technology in education would lead to classroom settings in which pedagogy was regularly ignored by instructors or loosely applied to course curriculum. As their research found, there is no replacement for proper instruction, but technology can help to make the classroom experience more efficient. According to Ribble and Miller, for educators to maintain pedagogy, open educational resources and learning materials need to follow the same implementation processes that educators use when introducing traditional learning materials such as textbooks to the classroom or course curriculum.

Open educational resources are a potential replacement traditional learning materials in the classroom. Educators and scholars at times referred to open educational resources as virtual learning tools (Miyazoe & Anderson, 2013). Transitioning courses from traditional learning materials such as textbooks to open educational resources allows for a decrease in the cost of education for students. This decrease in the cost of education for students is one of the initial expectations and motivations for the use of open educational resources in classrooms (Schlicht, 2013). Open educational resources allow educators to instruct courses without the needed

traditional book; this elimination of the conventional textbooks will enable students to have low or no cost for learning materials associated with the class. Studies have shown that students, educators, and administrators have supported open educational resources in higher education. However, the majority of the research connected to the use of open educational resources has been attached to the economic value of open educational resources (Baturay, 2011; Wighting, 2011). The implementation of open educational resources in college classrooms lowers the overall cost of education for students, but it also provides additional incentives to instructors. Instructors using open educational resources also experience increased academic freedom when using the resources (Wen & Liu, 2016). Ultimately, the lower cost of education for students and the increased academic freedom of instructors mean that student' abilities to access education increase with the use of open educational resources (Wen & Liu, 2016). Low-income students review the anticipated cost of attendance and often opt not to pursue higher education due to the costs associated with attending college (Hill, 2016). Reduction of textbook costs would assist all students, including low-income students, in accessing education. Student access to education is a common and vital concern for college administrators (Chismar, 2015).

The theoretical framework at the core of this study revolves around perceptual learning. Three theories are highly relevant to the topic of perceptual learning. Gibson (1971) and Rovai et al. (2009) described perceptual learning; Gibson (1971) described perceptual learning or perceived learning as the starting point of knowledge, and Rovai et al. (2009) used the CAP perceived learning theory to measure cognitive, affective, and psychomotor learning. The (CAP) perceived the research instrument referred to, as CAP perceived learning scale, measures learning theory. The CAP perceived learning scale measures perceived learning and the subscales of learning which for this study were cognitive learning, affective learning, and

psychomotor learning. The cognitive, affective, and psychomotor (CAP) perceived learning theory provided the framework for the following research by offering an approach and research instrument to measure the perceived learning scores of students participating in this study. These learning domains allowed for a complete understanding of an individual student's perceptions of learning in a given course (Rovai et al., 2009, p. 60).

Bloom's Taxonomy further aligns with the CAP perceived learning theory as Bloom's work also provides an additional definition of perceived learning. Rovai et al. (2009) and Bloom et al. (1956) both identified three sub-domains of perceived learning; they are as follows: cognitive learning, affective learning, and psychomotor learning. For this study, only the affective learning sub-domain and perceived learning serve as the independent variables of interest. Rovai et al. (2009) referred to cognitive learning as the ability to recall information, and Bloom et al. (1956) explained cognitive learning as the intellectual capacity to "think". Affective learning by Bloom's standard is a student's attitude or feelings to a subject (2009); Rovai et al. (2009) referenced affective learning as the ability to understand a subject. The last sub-domain of perceived learning mentioned by Rovai et al. (2009) and Bloom et al. (1956) is the psychomotor domain. Rovai et al.'s (2009) version of the psychomotor domain is the ability to perform a task after class instruction; Bloom et al.'s (1956) description of psychomotor learning is the ability to perform a function.

In addition to the CAP perceived learning theory, Gibson's (1971) theory of perceptual learning was also relevant to this study. Gibson defined perceptual learning as, "an increased ability to detect information, specify affordances, events, and distinctive features" (Gibson, 1971, p. 358). According to Gibson (1992), perceptual learning is the crucial element to knowledge and the starting point of the learning process. Students should be able to extract or select

relevant information on a topic after completing coursework. The CAP perceived learning scale measures students' perception of the information they have extracted from a given course based on a series of statements in which students' responses are measured on a Likert scale.

Extraction of information for a given course takes place through the learning materials used by students. Learning materials served as the independent variable for this study; specific learning materials of interest were traditional textbooks and open educational resources. Traditional textbooks are printed tools for learning in a particular subject (Gerhart et al., 2015); open educational resources are teaching materials that are freely available for educators and students to use, adapt, share, and reuse (Atkins et al., 2007). The CAP perceived learning theory, Bloom's taxonomy, and Gibson's (1971) theory of perceptual learning assisted the researcher in understanding how students learn in classrooms using open educational resources. The research questions for this study were guided by the theories explained above.

### **Problem Statement**

College administrators are increasing the use of open educational resources to improve access to education for community college students (Alves et al., 2014). The increased presence open educational resources in college classrooms are being addressed in research with scholars reviewing the economic influence of open educational resources on college access (Hilton, Gaudet, Clark, Robinson, & Wiley, 2014; Wen & Liu, 2016). Researchers have further investigated the implementation process and barriers to implementation as well as educators' motivation to use open educational resources (Algers & Silva-Fletcher, 2015; Pawlyshyn et al., 2013; Richter & McPherson, 2012). Researchers have explored the accessibility of open educational resources and students' observed value of open educational resources in the college classroom (Andrade et al., 2013; Schlicht, 2013). While these investigations are valuable, there

is a need for a study to examine student's perceived learning in classrooms using open educational resources (Hilton et al., 2013). We do not have substantial evidence that open educational resources have an impact on student learning (Hilton et al., 2013).

Identifying students perceive learning will specifically affect community colleges as investigating student learning in open educational resources will allow administrators to make impactful and informed decisions related to the implementation of open educational resources at community colleges (Shear, Means, & Lundh, 2015). Literature supports the demand for additional research in relation to open educational resources and the impact of the resources on student learning. Hilton et al. (2013) suggested that further research is necessary to understand students' perceptions of open educational resources. However, it is not known if the students grounded their opinions on the resources based on their learning experiences or the economic impact of the resources.

Understanding students' perceptions in classrooms, using open educational resources will assist the expansion of the resources on college campuses. The Research on Open Report further explained future impact studies should include a counterfactual and measure outcomes by control groups (Shear et al., 2015). Shear et al. (2015) suggested in the Research on Open that, "additional controlled impact of studies on establishing learning impacts of open educational resources in comparison with other digital or more traditional materials in a variety of settings" (p.52). This study will meet the suggestions set forth by the Research on Open report and will expand upon the existing literature related to the learning materials. The problem this study addresses is that students enrolled in community college courses that use open educational resources may perceive learning differently than peers enrolled in courses using traditional textbooks.

### **Purpose Statement**

The purpose of this causal-comparative study was to determine if students using open sourced material perceived learning differently from their peers using traditional learning materials such as textbooks. The dependent variables for this study were perceived learning, and affective learning as measured by the CAP Perceived Learning Scale. Perceived learning is the knowledge that a student believes they are learning as opposed to learning measured by in-class assessments (Wighting, 2011). Perceived learning is comprised of the three sub-domains of learning that include cognitive learning, affective learning, and psychomotor learning (Rovai et al., 2009, p. 65). Cognitive learning is the ability to recall information and the ability of a student to “think”, and affective learning is a student’s ability to understand course content and a student’s attitude towards feelings. Psychomotor learning is the ability of a student to perform a task (Bloom et al., 1956; Rovai et al., 2009). The independent variables for this study were traditional textbooks and open educational resources. The accepted definition of open educational resources is an educational or learning materials that are freely available for educators and students to use, adapt, share, and reuse as necessary (Atkins, Brown, & Hammond, 2007). Traditional textbooks are printed learning materials used for course instruction (Gerhart et al., 2015).

The sample for this study was a volunteer, convenience sample of first-year college students. All of the participating students completed a first-year seminar course during the fall 2016 semester at community colleges located in the southeastern region of the United States. At the time of this study, community colleges in the southeast region of the United States provide incentives for educators to develop courses using open educational resources (Whissemore, 2015). Therefore, the purpose of this study is to assist educators in expanding their

understanding of students' perceived learning as it relates to courses using the open educational resource and to provide data to aid with decisions related to the utilization of open educational resources in community college courses.

### **Significance of the Study**

This study expanded the limited body of research on the topic of open educational resources and students' perception of open educational resources. Additionally, this study sought to address a gap regarding the lack of the theory-based research on open educational resources. Additionally, this study expanded upon existing literature regarding adult learners and open educational resources. Alves, Miranda, and Morais (2014) found that open educational resources increase a student's ability to access information and learning materials needed for courses. Surveys have further indicated that the cost of textbooks negatively impact students' learning as students receive lower grades if they do not purchase textbooks, and furthermore, students textbook costs may affect a student's ability to graduate (Hill, 2016).

Algers and Silva-Fletcher (2015) stated, "Recent studies have analyzed the enablers and inhibitors of sharing open educational resources, without regard to the subject" (p. 35).

Indicating that although educators are using and sharing open educational resources in their classrooms and assessing the processes of sharing and student access, they are not researching the impact of these resources on student learning. Educators should evaluate open educational resources regarding student learning and the benefits that the open educational resources may provide to students. Therefore, teachers can make informed and data-driven decisions related to learning materials used in classrooms (Alves et al., 2014). Developing a deeper understanding of students' perceptions and perceived learning in openly sourced classes will allow educators to more efficiently utilize the resources and implement the resources into college courses.

The findings of this study will enable researchers to have an improved understanding of students' perceptions and perceived learning in classrooms using open educational resources. Hilton et al. (2013) believed that future research should focus on open educational resources because it influences students' access to other resources for their courses. Researchers are aware that the financial impact of using open educational resources in the classroom is beneficial to students. Nevertheless, researchers do not understand the impact of open educational resources on perceived learning of students and their learning experience. Understanding this impact would assist educators in adapting more courses to use open educational resources and to make informed decisions related to the implementation of the learning materials into college courses.

### **Research Questions**

**RQ1:** Is there a statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

**RQ2:** Is there a statistically significant difference in overall affective learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

### **Definitions**

1. *Community colleges in the Southeastern region of the United States* - The community college system that consists of 23 community colleges (Virginia Community College System, 2016).
2. *Face-to-face classes* - Face-to-face classes are classes in a classroom that an instructor can control in both online and face-to-face formats (Ganesh, Paswan, & Qin, 2015, p. 70).
3. *First-year seminar* – The first-year seminar is a one-credit hour course required for most first-year students or students with less than 24 transfer credits enrolling in a degree program

at community colleges in the southeastern region of the United States. (Virginia Community College System, 2016).

4. *Hybrid classes* - A hybrid class is “a course that combines elements of face-to-face instruction with elements of distance learning” (Lorenzetti, 2004, p. 7).
5. *Non-traditional students* - Non-traditional students are defined as students aged 25 years and older (Jinkens, 2009, p. 979).
6. *Online/distance education classes* - Online or distance education classes are classes in a classroom where instruction takes place over space and time the students and teacher were separated from one another by location (Finley, 2005, p. 35).
7. *Open educational resources* - Open educational resources are defined as any teaching materials that are freely available for educational purposes and may be used, adapted, shared, and reused (Atkins et al., 2007, p. 4).
8. *Perceived learning* - Perceived learning is comprised of the following three factors: cognitive learning, affective learning, and psychomotor learning (Rovai et al., 2009, p. 65).
9. *Traditional students* - Traditional students are defined as students aged 17-25 years of age (Tennant, 2014, p. 18).
10. *Traditional textbooks* - Traditional textbooks occupy a unique role in education and are defined as printed books used for course instruction, course readings, and exercises (Gerhart, Peak, & Prybutok, 2015, p. 92).
11. *Z-degree programs* - Z-degree programs are an initiative that allows community college students to complete their associate degree programs with no textbook costs (Spectrum, 2015, p. 5).

## CHAPTER TWO: LITERATURE REVIEW

### Overview

The following chapter provides background information regarding open educational resources and their influence on higher education. Furthermore, the section will present theoretical framework including the cognitive, affective, and psychomotor learning theories, Bloom's Taxonomy, as well as Gibson's theory of perceptual learning. The history, conceptual framework, the first-year experience of college students, the progression of online education, textbooks costs, open textbook publishing, and current topics related to open educational resources are all relevant to this study.

As of late 2016, only a minimal number of studies related to the utilization of open educational resources in community college classrooms were completed and published and therefore available to researchers to review (Wen & Liu, 2016). Perceived learning in online classes and face-to-face classrooms using traditional textbooks was a topic favored by scholars researching educational technologies and online learning formats. These themes were meticulously studied and investigated by social scientists during the period leading up to this study (Rovai et al., 2009). However, the vast majority of these studies did not include the use of open educational resources as part of the research. Moreover, relevant studies in the following areas did include online education: traditional versus non-traditional student experiences, sense of community in online coursework, and online instruction (Lindshield & Adhikari, 2013). These studies excluded the use of open educational resources, and none assessed students' perceived cognitive, affective, and psychomotor learning. Also excluded from these studies were data focusing specifically on the experiences of traditional and non-traditional students as well as minority students' perceptions of open educational resources (Flowers, Flowers, Flowers,

& Moore, 2014). Instead, the bulk of research on open educational resources concentrated on student and educator satisfaction with the available learning materials (Algers & Silva-Fletcher, 2015). Furthermore, student and instructor satisfaction research focused on the cost saving opportunities of open educational resources. It is imperative that for open educational resources to continue to gain momentum as a strong instructional tool and a viable substitute for traditional textbooks, researchers and educators need to develop an understanding of students' perceptions of learning in openly sourced courses (Alves et al., 2014).

The rising cost of higher education led to the open educational resources movement (Wen & Liu, 2016). The increasing costs of tuition, textbooks, and materials promoted some students to forgo a college education; however, open educational resources had proven to lower educational costs for students (Wen & Liu, 2016). Colleges benefit significantly from developing courses using open educational resources in place of or in complement to traditional textbooks. Lowering the costs of books also reduces the overall cost of education for students, thereby allowing more students to enroll in college courses and potentially increasing enrollments for colleges. Initially designed for distance learning courses, open educational resources proved successful in traditional seated classes and as a viable alternative to conventional textbooks (Daniel & Killion, 2012).

### **Theoretical Framework**

This study utilized the Cognitive Affective Psychomotor (CAP) Perceived Learning Scale as a research instrument. The CAP Perceived Learning Scale was designed to measure a student's perceived learning in a course regardless of the course's instructional modality. Instructional modalities for this study were as follows, traditional seated face-to-face courses and distance-learning courses. Rovai extensively studied student learning in preparation for the

development of the CAP Perceived Learning Scale. Rovai et al. (2009) determined from his research that perceived learning included three sub-levels: cognitive learning, affective learning, and psychomotor learning (Rovai et al., 2009, p. 65). Rovai believed that perceived learning was the combination of a student's ability to learn at the cognitive, affective, and psychomotor learning levels. A researcher found that there were stark differences between perceived learning of students enrolled in traditional classrooms and their virtual or online counterparts (Thapliyal, 2014, p. 60).

In 2009, a group of researchers conducted the first study on perceived learning in a distance learning classroom (Rovai et al., 2009). For this research project, participants completed a self-report learning scale. It took the scholars three phases of research to develop the CAP Perceived Learning Scale. The first step in the instrument's development involved 142 participants, and 80-item questions that correlated to the three domains of perceived learning were measured by the CAP Perceived Learning Scale. The second phase of the instrument's development involved 171 participants and a smaller 21-item set of questions. The third and final phase of development included nine-item questions and 221 participants. The Learning Loss Scale measured the validity of the cognitive learning domain while the Affective Learning Scale measured the efficacy of the affective learning domain (Rovai et al., 2009).

Participants in the research were graduate students enrolled in face-to-face and distance learning courses. Through the study, researchers found that students did perceive learning differently in distance education formats as compared to face-to-face formats. Cognitive, affective, and psychomotor learning is relevant to this study as understanding these levels of learning assisted in furthering the research on student's perceived learning in classes using open educational resources.

## Perceived Learning

Rovai et al. (2009) referred to perceived learning as the combination of three overlapping learning domains. These domains were cognitive learning, affective learning, and psychomotor learning. Rovai developed the CAP perceived learning scale as alternative assessments for student learning that did not rely on a course grade. Traditional grades were not a reliable measure of student learning (Rovai et al., 2009). Rovai developed the CAP perceived learning scale to measure the three domains of perceived learning. The CAP perceived learning scale was one of the first research instruments to measure individual students cognitive learning, affective learning, and psychomotor learning.

While Rovai referred to perceived learning as the combination of learning domains, Gibson believed that perceived learning was the analysis of what can be learned (Adolph & Kretch, 2015). Gibson spent over 70 years researching perceived learning in humans and animals and continually developed the theory of perceptual learning. Gibson (1992) found that perceptual learning is the ability of a person to learn to extract information out of the visual data environment. The learning environment provides an abundance of material for individuals so that they can expand their knowledge throughout their lifetime. For instance, when a child is first born, the sounds they hear are only a sound. However, over time they will learn to differentiate voices from sound especially voices they hear over an extended period. The same learning process takes place in classrooms. The perceptual learning process takes place over the duration of a class. When students are first exposed to the new curriculum, students require time to process the information and to expand their knowledge through the learning process. Students have achieved perceptual learning when they can differentiate information that is taught in the classroom (Gibson, 1992). Gibson (1971) further stated that the search for knowledge (learning)

was as integral to animals and humans as breathing. Perceptual learning is the starting point of the learning process (Adolph & Kretch, 2015, p. 130).

### **Cognitive Learning**

Cognitive learning is one of the learning domains of perceived learning in Rovai's research, and for the proceeding study, is referenced as the ability to recall information (Rovai et al., 2009). The Bloom's Taxonomy lists six competency levels to cognitive learning; they are: creating, evaluating, analyzing, applying, understanding, and remembering (Bloom et al., 1956). Ursani, Memon, and Chowdhury (2014) also defined the six competency levels of cognitive learning based on Bloom's work as remodeling, understanding, application, analyzing, creating, and evaluating (p. 170). Remodeling or creating is the attitude to recreate strategies and ideas; understanding is the ability to comprehend the content of a course. Analyzing is the capacity to examine course content; creating is the capacity to generate one's ideas from information presented in the classroom. The last level of cognitive learning is the ability to evaluate or remember content learned in the course and apply the new knowledge into everyday life.

### **Affective Learning**

Evans, Ziaian, Sawyer, and Gillham (2013) explained that "affective objectives refer to the acquisition of an appropriate level of internalization or value of content" (p. 24). Affective learning in this study is a complement to cognitive learning and an aspect of perceived learning. Affective learning assists in optimizing cognitive learning and critical thinking skills in some students (Evans et al., 2013). Researchers Birbeck and Andre (2009) explained that three actions are necessary for educators to create an appropriate affective learning environment. First, teachers ought to be acutely aware of their interactions with students. Being acutely aware of the students will assist educators in understanding and observing the student learning process.

Secondly, teachers should engage students in conversations regarding the topic of the subject of the course subject and make students understand injustice. Keeping the students occupied and engaged with course content will increase their learning potential. Lastly, educators must create an environment in which students participate in their understanding and development of feelings, emotions, and ideas (Evans et al., 2013). If educators follow these steps, they will create a pleasant affective learning environment.

### **Psychomotor Learning**

Psychomotor learning is another aspect of Rovai's et al.'s (2009) perceived learning concept. Psychomotor learning is the ability of students to perform tasks and incorporate learning with completing tasks. Psychomotor learning is hard to assess outside of specific content area research instruments (Rovai et al., 2009). Students proficient in psychomotor learning could master missions in the classroom such as playing an instrument, duplicating a function, or balancing a checkbook (Singer & Cauraugh, 1985, p. 117). Psychomotor learning traditionally takes place in a five-step process of perception, instructor or educator guided responses, the ability to perform the learned task without the assistance of the instructor or educator, the ability to react and use the skill in a changing scenario, and the ability to develop new skills based on the newly learned activity (Simpson, 1971).

### **Related Literature**

The principal goal of this study was to contribute to the existing body of research and literature related to open educational resources and openly sourced classes. This study addressed a gap in the literature related to open educational resources concentrating on the perceived learning of community college students using the resources in their college coursework. The CAP Perceived Learning Scale measured students' perceptions of learning and the sub-scales of

perceived learning, which were cognitive, affective, and psychomotor learning (Rovai et al., 2009). These sub-scales were also the three learning domains of perceived learning. This study focused specifically on first-year seminar courses offered at community colleges in the southeastern region of the United States. These first-year seminar courses assisted first-year college students with their transition to college. Because community colleges had become the main artery to higher education in the United States, it is crucial that educators remain knowledgeable on educational trends (Sanchez & Laanan, 1998). Students experience an immense amount of change during their first year of college. Colleges are learning to deal with an increasingly diverse student population on campus. While at the same time, colleges are growing and learning as the face of higher education changes, becoming more open and accessible to individuals wishing to pursue their educational goals (Keup, 2008).

A college education no longer occurs only in traditional seated classrooms, and therefore, learning materials used in college courses are shifting to meet the changing needs of an increasingly diverse set of learners. College classes now regularly happen in someone's office, a dining room, a bedroom, public spaces, and anywhere that WiFi is available. Distance learning has grown to 13 million undergraduate students in 2014 (U.S. Department of Education, National Center for Education Statistics, 2014). Although online learning has expanded opportunities for students to pursue higher education, the rising cost of textbooks affects community college students' ability to access these educational opportunities. Due to financial reasons, some students reported that they opt to forgo purchasing textbooks for their college courses. In response, educators began using open educational resources in classrooms as a viable alternative to traditional textbooks. Open educational resources decrease the cost of education for students and allow teachers the freedom to develop their course curriculum (Hilton et al., 2014; Schlicht,

2013). The education community hopes that the increased use of open educational resources will positively benefit the student and instructor of a given course (Schlicht, 2013).

### **Cognitive, Affective, and Psychomotor Learning**

The CAP Perceived Learning Scale classifies perceived learning into three sub-levels: cognitive, affective, and psychomotor learning. Each of these sub-levels is connected to Bloom's Taxonomy and the categories of learning analyzed in Bloom's research. Researchers made a variety of determinations related to the six levels of cognitive learning within Bloom's Taxonomy. Ursani et al. (2014), with Bloom's Taxonomy taken into consideration, defined cognitive levels of learning as remodeling, understanding, analyzing, applying, creating, and evaluating. Callens (2014) also cited Bloom's Taxonomy related to cognitive learning; Callens described the levels of cognitive learning as remember, understand, apply and analyze, and evaluate. Ursani et al. (2014) referred to remodeling or comprehension as the "ability to recall information and recreate strategies" (p. 164). Callens also denoted the first stage of the cognitive learning process as remember and stated that the first phase was the foundational aspect of the cognitive process. "Remembering knowledge is integrated within the larger task of constructing new knowledge or solving new problems" (Callens, 2014). The remember phase of cognitive learning is assessed by the student's ability to answer questions based on coursework and course materials (Callens, 2014).

Ursani et al. (2014) further defined remodeling into a second level of learning referred to as comprehension. The comprehension level separated into three tiers: interpretation, translation, and estimation. Ursani et al. (2014) defined interpretation as a student's ability to understand a definition, translation as the capacity to rewrite or transform concepts, and estimation as a student's ability to "establish relationships between system's input and output" (p. 164).

Anderson et al. (2000) and Callens (2014) defined the second level of learning as understanding. Anderson et al. (2000) stated, “Students understand when they build connections between the new knowledge to be gained and their prior knowledge” (p. 70). Callens (2014) explained that within the understanding level of learning is where meaningful learning for the student takes place.

Callens (2014) further defined the third and fourth levels of cognitive learning as application and analysis. Callens additionally described the application level as a student’s ability to separate ideas into segments and analysis as a student’s ability to separate ideas that they learned in a course (Ursani et al., 2014). Callens (2014) combined similar concepts to Ursani et al. (2014) into a level of learning described as applying and analyzing. Callens (2014) defined the applying category as the ability of a student to execute familiar and unfamiliar tasks to develop solutions to questions or problems. Callens further described the analyze level of learning as a student’s ability to comprehend course material and utilize what they learned to solve complex problems. “Analyze involves breaking materials into its consistent parts and determining how the parts are related to one another and to the overall” (as cited in Anderson et al., 2000, p. 79).

Callens stated, “Evaluate is defined as making judgments based on criteria and standards. The criteria most often used are quality, effectiveness, efficiency, and consistency” (Callens, 2014, p. 20). Ursani et al. (2014) and Callens (2014) defined the fifth level of learning as evaluation. Ursani et al. (2014) described evaluate as a “post-synthesis skills” and the highest level of cognitive learning (p. 164). Callens (2014) followed the definition of Anderson et al. (2000) for the evaluation level of learning. Callens (2014) defined the final level of cognitive learning as create and believed that creativity was the highest level of cognitive learning.

Creation is a student's ability to put together concepts learned to come to their conclusion.

Synthesis serves as the final level of cognitive learning. The synthesis is the student's ability to "rearrange component ideas into a new whole or put ideas together" (Ursani et al., 2014, p. 167).

Affective learning is the ability of a student to understand and value the content of a given course. Gaffney and Dannels (2015) stated, "Affective learning is a construct that allows teachers to verify that indeed they have inspired their students and possibly involved their students though teachers rarely have the opportunity to see the long-term effects associated with teaching" (p. 500). Researchers Thweatt and Wrench (2015) outlined five sub-levels of affective learning. The first of these sub-levels is receiving or the student's willingness to attend the course. The second sub-level of affective learning is responding or the student's desire to engage in a class. The third sub-level of affective learning is valuing or a student's ability to see the significance of the coursework they are studying. The fourth sub-level of affective learning is organizing or students' ability to compare and contrast the ideas taught in the course to develop their opinion on the topics in question. The fifth and final sub-level of affective learning is characterization by students using their value set or value system to make decisions regarding coursework (Thweatt & Wrench, 2015).

Myers and Goodboy (2015) contended that a student could not appreciate a course's material without paying attention to coursework and content. Affective learning takes place when students find their value in what they have learned. Myers and Goodboy (2015) continued that previous research related to affective learning had been misguided. Previous research focused on students' appreciation of their educators and their enjoyment of the course content. Affective learning truly takes place when a student obtains, strengthens, or modifies their values or attitudes associated with affective learning domain (Witt, 2015). A pre/post-test assessment

of information related to affective learning outcomes in a course measures a student's affective learning level. Affective learning exists when lasting internalization of course content has occurred.

Affective learning takes place when coursework has a lasting effect on a student's education; however, the concept of psychomotor learning is vastly different. Ofoha (2015) explained that psychomotor learning refers to skills that involve practical work or learning by doing. Singer and Cauraugh (1985) defined psychomotor learning as a student's ability to perform a task. Psychomotor learning describes a learning process in which students can meet learning outcomes through tasks that involve movement (Xu & Ke, 2014). "Body movements and gestures help learners acquire cognitive knowledge through psychomotor tasks" (Xu & Ke, 2014, p. 2). Humans are able to use their brains to connect to skeletal functions that then enable them to perform tasks. Measuring a student's ability to perform tasks related to a course such as conducting experiments, reciting dialogue, and completing group assignments can assess psychomotor learning.

Cognitive, affective, and psychomotor learning together assist educators in understanding the process by which students perceive their learning process. Understanding how students' see their learning in open educational resources allows teachers to develop curriculum utilizing open educational resources that meet a student's needs and will have a lasting impact on their lives.

### **First-Year College Students**

A first-year student in college experiences not only immense change in their personal life but also in their learning process. Reason, Terenzini, and Domingo (2006) hoped to gain a greater understanding of the first-year transitional period for college students. First-year college students were defined for this research as students who had previously never enrolled in college

coursework (Jinkens, 2009). First-year college students could be traditional-aged students or non-traditional aged students. Traditional-aged students are students aged 17- 25 years of age (Tennant, 2014). Traditional-aged college students often have difficulties dealing with the transition to college. As of 2008, the majority of first-year colleges students are traditionally aged (Keup, 2008). College students born during the years 1982-2002 make up the majority of first-year university students; these students bring with them a variety of issues that college administrators had previously not experienced (Keup, 2008). The parents of first-year college students born during this time are more involved in their college-aged children's decisions and college experiences. Therefore, the parents of first-year students are actively engaging with college administrators (Cullaty, 2011). In addition to increased parental involvement, first-year college students were dealing with a highly diverse population of peers on campus. First-year college student populations include greater representations of vast cultures, religions, races, socioeconomic backgrounds, and varied high school communities (Keup, 2008). Researchers do not know how these changes in college population affect students, but first-year programs that met the needs of the changing population are being developed (Keup, 2008). Non-traditional college students are rapidly enrolling in higher education courses at local community colleges. Non-traditional college students are motivated to pursue higher education in hopes of advancing their careers. Enrolling in degree programs allows these students to receive promotions or start second careers (Jinkens, 2009, p. 979).

First-year college students experience an immense amount of change when beginning their educational journeys. Reason et al. (2006) followed a group of students throughout their first year of college and analyzed the strategies the students used to handle challenges. Their study surveyed 6,687 first-year students at 30 participating college campuses and utilized Astin's

inputs-environment-outputs approach as the theoretical framework for the research (Reason et al., 2006). The researchers found there was a multitude of forces that affected a student's first year in college. Additionally, the study found that a student's experience related to the amount of support they felt they had received from their respective colleges. Student support came in the form of staff, faculty, parents, or friends. Students who believed that they had a stable support system performed academically superior to those who thought they lacked a reliable support system. Students who engaged in the classroom and with the instructor performed better academically than their peers who did not engage with the college community. Faculty affected a student's first-year experience and was an essential and helpful influence on a student's overall college experience (Reason et al., 2006, p. 153). Lastly, it appeared that when institutions encouraged students to study and spend additional time on their coursework, students felt more engaged with the school and performed better academically (Reason et al., 2006).

A successful freshmen orientation course has a lasting impact on students' lives (Burgette & Magun-Jackson, 2008, p. 260). Orientation programs provide students with the skills needed to be successful in their collegiate careers. Dilekmen (2007) observed a group of students from the time they enrolled in first-year seminar courses to their respective graduation ceremonies four years later. Dilekmen (2007) researched the correlation between students enrolled in freshman seminars and minority student retention. At the end of the students' senior year, it was determined that minority students enrolled in the first-year seminars were 72 times more likely to graduate with a bachelor's degree (Dilekmen, 2007, p. 1142). First-year seminar courses instructed in a seated, face-to-face format are very efficient. These courses provide students skills that help students succeed in college. The research on first-year seminars has focused on courses taught in a face-to-face setting and excluded the experiences of students enrolled in

online or distance learning freshmen seminars.

### **Online Learning**

Many first-year students opt to take their freshmen seminar classes in an online format (Dilekmen, 2007). The Department of Defense developed the Internet in the late 1960s (Perry & Pilati, 2011). Initially designed for the military to share files and information confidentially, the Internet's usage increased exponentially in popularity and quickly entered homes across the world by the 20<sup>th</sup> century. Correspondence courses were the first variation of distance learning education; these courses provided instructional materials by way of the United States Postal Service. Students taking correspondence courses would receive work at their home addresses, complete their coursework, and then return their completed coursework to their respective institutions through the postal service. This format meant that for the first time, students could attend classes without ever visiting a traditional college campus (Perry & Pilati, 2011). Correspondence courses created the first virtual college campuses and courses. Students enrolled in correspondence courses needed to find test proctors on their own to administer their exams and other assessments. Locating a proctor could be a challenging and cumbersome task for distance learning students. Advances in distance learning allowed students to take their tests, courses, and assessments entirely online. These changes in distance learning permitted 1.6 million students to enroll in online and correspondence courses (Allen & Seaman, 2007). The online classrooms grew in popularity and increased access to higher education. The number of students enrolled in distance learning programs tripled over the 20<sup>th</sup> century. In 2014, U.S. Department of Education, National Center for Education Statistics (2014) reported that over 21 million students registered for courses in distance learning programs. Of these 21 million distance-learning students, 11 million were undergraduate students enrolled in entirely online

degree programs (U.S. Department of Education, National Center for Education Statistics, 2014). Brick and mortar institutions took notice and began to offer online courses and in some cases entirely online degrees during the early 2000s (Finley, 2005).

The emergence and expansion of distance learning meant a need for the development of resources to support the instructional format. According to Finley (2005), “Faculty teaching distance education courses must become proficient in communications technology employed in their distance learning course” (p. 35). Institutions of higher education began adding departments and professionals to their schools known as instructional technology specialists whose sole responsibility was to design online courses and to maintain learning management systems. The instructional technology profession began to support distance learning. Instructional technology professionals assisted instructors in creating courses in which instruction took “place over space and time that are physically separated from one another” (Finley, 2005, p. 35). The instructional technology theory was a “practice of design, development, utilization, management, and evaluation of process and resources for learning” (Seals & Richey, 1994, p. 1). Websites such as MERLOT and SLOAN-C were established with the purpose to aid instructors in the proper development of distance learning courses (Perry & Pilati, 2011, p. 96). There was an increase in academic journals that supported and promoted online learning research. These new journals included the *Journal of Distance Education*, the *Journal of Educators Online*, the *Internet and Higher Education*, and the *American Journal of Distance of Education* (Perry & Pilati, 2011, p. 96).

Modern institutions of higher education offer a variety of instructional formats for students to enroll in college-level courses. These forms include face-to-face classes, distance learning, hybrid, and intensive courses. Face-to-face classes are “a classroom that an instructor

can control in both an online and face-to-face format” (Ganesh et al., 2015, p. 18). Online or distance learning classrooms are “classrooms that the instructor can control in an online format only” (Ganesh et al., 2015, p. 18). A hybrid course sometimes referred to as a blended course, “is a course that combines elements of face-to-face instruction with elements of distance learning” (Lorenzetti, 2004, p. 7). An intensive or short course is a course that is “taught within an accelerated format [and] have been quite common in colleges and universities” (Kucsera, & Zimmaro, 2010, p. 62).

Online courses during the early 2010s used a combination of in-person and online components to successfully instruct classes (Perry & Pilati, 2011, p. 97). Using the elements of face-to-face and distance learning courses allow educators to use the best skills and technology for online instruction. Instructors of online courses find that they need to cultivate and maintain student engagement in online courses to ensure that students are academically successful in their coursework (Perry & Pilati, 2011, p. 101). Thapliyal (2014) found that students are more aware of the limitations of virtual courses as compared to face-to-face classes. Students enrolling in virtual and distance-learning courses realize they will have fewer interactions with their instructors and peers. Students in openly sourced distance education courses self-report as fully engaged compared to their peers in traditional classrooms. Students in distance-learning courses feel isolated and at times stated that the lack of human contact hampered their abilities in being successful in their coursework (Thapliyal, 2014, p. 64). Rovai and Barnum (2003) developed the Classroom Community tool to measure a student’s sense of community in distance learning classes, and it is regularly used in research studies (e.g., Exter, Korkmaz, Harlin, & Bichlmeyer, 2009; Ouzts, 2006; Wighting, 2011). Rovai and Barnum examined 328 graduate students enrolled in online education and leadership courses. Nineteen courses participated in the

research project, and BlackBoard was the learning management system for the courses. Rovai and Barnum (2003) found that active interactions between students and instructors in online courses correlated to a student's increased success in online coursework.

Substantial interactions between students and instructors are required for a student to be successful in their coursework (Rovai & Barnum, 2003, p. 59). Students enrolling in distance education courses also need to interact with their virtual peers. This interaction helps to alleviate the sense of isolation that students in distance-learning courses often report feeling. Learning management tools, blogs, and discussion boards assist students in engaging and communicating with each other. The more students engage with each other, the more likely they are to stay involved in the coursework, and thereby the more likely they are to complete the online course (Perry & Pilati, 2011, p. 99). Students enjoy the flexibility of distance education classrooms and the opportunity to select when and where they participate in their coursework. In many cases, students enrolling in distance-learning courses are able to maintain full-time employment while pursuing their education. Online courses are also appealing to college and university administrators (Perry & Pilati, 2011). University officials favor distance-learning programs as the classes allow institutions to increase their space utilization of on-campus classrooms. Online learning also allows colleges to advance program offerings by adding courses that are not instructed on campus (Perry & Pilati, 2011, p.102). Increased course offerings enable institutions to provide additional courses and degree programs. Ganesh et al. (2015) stated, "Some researchers even assert that distance learning could provide a superior learning experience for students" (p. 70). Advocates for online learning challenge that traditional classrooms are no longer the preferred form of instruction in the collegiate environment (Gao, 2014).

## **Traditional Classroom Learning**

While online learning continues to grow in popularity, there is still the need to provide students with traditional learning environments that are set in a seated classroom. Senior academic officers are inconclusive in their responses to student academic achievement in distance learning courses (Stack, 2015). Gao (2014) stated, “Traditional classrooms refer to rooms that consist of clean pastel-colored walls and rows of desks and chairs facing a lectern” (p. 48). The research team led by Gao (2014) described the two types of traditional classrooms as teacher-centered and learner-centered. The goal of teacher-centered classrooms is for the educator to perform the leading role in the classroom and for the students’ focus to be on absorbing what the instructor is saying. The goal of learner-centered classrooms is to pay attention to the students’ learning abilities and to concentrate on engaging the student in the classroom through active learning (Gao, 2014).

Traditional classes enable students to “get to know” classmates and their instructors, allowing students to fully engage in their learning experience (Hughes, Hagie, & Smith, 2005). In Hughes et al.’s (2005) study, students described their ability to work one-on-one with instructors, the structure of classes, and immediate responses from professors and peers as benefits to learning in the traditional classroom. These same students chose traditional classes because they did not think that they adequately learned from online coursework (Hughes et al., 2005).

## **Rising Costs of Textbooks**

The rising cost of textbooks is an issue for students in online classrooms and traditional classrooms. At community colleges, “textbooks can cost more than tuition”, (Zalaznick, 2014, p. 15), and book prices rose faster than the rate of inflation in the United States in the early 2010s

(Di Benedetto, 2014). The cost of textbooks increased by over 80% in the 2000s the textbook costs for an average college student for one academic year was \$1,200 in 2015 (Di Benedetto, 2014). According to Di Benedetto (2014), “From 2012 to 2013, the price of new college textbooks increased 82 percent- nearly three times the rate of inflation, according to a 2013 study from the U.S. Government Accountability Office” (p. 4). In the southeastern region of the United States, 42% of students in the state reported skipping buying books for at least one semester (Bull, 2006). For community college students, “the cost of textbooks can be up to 40% of the cost of tuition” (Whissemore, 2015, p. 8). Publishers often update older versions of textbooks slightly, and instructors then require students to purchase this slightly updated version of books. Di Benedetto (2014) stated, “The existence of rental programs is the direct result of how much books are costing students” (p. 4).

Early research indicates that textbook rentals reduce the cost of textbooks for college students. According to Zaghab and Beckenholdt (2014), “The Higher Education Opportunity Act of 2008 and political pressures in the United States contributed to the shift toward text-free and cost reduction in textbook prices” (p. 191). State political action groups have acted regarding textbook costs. A political action group referred to as Virginia 21 represents college students aged 18-26 and lobbies for legislature ensuring that “book lists were posted before classes began so students could compare costs with online vendors before deciding whether to purchase books from the campus bookstore or online vendors” (Dowling, 2013, p.1).

Congress attempted to reduce the costs of textbooks for college students by subsidizing textbook rental programs. Government officials hoped that the subsidization programs would allow students to see a steady decrease in the expenses of books and thereby a reduction in the overall cost of education. College bookstores eagerly participated in these programs, and the

book rental programs did save students money. College bookstores embraced book rental programs and adapted their sales models to include textbook rentals as an option for students. However, the effects were not long-lasting (Goral, 2010, p. 42), and the cost of textbook rentals began to increase slowly following the end of the government subsidization program. College bookstores analyzed their options related to open educational resources in the hopes to remain prosperous in the ever-changing educational environment (Goral, 2010, p. 43).

The rising cost of textbooks impairs students' ability to enroll in college courses and weakens their ability to complete a college degree. The Student Public Interest Research Groups (PIRGs) discovered that "the cost of textbooks impacted how many courses they (students) were able to take" (Whissemore, 2015, p. 7). Books and educational resources are necessary components for students to ensure completion of college coursework. Some students have to decide between enrolling in additional college courses and paying for textbooks. The same PIRGs study revealed, "If just one traditional textbook were replaced with an open book each year, students would save more than \$1.4 billion nationally" (Whissemore, 2015, p. 7). An estimated 65% of students at colleges avoid buying textbooks and as a result fall behind on their coursework (Whissemore, 2015, p. 8).

Federal regulations in 2010 mandated that bookstores and publishers disclose textbook prices to instructors during the textbook vetting period and textbook selection process (Ward, 2015). According to Ward (2015), "The regulations require publishers to disclose prices to faculty members and allow students to purchase books, CDs, and other supplemental material separately rather than as a bundle" (p. 14). Furthermore, bookstores are required to provide students with a list of all textbooks and supplies necessary for any given course. The U.S. Census reported that "in the fall of 2013, the college enrollment nationwide, declined by nearly

half a million students from 2012” (Salmon & Washington, 2014, p. 38). The decrease in fall 2013 enrollment numbers could have been related to “funding cuts, increased competition from MOOCs, and other low-cost online programs” (Opidee, 2014, p. 39).

### **Open Educational Resources**

Open educational resources provide an alternative to traditional learning materials and have the potential to lower the cost of education for students. Massachusetts Institute of Technology programmer Richard Stallman became frustrated with a Xerox source code that he was unable to manipulate to meet his business needs. Due to his frustration, he began to develop openly sourced software that fit his clients’ needs as well as his business needs. Stallman promised his customers that he would always openly share the software he developed with other developers. The open-sourced software was software that was free to users and readily adaptable for their use. Apache and Sendmail were open-sourced software that experienced animosity when they were initially introduced; developers became concerned about the impact that open-sourced software would have on software sales and their programming careers. However, the success of open-sourced software proved popular and soon became mainstream. By the early 2000s, open source software such as Firefox, Ubuntu, and Libre Office rose in usage (Wiley & Hilton, 2009, p. 3). Open-sourced software revolutionized the IT world and gave users access to software they otherwise would not be able to use (Wiley & Hilton, 2009).

In 1998, Wiley took the concept of openly sourced software and began researching reusable educational resources (Wiley & Hilton, 2009, p. 3). Wiley became enamored with the idea of publicly sourced software and developed a similar approach for the educational world. Wiley believed that the sharing of learning materials would strengthen the educational environment and allow educators to have healthy curriculum options in their classroom. Slowly,

Wiley began to apply the theory of open-sourced software to educational settings. By 1999, Wiley developed his open license for educational resources; he referred to this license as the Open Publication License (OPL). The OPL allowed educators to make copies and redistribute materials while still making appropriate attributions to the original authors (Wiley & Hilton, 2009, p. 82). Wiley used the OPL to open the Wiley Online Library. The Wiley Online Library is a website that allowed educators to prepare and share their materials in an open format (“Wiley Online Library about Us Open Access OnlineOpen- Wiley Online Library”, n.d.). ...

Lessig began researching open educational resources and copyright licensing options for learning materials. Ultimately, Lessig developed the Creative Commons License for open educational resources (Wen & Liu, 2016). The Creative Commons License was a mechanism that has provided “flexible protective licensing options for regulating how content creators and users publish share and reuse online shared materials” (Wen & Liu, 2016, p. 1954). As of 2016, the Creative Commons License still was associated with open educational resources (Wen & Liu, 2016). The Creative Commons website features a search engine that is user-friendly and allows educators to quickly search for curriculum specific resources (Wiley & Hilton, 2009, p.11). Using a copyright license was one of the ways teachers could permit their open-sourced work and maintain ownership of their work. The Creative Commons License became the premier copyright format for open-educational resources and assured the original author received appropriate credit.

The United Nations Educational Scientific and Cultural Organization (UNESCO) was the first organization to use the term open educational resources. Once UNESCO devised the term in 2002, educators began developing a growing interest in the understanding and adoption of open educational resources. There was no standard definition for open educational resources, but a

modern interpretation has been, “materials used to support education that may freely be accessed, reused, modified, and shared by anyone” (Downes, 2011, p.1). The William and Hewlett Foundation began researching open educational resources. Eventually, the William and Hewlett Foundation developed a definition of open educational resources as they pertained to higher education. The foundation defined open educational resources as:

Open educational resources are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools materials, or techniques used to support access to knowledge. (Atkins et al., 2007, p. 4)

Open Educational Resources (OER) are teaching and learning materials that are freely available online for everyone to use, whether an instructor, student, or self-learner. Open educational resources could include course modules, assignments, games, and many more resources contained in digital media collections from around the world (“Discover, Share, Create,” n.d.).

Open educational resources are usable in online classrooms as well as in face-to-face classrooms. Open educational resources are also adaptable to traditional, face-to-face classrooms. It is necessary that the resources are printable and readily available to be used in the face-to-face classrooms or readily available for students to locate (Downes, 2011). Hilton et al. (2014) found that students experience a significant reduction in educational costs utilizing open educational resources. Students in Hilton et al.’s (2014) study purchased open educational resources for \$90.61 in supplies for their semester course materials rather than the \$900 paid by

their counterparts using traditional textbooks (p. 68). The students in the study reported that they preferred the open educational resources to traditional textbooks. Students stated they preferred open educational resources to traditional textbooks due to the lower cost of the resources and the easy access to course materials needed to be successful.

The promise of readily available resources entices many educators to use open educational resources in their classrooms (Kelly, 2014). Educators were at first apprehensive in implementing open educational resources into the college courses. Richter and McPherson (2012) suggested that the vagueness of whether materials were suitable for collegiate courses or if the learning materials met the needs of learners' educational knowledge caused this apprehension. Another reason for uneasiness was educators' difficulty in evaluating the suitability of OERs for particular courses and the realizations that OER materials may provide either too much information or too little information for students and that the resources could be easily modified (Richter & McPherson, 2012).

Algers and Silva-Fletcher (2015) stated, "Educators' and students' attitudes towards sharing open educational resources are dependent on their motivation to share" (p. 35). Algers and Silva-Fletcher (2015) researched educators' motivation for developing and sharing open educational resources in animal science courses. They found that the instructors' motives to share open educational resources varied and their motivations were involved. Overall, "sharing and collaborating on the creation of OER is a social culture creating satisfaction for teaching staff in the otherwise solitary profession" (Algers & Silva-Fletcher, 2015, p. 36).

Algers and Silva-Fletcher's (2015) study indicated that educators prefer peer-reviewed open educational resources for their classrooms. Instructors thought that peer-reviewed, open educational resources were of a higher quality than openly-sourced learning materials found

randomly through Internet searches. The development of open educational resources did not seem to provide educators the incentives that they wanted such as praise or promotion (Algers & Silva-Fletcher, 2015). Mercy College established success in their implementation of open educational resources by providing participating educators with incentives such as small stipends as payment for their participation (Pawlyshyn et al., 2013). A literature review on knowledge sharing "indicated that individuals might tend not to share their knowledge in a virtual community because such sharing may incur many types of costs, including not only relinquishing the knowledge the knowledge" (Cabrera & Cabrera, 2002, p. 692). As educators increase their awareness of the concept open educational resources and licensing options, there is hope that the use of open educational resources will improve.

Research by Andrade et al. (2013) found that there are five main barriers for educators wishing to implement open educational resources at their institutions. The first barrier is a lack of college or institutional support in the implementation process. An educator cannot successfully introduce open educational resources into the college classroom without the assistance of an institution's senior administration. Students describe open educational resources as more enjoyable due to their affordability and accessibility (Schlicht, 2013). Rosen and Wolf (2011) found that there is potential for students from low achievement and low socioeconomic backgrounds to find success in coursework using open educational resources.

The second barrier to the implementation of open educational resources is a lack of technology skills to develop, adapt, and share resources. It is possible for educators to seek help from their institution's Instructional Technology or Information Systems departments to increase their technical understanding of the resources. The third barrier to implementation of open educational resources is a lack of time to develop resources. College administrators and

professors have minimal spare time to spend on new projects and do not always wish to spend valuable time developing open educational resources. The fourth barrier to implementation of open educational resources is the quality and sustainability of open educational resources. Open educational resources are highly efficient, yet the resources are extremely fragile and have a short lifespan. In order to increase the strength and lifespan of open educational resources, extensive collaboration needs to take place among the educators developing the materials. Cultures of sharing information already existed in education. However, these habits of sharing had barriers to overcome to exchange information in the global education arena. Collaboration among educators and scholars could aid in increasing the strength of open educational resources. The long-term effects of open educational resources on education still need to be researched at the time of the proceeding study; however, researchers continue to investigate open educational resources. The lifespan of open educational resources is two to five years. To increase the lifetime of open educational resources, staff, academics, and educational partners must work together to improve the capability, vigor, and lifecycle of these resources. Teamwork is essential to the increased usage of open educational resources in the modern college classroom (Schlicht, 2013). The fifth and final barrier to implementation is a lack of trust in the resources, skills, and staff (Hilton et al., 2014, p. 82). Providing instructors and institutions with additional training related to open educational resources assists with a seamless transition of resources and alleviates the fifth barrier to implementation.

Educational scholars thought that open educational resources are, “the key not only to solving the global education crisis but unlocking sustainable growth in the 21<sup>st</sup> century” (Daniel & Killion, 2012). Lowering the cost of education would allow increased access, and thereby the world could be educated. Additionally, many in the open educational resources movement

thought, "... that the educational institution functions as a barrier to the egalitarian acquisition of knowledge" (Knox, 2014, p. 830). However, Knox believed that the "OER Movement has overemphasized the removal of barriers as the principal concern of education" (p. 824). Knox (2014) argued that open educational resources proponents see the traditional university as a barrier and decidedly underestimate the role of the college instructor. In addition, the proponents hold that the open educational resources phenomenon is based on a self-directed learning module.

Mercy College began implementing open educational resources into first-year mathematics courses using funds they received from a Next Generation Grant. Before adopting open educational resources, the college opted to develop a steering committee that designated the named Kaleidoscope Open Course Initiative or KOCI for short. Mercy College chose to initiate a slow implementation of open educational resources into their first-year mathematics classrooms (Pawlyshyn et al., 2013). Students began the course with a traditional textbook and supplemental OER material. Pawlyshyn et al. (2013) recommended that open educational resources implementation start slowly and with an accessible introduction and training for faculty members. The Mercy College open educational resources implementation was successful. The college experienced an increase in retention, and students in courses using open educational resources reported that they were more motivated than their peers using traditional textbooks. Mercy College set the goal to eliminate textbooks entirely from the first-year mathematics course. "KOCI [OER] does more than saving students money; it might just be what students need for their future success" (Pawlyshyn et al., 2013). However, the investment of educators, administration, fundraisers, and students needs to meet this goal and to continue the success of the KOCI program (Alves et al., 2014, p. 17).

In addition to lowering the costs of education in the United States, open educational resources are an advantage to educators who were developing curriculum in third world countries (Harsasi, 2015). Open educational resources flatten the world, allowing all individuals the ability to obtain the same education no matter their geographic locations or socioeconomic status. Indonesia and the United Kingdom are both actively researching open educational resources (Harsasi, 2015; Hockings, Brett, & Terentjevs, 2012). Open educational resources are promoted by “global organizations such as UNESCO and the European Economic Community” (Hockings et al., 2012, p. 238).

### **Massive Open Online Courses**

The concept of open educational resources was greatly influenced by the Massive Open Online Course (MOOC) movement. The economic environment, rising textbook costs, increasing tuition rates, and low retention rates aided the growth of the Massive Open Online Course phenomenon (Lin, 2014, p. 372). EDUCAUSE defined MOOCs as, “a model for delivering learning content online to virtually any person and as many of them who wants to take the course” (Skiba, 2012, p. 416). MOOCs are offered in an online format and were designed to accommodate a large number of students in the courses and were offered free of cost. “MOOCs have hogged much of the public conversation about remaking college” (Parry, Field, & Supiano, 2013, p. 22). Institutions such as the University of Virginia, Massachusetts Institute of Technology, University of Chicago, and Columbia University utilize MOOCs to offer students opportunities to take free courses for professional or personal development purposes. MOOCs are often self-paced; this allows students to finish the course at their leisure. MOOCs do not provide college credit or certifications; however, the same learning outcomes and coursework are completed in the MOOC courses that are used in for credit classes. A few MOOCs do allow

students to print a certificate of completion for their records. The primary goal of these massively open online courses is to increase the reach and access to knowledge (Demirci, 2014, p. 246). Additionally, “MOOCs are a great mechanism for lifelong learning” (Skiba, 2012, p. 416) and are used by individuals hoping to seek reasonable professional development opportunities.

The researchers developed the term to describe an online course that was in development at the University of Manitoba in Canada. The course offered by the University of Manitoba was an online course that allowed 25 students to receive credit but had a total enrollment of 2,325 students (Demirci, 2014). MOOCs rose in popularity from 2011-2014 with the creation of virtual institutions such as Coursea (Demirci, 2014). Students enrolling in MOOCs were often searching to extend their knowledge base on a particular topic or enjoy continued learning.

The rise in MOOCs changed higher education and the way in which colleges designed and offered courses. There were very few research studies on MOOCs and their effects on students (Demirci, 2014, p. 26). However, it became common for institutions to develop MOOCs as a recruitment tool. Higher education institutions such as Arizona State University, University of Arkansas, and the University of Cincinnati began converting introductory college courses and first-year seminars into MOOCs. These MOOC formats were free to students, but students paid a fee at the completion if they wanted the class to be included their individual or potential degree plans. MOOC2Degree Model converted MOOC allowed for MOOC coursework into college credit (Lewin, 2013). California introduced Bill 520 in 2013; this bill provided incentives for colleges to offer college credit for MOOC coursework and ultimately, the legislature opted to table the bill until the 2014 legislative term (Lin, 2014, p. 371). Ruth (2012) stated, “MOOCs have already had significant funding and support from top academic leaders in

participating universities.” MOOCs are publicized as free or low cost, but there is a cost associated with course development. The upfront costs of developing high-quality MOOCs can be “very expensive although the cost of teaching is low” (Lin, 2014, p. 373). Organizations and universities pay individuals to develop course materials; there are special fees and website fees related to the MOOCs. These costs could eventually force organizations and schools to allocate these costs to students (Lin, 2014).

Locating valid and quality open educational resources could be difficult for educators. Yuan and Recker (2015) suggested using rubrics to determine the quality of open educational resources. Rubrics were developed specifically for the evaluation of open educational resources and provide scoring schemes on constructs that are of specific importance to open educational resources.

### **Open Textbook Publishing and E-Textbooks**

Open textbooks are another reduced cost learning material that educators can use to offset the cost of education for students. Open textbooks are inexpensive to publish and allow authors to take on the publishing roles from larger firms and determine the textbooks’ prices in the marketplace. Open textbooks and e-texts are significantly less expensive than traditionally-printed textbooks. According to Waller (2013), “Publishers get three-quarters of the amount of the profit from each textbook” (p. 1). This production cost reduction allows authors to lower the costs of texts for students and eliminate the intermediary. Open textbook publishing will enable authors to expedite their book to the marketplace and into college classrooms (Moxley, 2013, p. 43). Open publishing ensures that authors regularly update textbooks.

Open textbooks are able to reduce textbooks cost for students and are considered a compliment to open educational resources. Open textbooks are excellent options for instructors

who are building openly-sourced curriculum but still want an inexpensive text option for their students (Prasad & Tsuyoshi, 2014, p. 228). Alternatively, instructors whose courses do not lend themselves to forgoing a textbook are able to use e-textbooks. The majority of open textbooks are available in an e-text format. According to Waller (2013), “E-textbooks seem to mirror distance learning in the similarity of cost and convenience” (p. 1). E-textbooks are readily available and are offered at a lowered cost than traditional texts. Given that “printed textbooks can cost as much as tuition” (Waller, 2013, p. 1), educators began looking into e-textbooks aggressively. The emergence of e-readers such as the Nook, Kindle, and iPad-assisted with the growth of e-textbooks (Waller, 2013, p. 3). However, e-textbooks are not useful to students who do not already own devices on which to read the texts. Therefore, instructors and institutions require students to own or have access to an electronic device before implementing e-textbooks.

In a technology-driven educational environment, e-textbooks and open published textbooks inevitably found their place on the modern college campus (Waller, 2013). According to Waller (2013), “Students may find e-textbooks easier to use than faculty since the majority of students have been brought up in the technology age and use some form of technology every day” (p. 4). Institutions considering making the change from printed textbooks to openly-published textbooks or open educational resources provide instructors with training opportunities to ease those faculty members’ apprehensions. According to Waller (2013), “The transition is likely to take a long time but can be made easier with training for teachers and administrators and reinforcement of e-textbook benefits and advantages” (p. 5).

### **Open Educational Resources and Higher Education**

Open educational resources (OER) and open textbook publishing revolutionized the face of higher education. Open educational resources materials eventually gained popularity and

became increasingly relevant to the field of teaching and learning. In addition to offering phenomenal supplements to traditional textbooks and coursework, open educational resources proved their ability to reduce the cost of education for college students. Colleges and universities have begun embracing the use of open education resources on their campuses. Distance learning programs benefit from incorporating open education resources into their curricular programs. If correctly implemented, open education resources could drastically lower the cost of education for many students and increase enrollment at the collegiate level (Schlicht, 2013, p. 96).

Transitioning classes from the traditional textbooks to the open educational resources allows for a decrease in the cost of education to students. Open education resources are available for low prices and often free of charge and enable course instruction to take place without a textbook. Instructing courses without a book allows educators creative freedom (Schlicht, 2013). Utilizing open educational resources in higher education substantially widens a learner's access to materials. Studies have shown that students and administrators support open educational resources in higher education. According to Nikoi and Armellini (2012), "The perceived value of open educational resources in higher education is the potential for widening learners' access to higher education" (p. 166). Students previously unable to access education are now able to attend classes virtually or in-person without hard copy textbooks. The design of a portion of higher education distance learning programs is in a for-profit format, and the institutions charge exorbitant tuition rates. MIT is working on low-cost pathways to education that applied open education resources. Schlicht (2013) proclaimed that eventually, open education resources would be the norm in every college classroom due to their ability to reduce educational costs for students (p. 96).

## Community College Access

Increasing access to a college education is an important issue facing community colleges, and open educational resources improve educational access for students. Community colleges in the southeastern region of the United States suffer limited state funding and a downward economic spiral. The focus of education in these areas sways towards providing students with job skills rather than traditional, transferable degrees. The fiscal environment in higher education, “is expected to be a drag on state revenues for at least another year, lawmakers in some states were able to increase money for higher education, primarily to aid economic development and job training” (Kelderman, 2010, p. 64). According to Hilton et al. (2014), “The rising cost of textbooks may disproportionately harm students in community colleges, where tuition is lower, and students may face greater financial difficulties” (p. 68). In general, textbooks make up a significant portion of the costs to students for pursuing higher education. The average savings per student for each course converted from traditional textbooks to open educational resources is \$90.61 per a 2014 study (Hilton et al., 2014). If five percent of all college courses taught nationwide converted from traditional textbooks to open educational resources, students and universities would experience a billion dollars in savings (Hilton et al., 2014).

Online learning and openly sourced classrooms grant students access to an education they might have otherwise not been able to receive. The increased acceptance of distance learning courses allows institutions to offer vibrant distance learning programs to complement existing in-person programs. Community colleges have been the nation’s primary access point for higher education and have begun to offer more online courses as well as more courses utilizing openly sourced materials to meet their growing demands (Sanchez & Laanan, 1998, p. 5). An estimated

half of all of the undergraduates at traditional, four-year colleges and universities began their college careers at community colleges (Eddy, Christie, & Rao, 2006, p. 85). Students who choose to start their educational journey at the community college often do so due to the lower cost of tuition; flexible scheduling; alternative delivery options; and proximity to work, home and family responsibilities (Eddy et al., 2006, p. 74). The community college systems across the country educate thousands of first-generation college students each year. Community colleges were not always aware of their unique niche within higher education. Fifty years ago, community colleges barely existed in the United States (Sanchez & Laanan, 1998). A generation later, every state in America has a state-run community college or junior college. Community colleges are increasingly becoming influential to traditional-aged students who utilize these institutions as pathways to their bachelor's degree programs and as a way to first experience collegiate life (Bagnato, 2005, p. 8).

The community colleges in the southeastern region of the United States received a Hewlett Foundation grant that helped to finance 16 Z-degree programs (Whissemore, 2015, p. 7). The Z-degree program is a “zero textbook cost degree program” (Whissemore, 2015, p. 7) that relies heavily on open educational resources and open textbooks. These new Z-degree programs joined seasoned programs in the Tidewater area and the DC metro area. The Z-degree project has the potential to save 50,000 students a combined five million dollars.

### **Summary**

The collegiate environment has changed dramatically over the decades preceding this study and has ultimately accepted distance education as an ordinary course delivery mode. Correspondence classes have laid the foundation for today's online and remote classrooms. As online classes became prevalent in higher education, educators are obligated to develop

resources and learning materials to meet the needs of online students. Institutions work to build units and services to support online learning and the instructors teaching in distance education classrooms (Allen & Seaman, 2007). During the 2012-2013 academic year, the system office overseeing the community colleges in the southeastern region of the United States awarded Innovation Grants to encourage and incentivize faculty and staff to develop courses that utilized open educational resources (Whissemore, 2015).

As the cost of education began to rise, so did the costs of textbooks and learning materials. Educators commenced researching alternatives to the traditional textbooks to assist students with reducing educational costs. Utilizing the concept of open software developed by Stallman (Wiley & Hilton, 2009), educators began to develop open educational resources. These resources, as with open software, are free for their teacher peers to use and adapt as needed. The use of open educational resources is a proven tool in reducing textbook costs to students and increasing access to higher education. A reduction in textbook costs assists a student in having the financial resources to enroll in additional courses and to pursue their college degrees. However, proponents of open educational resources thought that materials ignored traditional pedagogy and made assumptions that the future of education lay within self-directed learning (Knox, 2014, p. 825).

Massively Open Online Courses provide professional development opportunities to individuals for no charge. As MOOCs rose in popularity, higher education institutions finally began accepting MOOCs as traditional college courses. State legislatures across the country analyzed whether this mode of instruction would be beneficial to schools in their states. Upon their arrival to the educational world, MOOCs raised critical concerns about the survival of higher education with increased usage of open educational resources (Stack, 2015). MOOCs and

open educational resources were two tools that assisted in the reduction of education costs. Additionally, educators realized that MOOCs could serve as a means to recruit tuition-paying student (Stack, 2015).

Open educational resources are usable in both the face-to-face classrooms and virtual classrooms. Researchers developed the CAP Perceived Learning Scale to measure students' perceived learning in online and in-person classrooms (Rovai et al., 2009). The self-report scale measures the cognitive, affective, and psychomotor learning of students. The CAP Perceived Learning Scale, like open educational resources, is used for face-to-face class assessment and virtual class assessment. Understanding a student's perception of their learning is essential to evaluate the continued use of open educational resources in collegiate classrooms.

Research on open educational resources had been limited, but the increased pressure to lower the cost of education made the topic grow in interest among educational researchers. The majority of studies completed focused on what enabled or inhibited the sharing of open educational resources (Algers & Silva-Fletcher, 2015, p. 35). The research concluded on open educational resources at the time of this study related to course satisfaction and student success in courses using open educational resources. The assessment of learning in classrooms using open educational resources has not been researched, nor has the students' perceived learning been thoroughly probed. Hence, this study adds to the literature related to open educational resources. Additionally, this study is one of the first to look at the use of open educational resources at community colleges in the southeastern region of the United States.

## **CHAPTER THREE: METHODS**

### **Overview**

The following chapter outlines the research design, research questions, and hypotheses of the above study. Moreover, this section details the participants and setting in which the research took place as well as an overview of the research analysis completed as part of this project. Detailed information related to the CAP Perceived Learning Scale and the scoring of the instrument.

### **Design**

This study utilized a quantitative, causal-comparative, non-experimental design. This methodology establishes the differences between two or more groups within the dependent variable when no intervention has taken place (Schenker & Rumrill, 2004). In non-experimental research, researchers do not manipulate variables but instead look for relationships among the variables (Ary, Jacobs, Sorensen, & Walker, 2013). Additionally, this research design was selected because the researcher wanted to determine or to locate the differences in perceived learning between two pre-existing groups (students using textbooks and students using open educational resources).

In experimental research studies, independent variables are manipulated; however, in causal-comparative research, the independent variable occurs inherently. Research participants in causal-comparative studies need to be reasonably homogeneous (Gall, Gall, & Borg., 2010). Therefore, the researcher opted to use the Classification of Institutions of Higher Education to determine college participation. Utilizing the Carnegie Classification system, the researcher ensured that participating colleges were of similar size, geographic location, and socioeconomic environment. Causal-comparative research designs often facilitate in an attempt to “identify a

causal relationship” (Schenker & Rumrill, 2004, p. 118). However, due to their nonexperimental design, it is impossible to prove complete causality.

In this study, the dependent variables were perceived learning and affective learning. The independent variable was learning materials: open educational resources and traditional textbooks. Perceived learning was defined as the knowledge that a student believes they are learning as opposed to learning measured by in-class assessments such as tests or other standardized assessments (Wighting, 2011). Perceived learning is composed of three sub-domains of learning; these levels were cognitive learning, affective learning, and psychomotor learning. Cognitive learning was defined as the ability to recall information and skills after the initial instructional session, whereas affective learning was described as a complete understanding and the internalization of ideas presented during an instructional session. Psychomotor learning was defined as the ability to perform tasks following the initial instructional meeting (Rovai et al., 2009). The independent variable for this study was learning materials and had two levels; these levels were open educational resources and traditional textbooks. Open educational resources were defined as any as educational or learning materials that are freely available for educators and students to use, adapt, share, and reuse as necessary (Atkins et al., 2007). Traditional textbooks were defined as printed tools used for learning in a particular subject or content area (Gerhart et al., 2015).

### **Research Questions**

**RQ1:** Is there a statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

**RQ2:** Is there a statistically significant difference in overall affective learning scores

of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

### **Hypotheses**

**H<sub>01</sub>:** There is no statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks.

**H<sub>02</sub>:** There is no statistically significant difference in overall affective learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks.

### **Participants and Setting**

The researcher drew student participants from a volunteer convenience sample; this sampling type was a match for the study as the researcher had access to the research populations through a professional relationship with the participating colleges. This sampling technique fit the study as this was the most straightforward avenue by which to recruit subjects from the desired population. The study took place at nine community colleges in the southeastern region of the United States. Each study participant enrolled in a first-year seminar course in the Fall 2016 semester, completed the course, and was over the age of 18 as of August 22, 2016.

The Carnegie Classification of Institutions of Higher Education assisted the researcher in determining which of the community colleges in the southeastern region of the United States were to participate in the study. The Carnegie Foundation for the Advancement of Teaching (2001) offers a classification system that is an outline for classifying colleges and universities in the United States. This classification system noted that all two-year schools in the United States fall into five classifications based on enrollments: very small, small, medium, large, and very

large. The researcher chose this selection policy so that there would be a stable research population based on enrollment size.

Three small-sized community colleges, four medium-sized community colleges, and two large-sized community colleges agreed to participate in the research study (Carnegie Foundation for the Advancement of Teaching, 2001). The study took place during the spring 2017 semester following the completing of first-year seminar coursework during the fall 2016 semester. During the fall 2016 semester, 5,644 community students completed the first-year seminar at the nine participating community colleges. These 5,644 community college students represent the population for the study.

Surveying the students after the completion of the fall 2016 semester ensured that each of the courses was able to cover all eight learning outcomes mandated by the system office located in the southeastern region of the United States. The master course file for community colleges in the southeast region describes the first-year seminar course was as follows:

- Assists students in transition to colleges,
- Provides overviews of college policies, procedures, and curricular offerings,
- Encourages contacts with other students and staff,
- Assists students toward college success through information regarding effective study habits, career and academic planning, and other college resources available to students,
- May include English and Math placement testing, and
- Highly recommended for beginning students. Required for graduation. Lecture 1-3 hours per week (Virginia Community College System, 2016).

The community colleges in the southeastern region of the United States required that the majority of first-time college students complete the first-year seminar course before graduation.

Students were encouraged students to enroll in the course during their first 15 hours of coursework. Exemptions to the requirement were made based on student's degree plans, and some career and technical programs do not require students to complete the course to graduate. The primary purpose of the course was to prepare students to thrive in their college pursuit. The secondary objective of the course is to engage students in their learning environment and to connect them to full-time faculty/staff at the individual colleges. Additionally, the oversight body for the community colleges in the southeastern region of the United States prescribes a series of learning outcomes that requires all community colleges in the system to follow (Virginia Community College System, 2016). A task force of student affairs professionals throughout the region carefully developed these learning outcomes. Students participating in first-year seminar courses that were related to academic majors or vocational courses such as education and advanced manufacturing were included in the research. These specialized sections still follow the eight learning outcomes set by the system office but provide students with additional career or major specific information. Dual enrollment sections of the first-year seminar course were not included in this study.

Within the southeastern region of the United States, the first-year seminar courses were some of the first courses to accept the challenge of implementing open educational resources into the course curriculum. The transition from textbooks to open educational resources was well underway by the 2015-2016 academic year, and 15 of the community colleges in the region had transitioned their first-year seminar courses to open educational resources. In 2015, the community colleges in the southeastern area of the United States received a Hewlett Foundation grant to expand the Z-degree programs to 15 of the 23 institutions. Z-degrees are degree programs that had zero textbook costs associated with the degree plan. This expansion of Z-

degree programs meant additional schools would convert their first-year seminar courses in the next two years (Spectrum, 2015). By the 2017-2018 academic year, only a minimal number of colleges were still using traditional learning materials in their first-year seminar courses.

After gaining conditional IRB approval from Liberty University, the researcher contacted 23 community colleges within the southeastern region of the United States that were using open educational resources and traditional textbooks in their first-year seminar classrooms and obtained approval to research at nine community colleges. The researcher then went through the IRB approval process with each of the participating community colleges to perform the research. The researcher ensured that the requirements of each institution were met before conducting research. Once the researcher received approval to study letters from the nine community colleges, the documents were forwarded to Liberty University's IRB office for final review. Upon consideration of the materials, the researcher received formal permission to begin the research study from Liberty University, and research for the study commenced in February 2017. Six of the participating schools used open educational resources and three used traditional textbooks in their first-year seminar classrooms. The participating colleges' first-year seminar enrollments ranged from 98 students enrolled in the course to 1,211 students enrolled in the course during the fall 2016 semester.

Table 1

*Participating Community College's Demographic Information*

College & Carnegie Classification *	Course Enrollment Fall 2016 **	Learning Materials
College A-Small	98	Traditional Textbook
College B- Small	302	OER
College C-Small	408	OER
College D- Medium	364	Traditional Textbook
College E- Medium	367	OER
College F- Medium	994	OER
College G- Medium	834	OER
College H- Large	1068	OER
College I- Large	1211	Traditional Textbook

*Note.* \* (Carnegie Foundation for the Advancement of Teaching, 2001).

As suggested by Gall et al. (2010), a minimum sample size of 100 students was set as the standard for the research; this ensured a medium effect with a statistical power of .7 at an alpha level of .05. The sample was a volunteer, convenience sample as it was not mandatory for students to participate in the study. The researcher sent out 5,644 surveys to the study population; the researcher received 224 completed questionnaires that used the CAP Perceived Learning Scale. Participants in this study completed their first-year seminar course during the fall 2016 semester and were over the age of 18 as of August 22, 2016. Researching after the completion of the fall 2016 courses ensured that all of the course learning outcomes were

covered. Guaranteeing those study participants were over the age of 18 by August 22, 2016, meant that no minors were included in the study population. The only data collected for this study from participants were their scores for the CAP Perceived Learning Scale and the teaching materials used in their first-year seminar course.

Representatives at five of the nine participating community colleges contacted the potential participants on behalf of the researcher. The researcher approached students at the four remaining community colleges on their own, with permission from the institutions. Of the study respondents, 101 described themselves as enrolled in first-year seminar courses using open educational resources and 126 described themselves as enrolled in first-year seminar courses using traditional textbooks. All students surveyed identified as currently registered at a community college in the southeastern region of the United States at the time of study completion and verified that they were 18 as of August 22, 2016. The first-year seminar courses surveyed were each valued at 1 to 3 credit hours depending on the community college. All first-year seminar courses within the southeastern region of the United States were required to cover the following topics: Career Development/Career Exploration, Library Resources /Information Literacy, College Policies and Services, Study Skills, and Life Management Skills. Appendix F includes a complete list of learning outcomes required for the first-year seminar course.

### **Instrumentation**

The CAP Perceived Learning Scale (Rovai et al., 2009) was the research instrument used to measure students' perceived learning. The CAP Perceived Learning Scale has been utilized in several research studies (Alrushiedat, Olfman, Ryan, Kung, & van der Pol, 2010; Araiza, Kutugata, & Dorfer, 2012; Flowers et al., 2014; Kuyatt & Baker, 2014; Wighting, 2011; Yener, 2013). Alrushiedat et al. (2010) examined perceived learning effects of Aplia, a discussion

board platform, and asynchronous online instruction. Their study found that students using online discussion boards experienced higher levels of perceived learning (Alrushiedat et al., 2010). Wighting used the CAP Perceived Learning Scale in association with the Classroom and School Inventory (CSCI) to examine if a relationship between perceived learning and sense of community existed in participants seeking teaching licensure. Wighting (2011) found that a positive correlation existed between a sense of community and perceived learning among participants (Wighting, 2011). The Flowers et al. (2014) study looked at perceived learning of African American students in online classrooms. Their study found that students enrolled in online classes had lower affective and psychomotor learning values than their peers did in in-person sections.

The CAP Perceived Learning Scale features three subscales: cognitive, affective, and psychomotor learning. Cognitive learning is the ability to recall knowledge, affective learning is the positive attitude towards the subject matter, and psychomotor learning is the capacity to perform tasks (Rovai et al., 2009). The CAP Perceived Learning Scale provides researchers with complete instructions related to the proper administration of the survey (see Appendix A). The instrument features nine questions using a seven-point Likert scale, the scale measures from Not at All (1) to Very Much So (7). The CAP Perceived Learning Scale assists with the analysis of the three subscales including cognitive learning, affective learning, and psychomotor learning. The combined score from all nine statements in the CAP Perceived Learning Scale provide the perceived learning scores of each participant. The Cronbach's alpha coefficient for the instrument is .79 (Rovai et al., 2009). Perceived learning scores are valued between zero to 54, and each subscale is valued between zero to 18. A high CAP Perceived Learning Scale score is

an indicator of a keen perception of learning by students participating in the study (Rovai et al., 2009).

Table 2

*CAP Perceived Learning Scales Cronbach's Coefficient Alphas*

Perceived Learning	Affective Learning
0.72	0.92

Subscale cognitive learning describes a student's ability to recall information and skills (Rovai et al., 2009). Statements one, two, and five of the CAP Perceived Learning instrument measure cognitive learning. The instrument assessed these values via a Likert Scale with values from 0-6. These statements were listed in the tool as follows:

- (1) I can organize course material into a logical structure;
- (2) I cannot produce a course study guide for future students;
- (5) I can intelligently critique the texts used in the course (Rovai et al., 2009, p.10).

Statement two per the CAP Perceived Learning Scale directions involve scoring the students' responses inversely, and all other statements are, in contrast, to be scored following the Likert scales traditional measurements.

Subscale affective learning is the student's ability to completely understand ideas (Rovai et al., 2009). Statements four, six, and nine of the CAP Perceived Learning Scale are listed as follows in the instrument:

- (4) I have changed my attitudes about the course subject matter as a result of this course;
- (6) I feel more self-reliant as the result of this course;
- (9) I feel that I am a more sophisticated thinker as a result of this course (Rovai et al., 2009, p.10).

All subscales for affective learning are normally scored. The Cronbach's coefficient alpha for affective learning is 0.92. Subscale psychomotor learning is a student's ability to perform tasks (Rovai et al., 2009). Statements three, seven, and eight of the CAP Perceived Learning measure psychomotor learning; the statements are as follows: (3) I am able to use physical skills learned in this course outside of class; (7) I have not expanded my physical -skills as a result of this class; and (8) I can demonstrate to others the physical skills learned in this course (Rovai et al., 2009). Statement seven is inversely scored while the other statements are scored in a standard pattern. The Cronbach's coefficient alpha for psychomotor learning is 0.25 (Rockinson-Szapkiw et al., 2013). SurveyMonkey was the platform used to administer the CAP Perceived Learning Scale to study participants. SurveyMonkey is an online survey platform that allows researchers to develop customizable surveys to meet their research needs.

The CAP Perceived Learning Scale featured nine questions that were all scored on a seven-point Likert scale system. The Likert scale required students to select the numeric value that correlated to their agreement with the statements presented. The lower the number, the less the student agreed with the statement. The higher the number, the more a student agreed with the statement. As part of the instrument, students were instructed to answer the survey questions quickly and not to spend too much time pondering any particular statement. Each subscale or construct was scored directly to the three issues the construct was related to within the instrument. Permission to use the instrument was obtained from Dr. Rovai on October 10, 2014 (see Appendix A).

### **Procedures**

The researcher sent a complete research packet to Liberty University's Institutional Review Board and obtained approval before the start of the investigation (see Appendix B). The

package included the IRB application, explanations, and rationale of the study, and examples of all communication materials related to the research study. Upon receiving conditional approval from Liberty University's IRB committee, the researcher contacted 23 community colleges within the southeastern region of the United States to solicit permission to research. Nine community colleges granted the researcher permission to conduct the study (see Appendix C). The researcher then provided Liberty University with the college-level IRB approval and received permission from the committee to begin research. The researcher finalized the SurveyMonkey survey link during the IRB review period.

A representative from five of the nine community colleges sent the recruitment letter to eligible participants (see Appendix D). The researcher contacted students at the four remaining colleges through email addresses provided by the respective colleges. The original email message included an introduction, time constraints, and directions to complete the survey. Students were informed within the message that there was no academic penalty for not completing the survey. The survey instrument did not ask for participants' names, addresses, colleges of study, or any other information that could identify the participants. College representatives contacted participants five business days after the original message and encouraged students to participate in the study. The surveys remained open for two full weeks or ten business days. The steps listed above were duplicated nine times, once for each community college's data collection process. Messages used to contact students are listed in Appendix D.

Four of the participating colleges provided the researcher with the directory information for students eligible to participate in the study. Directory information contained only alphanumeric characters, and therefore the students' identities remained anonymous. The researcher followed the same practice as the college representatives at the five other participating

colleges. Following the same practices at each community college ensured that students were contacted using the same set of text and that student information remained anonymous.

Participants were asked in the letter to complete the survey in the comfort of their own home. As the research took place after the course was completed, students were not able to complete the survey during the class period. Filling out the survey in the privacy of their own home reduced the threats that can be introduced in self-report instruments. The participants responded to each question on the survey individually without any interference from the researcher. The instrument asked participants questions directly related to their perceptions of learning. Threats could have included potential bias resulting from dishonest reporting (Granello & Wheaton, 2004; Van Selm & Jankowski, 2006). Participants could have dishonestly answered the instrument's questions to finish the survey quickly, or because they did not fully understand, the issues posed in the instrument. However, the researcher worked to ensure that students understood the concepts of the study.

Students electing to participate in the study accessed the survey from the SurveyMonkey link that was emailed to them directly by the researcher or a college representative from their respective community college. The participants were informed of the purpose of the research study and reminded again that the survey was voluntary and that there was no academic penalty for not completing the survey. Additionally, students were informed that they might discontinue completing the survey at any time before hitting submit on the final page. The SurveyMonkey page featured a consent form that participants reviewed. Following the consent page, two screening questions were asked of the students before gaining access to the survey. They were as follows: "Were you over the age of eighteen as of August 22, 2016?" and "Did you enroll in a first-year seminar course during the fall 2016 semester (August – December)?" If the questions

were answered favorably, the students were able to access the next page of the SurveyMonkey tool. Students who did not respond to those questions favorably were next routed to the thank-you message and provided directions to enter the raffle for the Amazon gift cards. Students answering favorably to the screening questions were then asked a question related to the learning materials used in their course. The question was as follows: “Did your freshman seminar course have a required textbook that you purchased from the college bookstore or another source (Amazon, Chegg, eBay, etc.)?” Students who self-reported that they bought textbooks for their course were included in the variable group of using books. Students who reported they did not purchase a book for the courses were included in the variable group of using open educational resources.

Upon answering the learning material question, the CAP Perceived Learning Scale portion of the survey was made available. The survey consisted of nine statements measured on a seven-point Likert Scale. After completing the nine questions, the students submitted their answers, and the results were stored in the SurveyMonkey database. An exit survey button was made available to students on the top right page of the survey and allowed participants to leave the survey at any time. Upon completion of the survey, students were thanked for their participation in the research. The thank you page provided directions for the students to participate in the raffle. The participants that chose to participate were routed to the Random Picker Raffle entry form. The Random Picker Raffle entry form only asked for the participant’s email address. The message on the form informed students that entering the raffle was confidential and that the researcher would just contact raffle winners. Participants were told that raffle winners would be contacted no later than June 5, 2017. Random Picker is an online sweepstakes platform that is used to host online drawings; this costs \$39.00 for one project with

300,000 entries. After the nine participating community colleges completed the research process, the researcher discontinued the SurveyMonkey link, and the data analysis began.

### **Data Analysis**

This study measured the perceived learning differences between students using open educational resources and those students using traditional textbooks for students enrolled in freshmen seminar courses during the fall of 2016 academic semester. Consequently, a causal-comparative study was conducted to test the hypotheses regarding the relationship between students using open educational resources perceive learning differently from those using traditional textbooks. The causal-comparative design was suitable, as two samples were compared to determine if there was a difference between a specified population mean (Gall et al., 2010). Furthermore, independent sample t-tests were executed on the dataset. An independent samples t-test determines whether a sample mean statistically significant difference between a specified population mean (Gall et al., 2010, p. 305). Researchers and statisticians have found that t-tests offer accurate estimates even in instances where assumption testing is violated (Gall et al. 2010).

Student responses from each survey were downloaded from the SurveyMonkey platform into an excel spreadsheet that was imported into SPSS. Statistical analyses were conducted using the IBM SPSS Statistical Software 24.0. Before data analysis began, data screening and assumption testing were performed on the data. Incomplete surveys were eliminated from the dataset using listwise deletion; incomplete surveys were surveys that included any unanswered questions. Listwise deletion was one method by which researchers handle missing data in educational research (Cheema, 2014).

The researcher performed three assumption tests on the obtained dataset. The data for this study was collected from a ratio level Likert scale instrument that measured the dependent variable with an absolute and meaningful zero (Davison & Sharma, 1988). The first assumptions tests were done to determine if outliers existed in the dataset; preparing box and whisker plots of each variable showcased outliers within the dataset. The researcher used the outlier-labeling rule to determine if outliers were present in the dataset (Hoaglin et al., 1986). No extreme outliers were found in the dataset. The second assumption test was designed to measure normal distribution within the dataset; a series of histograms for each variable confirmed that the data was normally distributed. To further test for normality the Kolmogorov-Smirnov test was carried out; the Kolmogorov-Smirnov analysis was used to determine normal distribution as the sample size was greater than 50 (Gall et al., 2010). The final assumption test was to determine equal variance amongst the variables. The t-test assumptions were found tenable, so two independent samples t-tests were run to test the null hypotheses. A Bonferroni correction was executed, as the same sample was tested twice. The alpha level was adjusted from 0.05 to  $\alpha = 0.025$  based on the two comparisons. All hypotheses were assessed at the alpha level of 0.025. The null hypotheses were rejected at a P confidence level less than 0.025. The effect sizes were measured by eta squared and interpreted regarding Cohen's d (Gall et al., 2010).

## CHAPTER FOUR: FINDINGS

### Overview

The following section provides details information regarding the study's statistical findings, analysis of the dataset, screening of the dataset and results based on the analysis of the dataset. This section details the data screening's findings, and *t*-test assumption findings along with the participant characteristics and the testing of the null hypotheses results. Statistical analyses were conducted using the IBM SPSS Statistical Software 24.0. Data screening and assumption testing were performed on the data.

### Research Questions

**RQ1:** Is there a statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

**RQ2:** Is there a statistically significant difference in overall affective learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

### Null Hypotheses

**H<sub>01</sub>:** There is no statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks.

**H<sub>02</sub>:** There is no statistically significant difference in overall affective learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks.

### Descriptive Statistics

The researcher received 227 completed surveys from 227 participants. One hundred and one (45%) participants identified as being enrolled in course using open educational resources and 126 (55.5%) identified as being enrolled in courses using traditional textbooks. Incomplete surveys were eliminated from the dataset using likewise deletion; incomplete surveys were surveys that included any unanswered questions or did not meet the parameters of the study (Cheema, 2014). Seven surveys were eliminated from the study due to incomplete answers or participants who did not satisfy the population parameters. Participants for this study needed to be over the age of 18 and have completed the first-year seminar course during the fall 2016 semester.

Table 3

#### *Perceived Learning Descriptive Statistics*

Learning Material	<i>N</i>	<i>M</i>	<i>SD</i>
OER	101	29.4	6.5
Traditional Textbook	126	27.5	5.6

Table 4

#### *Affective Learning Descriptive Statistics*

Learning Material	<i>N</i>	<i>M</i>	<i>SD</i>
OER	101	10.9	4.3
Traditional Textbook	126	10.1	4.1

## **Results**

### **Data Screening**

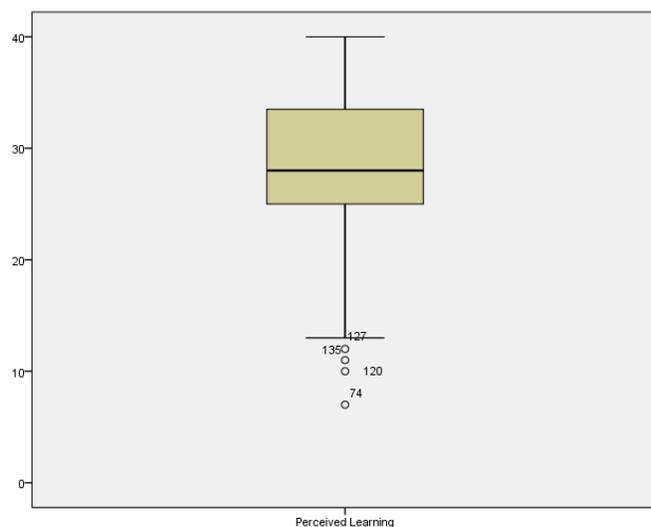
The researchers screened the data to determine which data would be included in the study. The researcher reviewed the results and removed responses in which the student failed to identify their learning material (open educational resources or traditional textbooks) from the dataset. Once learning materials were identified, the researcher labeled these categories accordingly in the dataset. The researcher then confirmed that students identified themselves as enrolling the first-year seminar course during the fall 2016 semester. Four additional surveys were excluded from the study as the participants stated they did not complete the freshman seminar course during the fall 2016 semester. Incomplete surveys were eliminated from the dataset; incomplete surveys were surveys that included any unanswered questions. Three surveys were incomplete and missing information; these surveys were removed from the study. The researcher used listwise deletion and eliminated any survey result with unanswered questions (Cheema, 2014). In total, seven surveys were excluded from the study.

### **Assumptions**

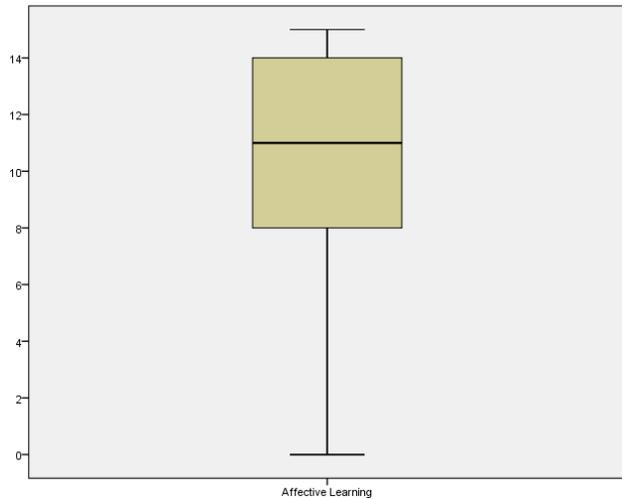
Once data screening was complete, the researcher began testing assumptions for independent sample t-tests. The data for this study was collected from a ratio level Likert scale instrument that measured the dependent variable with an absolute and meaningful zero (Davison & Sharma, 1988). Therefore, the level of measurement assumption was met. First, the researcher reviewed the reviewed the dataset using the outlier-labeling rule to determine if any outliers were present in the dataset for the two variables (Hoaglin et al., 1986). Three low quartile level outliers were found in the perceived learning variable, and no outliers were detected in the affective learning variable. Upon reviewing the outliers the researcher, found that the outliers in the perceived

learning variable were small numerical outliers. Due to the large sample size and the limited number of outliers, the researcher opted to keep all of the outliers in the datasets. According to Bluman, researchers should review outliers, but a researcher must determine whether to allow the outliers to remain in the dataset (2008). The researcher further opted to keep the outliers in the dataset as they were not extreme outliers and would minimally distort the results (Gall et al., 2010). The outliers were found to be small numerical outliers and therefore not absolute outliers.

The researcher then prepared box and whisker plots for each variable to determine the existence of outliers. The box and whisker plots confirmed that outliers did exist in the perceived learning variable. Outliers present in the perceived learning variable were low within the dataset. No outliers were found in the affective learning variable.



*Figure 1.* Box and whisker plots for perceived learning.



*Figure 2.* Box and whisker plots for affective learning.

The researcher then tested each variable for normality using the Kolmogorov-Smirnov found the assumption of normality to be tenable (Freedman, Pisani, & Purves, 2011). The Kolmogorov-Smirnov test was used to determine normality as the sample size was higher than 50. The Kolmogorov-Smirnov analysis revealed that the two dependent variables ( $p < 0.05$ ) had significant scores of less than 0.001. The large sample of this study ( $n = 227$ ) allows for the use of the central limit theorem (CLT). The central limit theorem proves that when independent variables are added, the sum moves towards a normal distribution even if the even if the original variables themselves are not normally distributed (Freedman, Pisani, & Purves, 2011). Thus, the dependent variables of this study are assumed to be normally distributed due to the large sample and the visible normal histograms. Histograms were produced for the variables of perceived learning and affective learning; these histograms confirmed normal distribution of the variables.

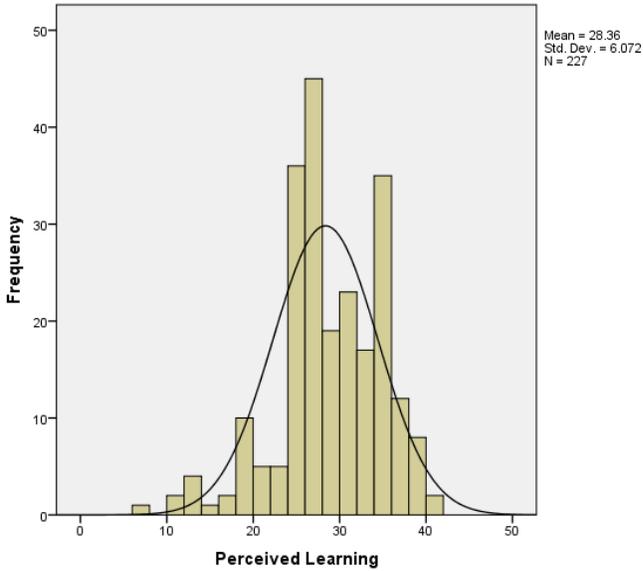


Figure 3. Histogram displaying normality of perceived learning variable.

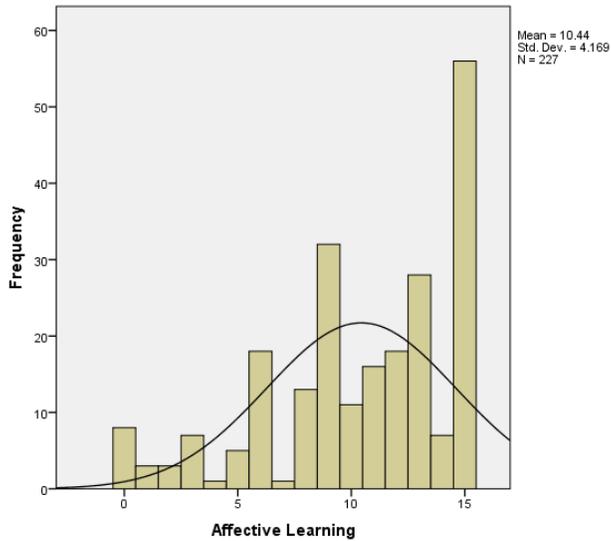


Figure 4. Histogram displaying normality of affective learning variable.

The data test was then tested for homogeneity of variance using the Levene's test of equality. The Levene's test for equality of variance was violated as related to the perceived learning variable ( $p = 0.047$ ,  $F = 3.99$ ). The Levene's test for equality of variance was not

violated as related to the affective learning variable as the *p value* was above 0.5 ( $p = 0.685$ ,  $F = 0.165$ ).

### Hypothesis Testing H<sub>01</sub>

Normality was tested using histograms; normality for students enrolled in open-sourced courses and students not enrolled in an open-sourced course as related to the perceived learning variable was assumed as all data fell within the bell curve (see figure 5). Accordingly, normality was found acceptable. The assumption of homogeneity of variance was verified using Levene's test of equality of variance. The results of the analysis,  $F(225) = 3.99$ , indicates that the variances of the two populations were violated ( $p = 0.047$ ) for the variable of perceived learning revealing there were unequal variances within the variable. Therefore, the t-value of equal variances not assumed was used.

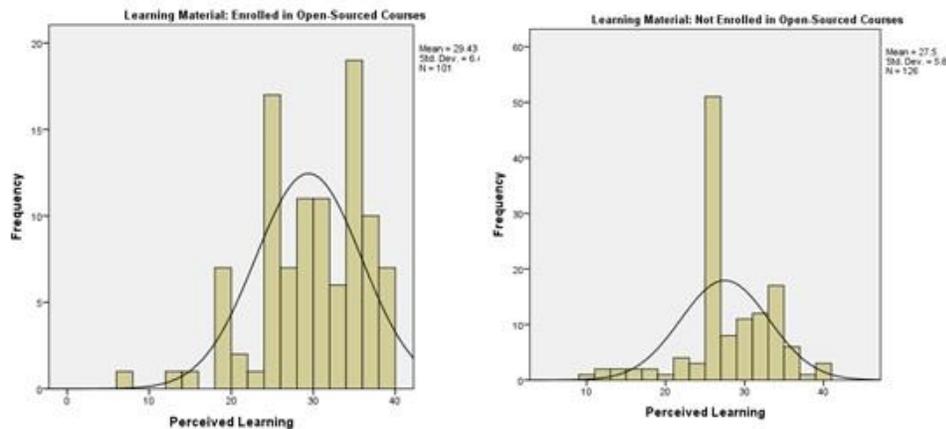


Figure 5. Histogram for Learning Materials related to Perceived Learning.

Table 5 *H<sub>01</sub> Levene's Test of Equality of Variance for Perceived Learning*

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Affective Learning	Equal variances assumed	3.99	.047	2.40	225	.017	.80
	Equal variances not assumed			2.36	198.95	.019	.82

**H<sub>01</sub>:** There is no statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks.

An independent samples *t*-test was performed for the statistical analysis and determined there was a statistically significant mean difference in perceived learning of students using open educational resources ( $M = 29.43$ ,  $SD = 6.47$ ,  $n = 101$ ) and those enrolled in courses using traditional textbooks ( $M = 27.50$ ,  $SD = 5.61$ ,  $n = 126$ ) at  $t(199) = 2.362$ ,  $p = 0.019$ . The results revealed an effect of 0.31 which is considered a medium effect size (Gall et al., 2010). The 95% confidence interval was .344 to 3.533. The *p*-value was less than .05. Therefore, the null hypothesis was rejected.

Table 6 *Independent Samples t-test on Perceived Learning*

Equal Variances	<i>t</i>	<i>Df</i>	<i>p</i> (2-tailed)	95% CI	
				Lower	Upper
Assumed	2.40	225	.017	.344	3.507
Not Assumed	2.36	199	.019	.318	3.533

### Hypothesis Testing H02

Normality was tested using histograms; Normality for students enrolled in open-sourced courses and students not enrolled in an open-sourced course as related to the affective learning variable was assumed as all data fell within the bell curve (see figure 6). Accordingly, normality was found acceptable. An independent samples t-test was performed for the statistical analysis and Levene's test for equality of variance was not violated for the variable of affective learning, and equal variances were assumed. Therefore, a standard t-test was executed, and the t-value of equal variances was used.

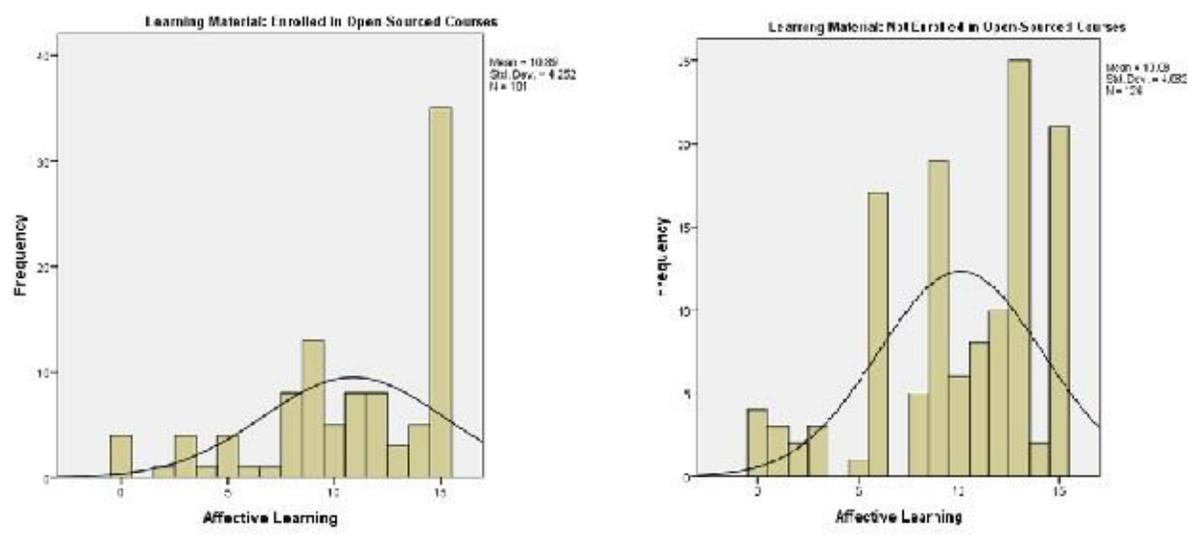


Figure 6. Histogram for Learning Materials related to Affective Learning.

Table 7 *H<sub>02</sub> Levene's Test of Equality of Variance for Affective Learning*

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Affective Learning	Equal variances assumed	.165	.685	1.46	225	.15	.81
	Equal variances not assumed			1.47	210.46	.15	.81

**H<sub>02</sub>:** There is no statistically significant difference in overall affective learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks.

An independent samples *t*-test was performed for the statistical analysis and determined there was a statistically significant mean difference in affective learning of students using open educational resources ( $M = 10.9$ ,  $SD = 4.3$ ,  $n = 101$ ) and those enrolled in courses using traditional textbooks ( $M = 10.1$ ,  $SD = 4.1$ ,  $n = 126$ ) at  $t(225) = 1.462$ ,  $p = 0.145$ . The results revealed an effect of 0.39, which is considered a medium effect size (Gall et al., 2010). The 95% confidence interval was -.283 to 1.912. The *p*-value is more than .05. Consequently, the null hypothesis was accepted.

Table 8

*Independent Samples t-test on Affective Learning*

Equal Variances	<i>t</i>	<i>Df</i>	<i>p</i> (2-tailed)	95% CI	
				Lower	Upper
Assumed	1.462	225	.145	-.283	1.906
Not Assumed	1.455	210.459	.147	-.288	1.912

## CHAPTER FIVE: CONCLUSIONS

### Overview

The researcher conducted this study to determine if students' perceived learning differently in courses using open-sourced materials than those students enrolled in courses using traditional learning materials. The following chapter outlines the researcher's findings and suggestions for future research.

### Discussion

The purpose of this causal-comparative study was to determine if students using open educational resources perceived learning differently from those students using traditional learning materials as measured by the Cognitive, Affective, and Psychomotor (CAP) Perceived Learning Scale (Rovai et al., 2009).

**RQ1:** Is there a statistically significant difference in overall perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

Perceived learning is the combination of students' cognitive, affective, and psychomotor learning scores. A statistically significant difference in the perceived learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks was found. This result further establishes that open educational resources are the same or superior to traditional textbooks. Furthermore, this finding is in line with literature related to open educational resources. One researcher found that there were significant differences between perceived learning enrolled in traditional classrooms and their virtual or online counterparts (Thapliyal, 2014, p. 60).

Therefore, students using open educational resources and traditional textbooks perceived learning differently based on the learning materials provided in their courses. The theory of perceptual learning describes perceived learning at the start of the learning process and the analysis of what is learned (Adolph & Kretch, 2015) and the ability to extract information (Gibson, 1992). At the outset of the learning process, students in courses using open educational resources and traditional textbooks perceived their learning experiences to be similar thus implying that learning materials used in the instruction of coursework do not influence students' perceived learning.

The study took place at nine community colleges, and each study participant identified as enrolled in a first-year seminar course in the fall 2016 semester and completed the course. The research indicated that first-year students' engagement directly corresponds to student success. Researchers found there was a multitude of forces that affect a student's first-year in college and that a student's experience is related to the amount of support they felt they had received from their respective colleges. Student support came in the form of staff, faculty, parents, fellow students, or friends. Faculty affected a student's first-year experience and were an important and helpful influence on a student's overall college experience (Reason et al., 2006, p. 153). Lastly, it appeared that when institutions encouraged students to study and spend additional time on their coursework that students felt more engaged with the school and performed better academically (Reason et al., 2006). Despite these findings of engagement producing success in traditional classrooms, students enrolled in courses using open educational resources perceived their learning at higher levels than their peers using traditional textbooks did.

Course instruction is similar regardless of the instructional format, as modern institutions of higher education offer a variety of instructional formats for students to enroll in college-level

courses. These forms include face-to-face classes, distance learning, hybrid, and intensive courses. Face-to-face classes are “a classroom that an instructor can control in both an online and face-to-face format” (Ganesh et al., 2015, p. 18). Online or distance learning classrooms are “classrooms that the instructor can control in an online format only” (Ganesh et al., 2015, p. 18). A hybrid course sometimes referred to as a blended course and “is a course that combines elements of face-to-face instruction with elements of distance learning” (Lorenzetti, 2004, p. 7). An intensive or short course was a course that is, “taught within an accelerated format, have been quite common in colleges and universities” (Kucsera & Zimmaro, 2010, p. 62). Intensive or short courses may contribute to the significant difference in perceived learning.

**RQ2:** Is there a statistically significant difference in overall affective learning scores of students enrolled in courses using open educational resources and students enrolled in courses using traditional textbooks?

There was no statistically significant difference in the overall affective learning scores in open-sourced courses and students who were not enrolled in courses in open-sourced courses. Affective learning is a complement to cognitive learning and can assist in the optimization of learning (Evans et al., 2013). The Flowers et al. (2014) study also found that students enrolled in online courses had lower affective learning scores than their peers in an in-person course. There was probably not a significant difference in affective learning as mentioned above; the CAP was standardized on graduate students and not first-year undergraduates and open-sourced learning has changed dramatically since 2009.

Distance learning had grown to 13 million undergraduate students in 2014 (U.S. Department of Education, National Center for Education Statistics, 2014). The growth of distance education may be why there is no significant difference in overall affective learning.

Thus, there may not be much difference anymore in teaching modality, and cognitive learning as modern institutions of higher education offer a variety of instructional formats for students to enroll in college-level courses (Ganesh et al., 2015).

This study's findings supported the conclusions of Hilton et al. (2013). The findings further established that open educational resources are the same or superior to traditional textbooks. This study discovered that students' affective learning values were similar regardless of the teaching materials used in their first-year seminar course. These outcomes supported the statement that open educational resources were the same as traditional textbooks in the collegiate educational environment. Likewise, this study supported the findings of Lindshield and Adhikari (2013). The Lindshield and Adhikari study observed that students perceived the influence of opened educational resources on their learning as positive. Students in openly-sourced classes did report higher perceived learning values than students in courses using traditional textbooks, implying a more positive learning experience. This study established that students perceived their learning as similar in courses using open educational resources as in courses using traditional textbooks. The CAP perceived learning scale was not explicitly designed to assess student learning in first-year seminar courses.

### **Implications**

The impact of the study was significant; the study demonstrated that students perceive their learning as similar or superior in courses using open educational resources and courses using textbooks. Specifically, students enrolled in courses using open educational resources perceived their learning as slightly higher than their peers in courses using traditional textbooks. This is especially interesting given that research has suggested that first-year students are the least likely to benefit from open educational resources (Hill, 2016). While this study did not

measure the benefits of students, it did review perceived learning of students, and the results suggested that students in first-year seminar courses using open educational resources regard their perceived learning favorably. College administrators and educators will be able to use the data from this study to make data-informed decisions regarding open educational resources and openly-sourced classrooms. These same students reported their affective learning at similar levels regardless of the learning material used in their respective first-year seminar courses. The results implied that students using open educational resources are learning at similar levels as their peers using traditional textbooks, thus validating the use of open educational resources in college classrooms. As previously described, open educational resources increase students' ability to access education (Alves et al., 2014; Lindshield & Adhikari, 2013). Therefore, when possible, educators should work to incorporate open educational resources into their college courses and to develop more openly-sourced courses. The increased use of open educational resources will allow more students to access education and ultimately obtain college credentials.

Additionally, the results of this study have the potential to assist college administrators in making informed decisions in a tight budget environment. The lower cost of the resources expand access to education and have the ability to lower the overall costs of education for students. In addition to tight budgets, community colleges are also facing declining enrollments (Baum et al., 2012). Surveys indicate that the cost of textbooks negatively impacts student learning, and the prices are related to low graduation rates (Hill, 2016). This study strengthens the case for implementing open educational resources in community college classrooms and can assist colleges in promoting their Z-Degree programs. The Z-Degree plans are a potent recruitment tool that can help in addressing declining enrollments. The Z-Degree uses open educational resources as the primary learning materials for coursework within the program

(Spectrum, 2015; Whissemore, 2015). Expanding the use of open educational resources in college classrooms and promoting their use as a suitable substitute to traditional learning materials is a robust recruitment tool for colleges to use as they prepare their strategic enrollment management reports.

Lastly, at the time of this study, only a small number of theory-based research studies were completed to observe the use and impact of open educational resources on student learning (Bateman, Lane, & Moon, 2012). Farrow (2015) researched open education and the use of pedagogies. McAndrew and Farrow (2013) compiled a list of current theoretical based research studies using open educational resources. Their list included open educational resources relative to the de-schooling theory that rose in popularity during the 1970s (McAndrew & Farrow, 2013). The de-schooling approach centered itself on students' need to obtain resources that would assist them in achieving their own goals (McAndrew & Farrow, 2013). Vavoula's (2004) research on the typology of learning is also relevant to open educational resources according to McAndrew and Farrow (2013). Vavoula (2004) found that open educational resources have enabled all forms of learning because they have provided materials that assist in the transference of learning. Research on the topic of open educational resources centers primarily on the student experience, the faculty member experience, and the cost-saving effects. Increasing the body of research related to theory-based studies on open educational resources will allow college administrators to have productive conversations with faculty regarding student learning. Productive discussions will only assist in developing robust curriculums that utilize open educational resources as a learning material that meets the needs of administrators and students.

## Limitations

One study limitation was lack of prior research on the particular topic of openly sourced classes. Researchers found that students enjoyed openly sourced courses and perceived value in open educational resources (Hilton et al., 2013; Lindshield & Adhikari, 2013). It was unknown to researchers how individual students perceived their learning in openly sourced courses or how open educational resources affected student learning. Instead, the majority of research on open educational resources focused on student and educator satisfaction with the available learning materials (Algers & Silva-Fletcher, 2015). In addition, researchers have yet to study the long-term use of open educational resources and the impact of these on student learning (Wen & Liu, 2016).

Another limitation was the use of unreliable, self-reported data from participants on an online survey platform. The online survey asked participants questions directly related to their perceptions of learning. This could have included potential bias resulting from dishonest reporting (Granello & Wheaton, 2004; Van Selm & Jankowski, 2006). For example, participants could potentially dishonestly answer the instrument's questions or quickly finish the survey because they did not fully understand the issues posed in the instrument.

The study was designed to limit threats; students participating in the study did so on a voluntary basis and were compensated for their participation by entry into an anonymous raffle to win one of four \$50.00 gift certificates. All IRB guidelines set forth by Liberty University and the participating colleges were strictly adhered to by the researcher. The participants' identities were kept anonymous from the investigator, and this assisted in limiting internal bias by the researcher. However, limitations were unavoidable; the first limitation was the students participating in the study self-reported the learning materials (open educational resources and

textbooks) used in their first-year seminar course. Therefore, the researcher assumed that any student who did not use a textbook in the course was utilizing open educational resources. Second, the students' participation took place several months after the completion of the first-year seminar course. The study took place during the spring 2017 semester, but the students were enrolled in the course during the fall 2016 semester. Therefore, the time elapsed between the course and the research could have skewed the study's results. Students may not have remembered the coursework as vividly a few months following completion of the course, as they would have if the research had taken place immediately following the conclusion of the course.

### **Recommendations for Future Research**

Future studies should be conducted to determine if similar results are found in other classes. A prospective qualitative study could be performed by researchers to see if similar results are found between the perceived learning of students on openly-sourced courses and students in courses using traditional textbooks. Additional research could also be conducted on:

- (a) A similar study using a different population and a larger sample size, such as students enrolled in another course such as English, Math or History.
- (b) A study looking at the relationship between open educational resources and student course completion/success rates.
- (c) A study looking at the correlation between open educational resources, Z-degree programs, and graduation rates.
- (d) A research study measuring perceived learning using another research instrument such as the Learning Loss Scale (Rovai et al., 2009).
- (e) A research study designed to look at the perceived learning of students enrolled in Z-Degree programs.

These potential studies have the promise to expand the body of literature already existing related to open educational resources and will continue to advance the use of open educational resources in college classrooms.

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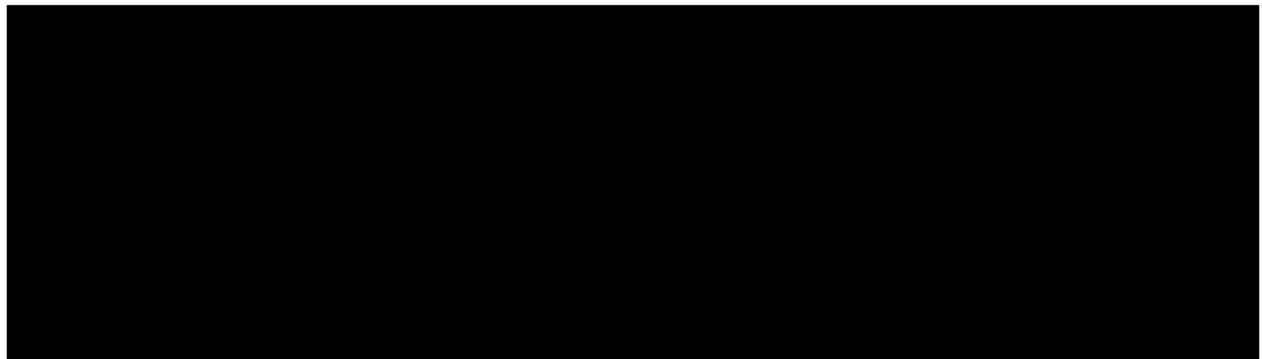
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## Appendix A

### Permission to use the Instrument & Instrument



Alfred Rovai

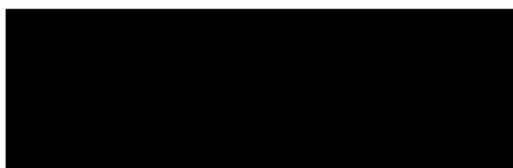
Fri 10/10/2014, 2:26 PM



Hi,

Yes, you may use the instrument. Make sure you cite the source article in any report you publish.

Best wishes,  
Fred Rovai



## CAP PERCEIVED LEARNING SCALE SCORING KEY

### Total CAP Score

Score the test instrument items as follows:

Items 1, 3, 4, 5, 6, 8, and 9 are directly scored; use the scores as given on the Likert scale, i.e., 0, 1, 2, 3, 4, 5, or 6.

Items 2 and 7 are inversely scored; transform the Likert scale responses as follows: 0 = 6, 1 = 5, 2 = 3, 3 = 3, 4 = 2, 5 = 1, and 6 = 0.

Add the scores of all 9 items to obtain the total CAP score. Scores can vary from a maximum of 54 to a minimum of 0. Interpret higher CAP scores as higher perceptions of total learning.

### CAP Subscale Scores

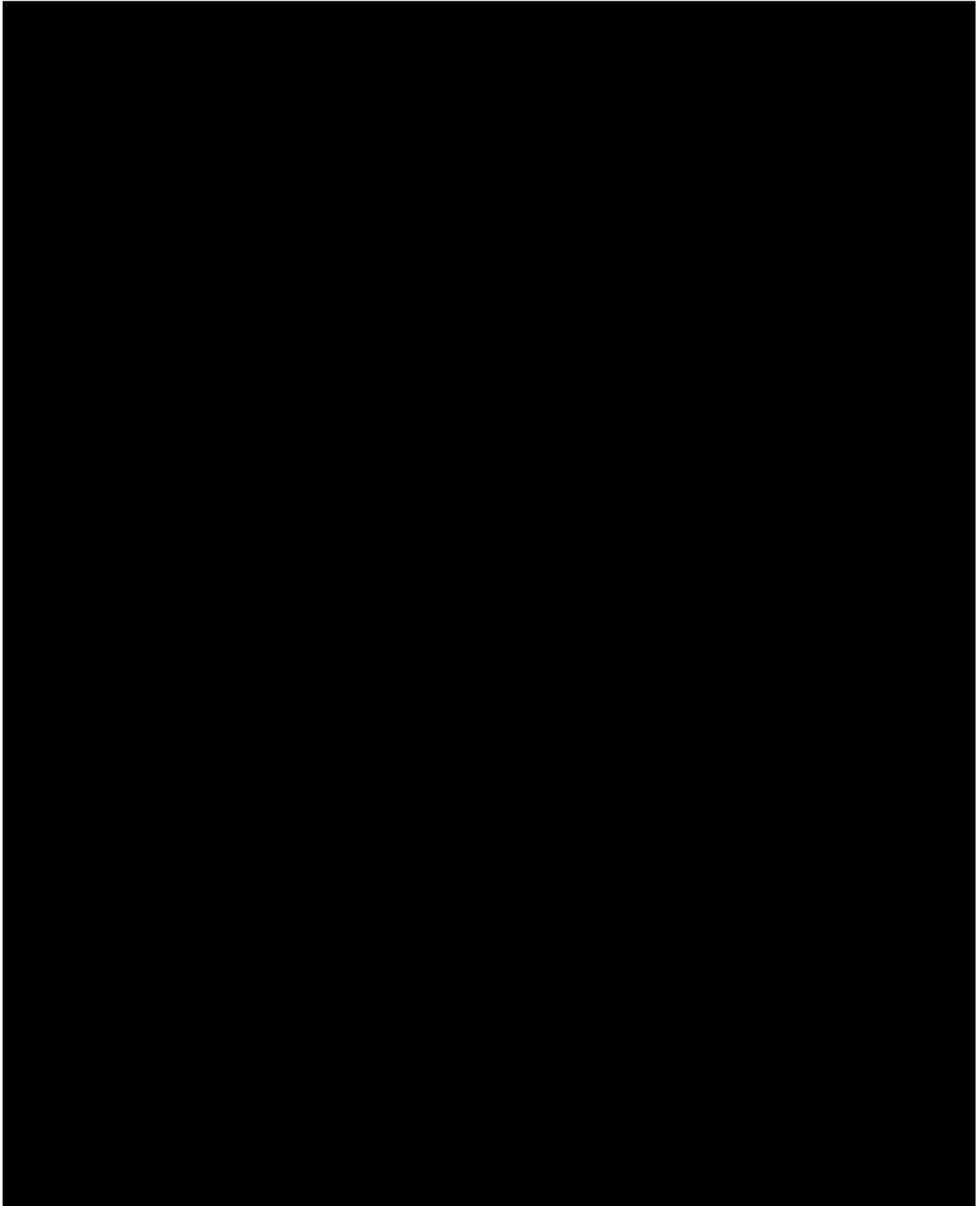
Add the scores of the items as shown below to obtain subscale scores. Scores can vary from a maximum of 18 to a minimum of 0 for each subscale.

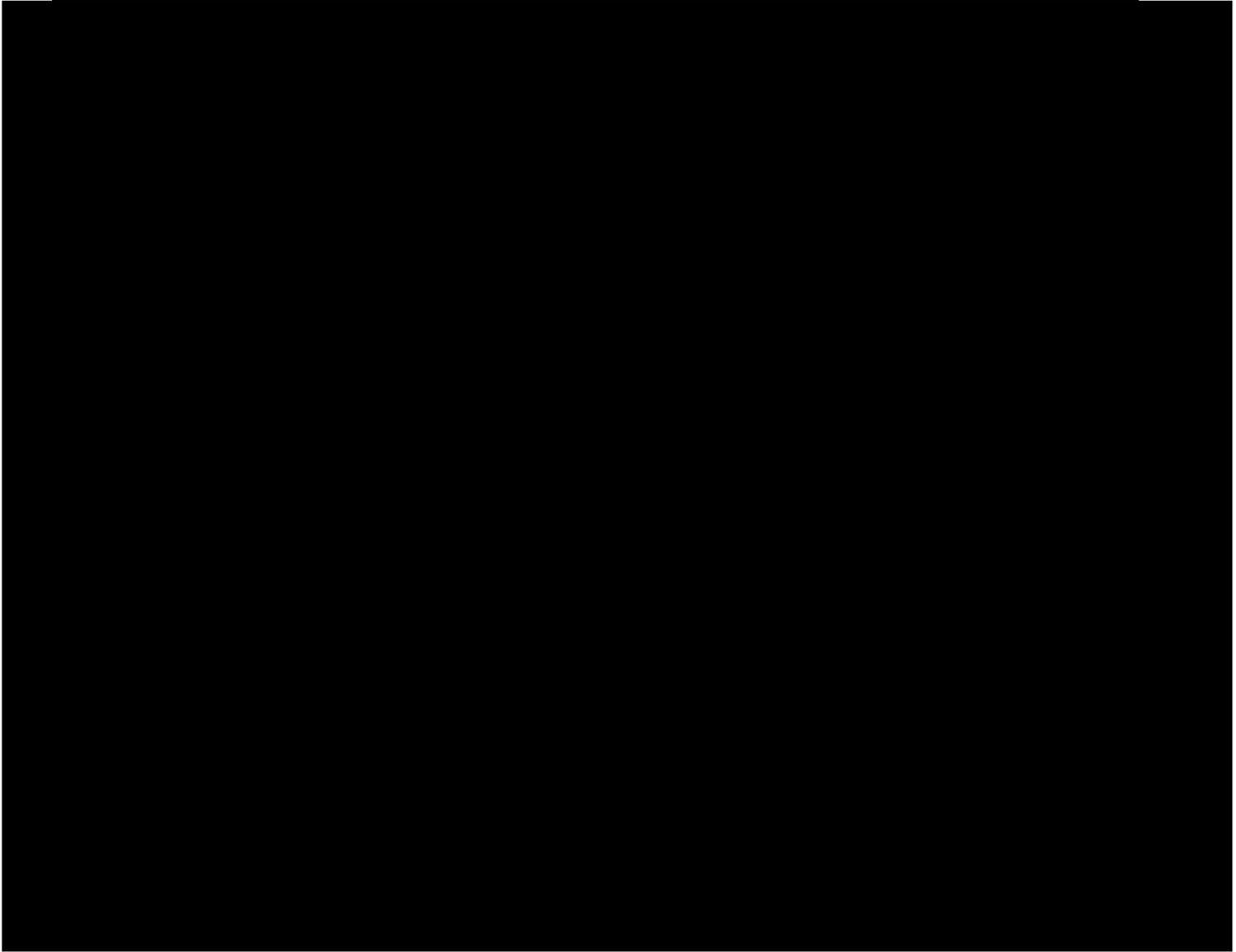
Cognitive subscale: Add the scores of items 1, 2, and 5.

Affective subscale: Add the scores of items 4, 6, and 9.

Psychomotor subscale: Add the scores of items 3, 7, and 8.

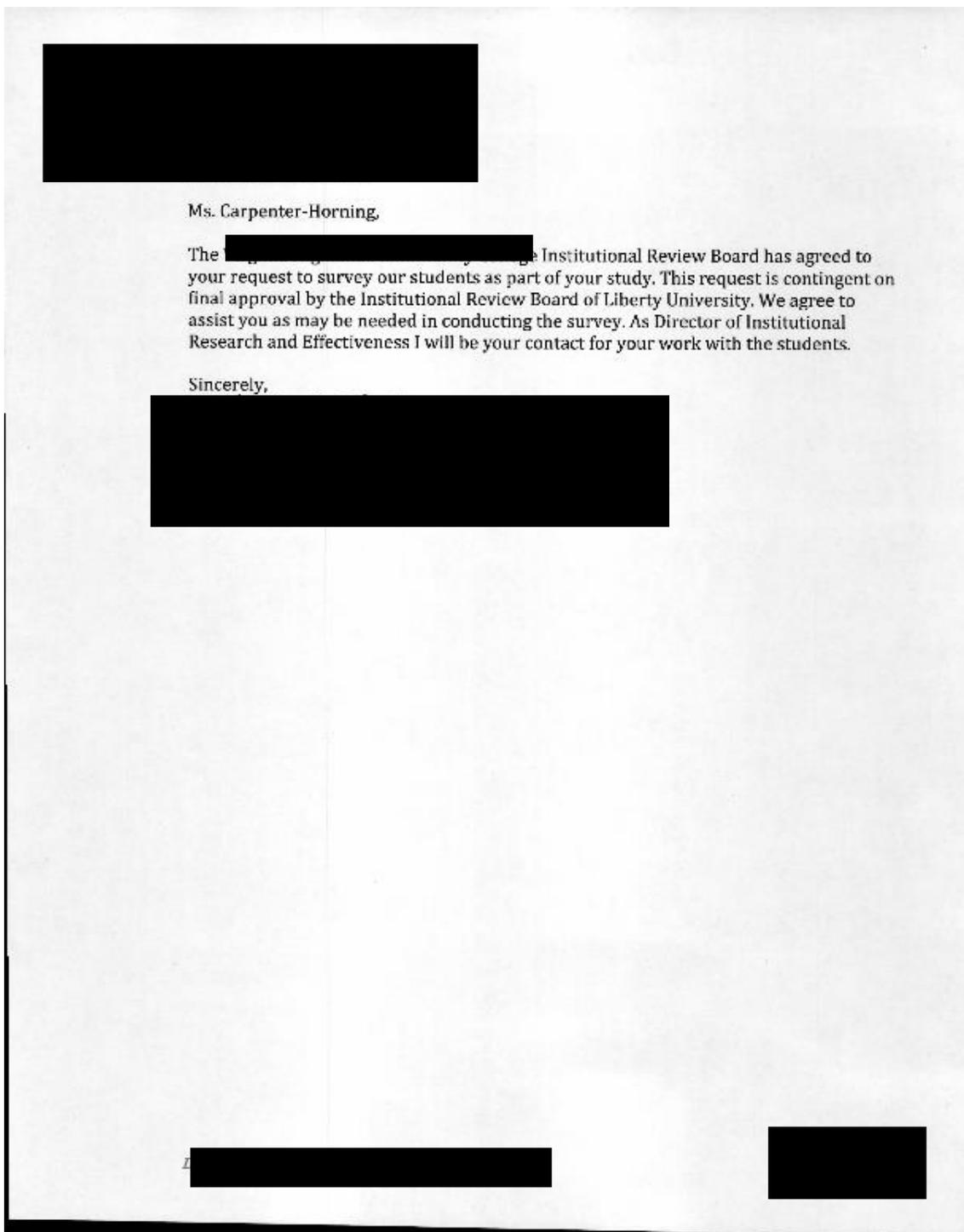
*CAP Perceived Learning Scale*

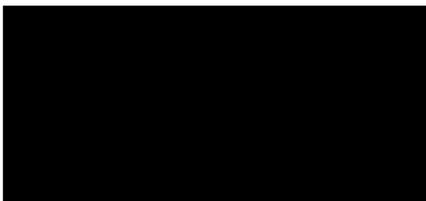




## Appendix B

### College Level Permission Letters





January 19, 2017

Amanda K. Carpenter-Horning



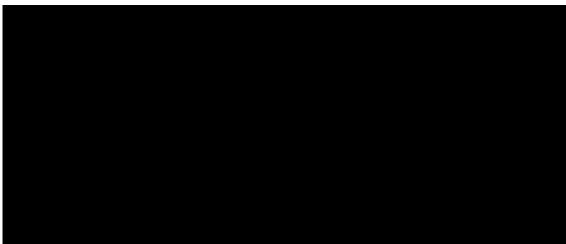
Dear Ms. Carpenter-Horning,

Your request to survey students for your doctoral study about SDV and OER is approved.

██████████ staff will send the URL for the survey to its students. Please let us know when you want us to do that and if you want to include dual enrollment, high school students.

██████████ is in charge of the IE office and can handle your data needs moving forward. I am ccing her in this letter and you should work with her directly.

Thanks and good luck,  
Sincerely,





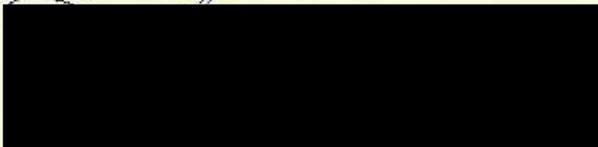
January 24, 2017

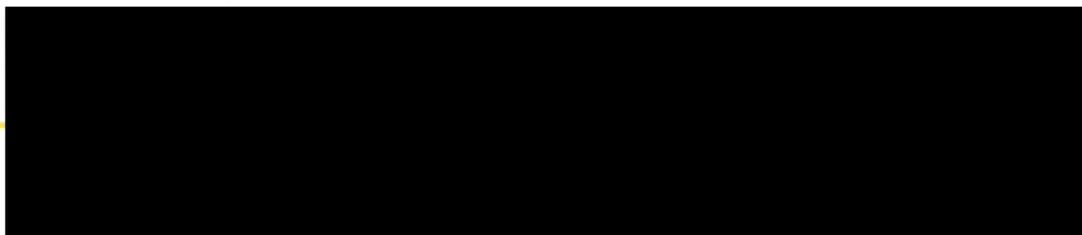
Dear Ms. Carpenter-Horning,

This letter acknowledges that [REDACTED] Office of Institutional Research and Assessment has received your request to conduct your research project entitled "The Effects of Perceived Learning on Open Sourced Classrooms within Community Colleges in the Southeastern Region of the United States" at [REDACTED]. Your request has been reviewed in accordance with [REDACTED] policy. Your request has received provisional approval pending receipt of final IRB approval from Liberty University.

My office will serve as your point of contact and I look forward to working with you. If you have any questions or concerns, please feel free to contact me at [REDACTED] or via email at [REDACTED].

Sincerely,





January 24, 2017

To Whom It May Concern,

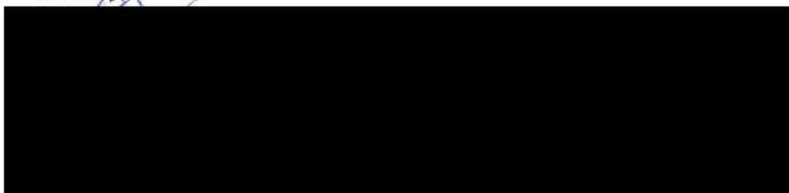
████████████████████ approves the request by Amanda Carpenter to conduct the learning scale survey with students enrolled in SDV 100 in the term. This approval is contingent on final approval by the Liberty University IRB.

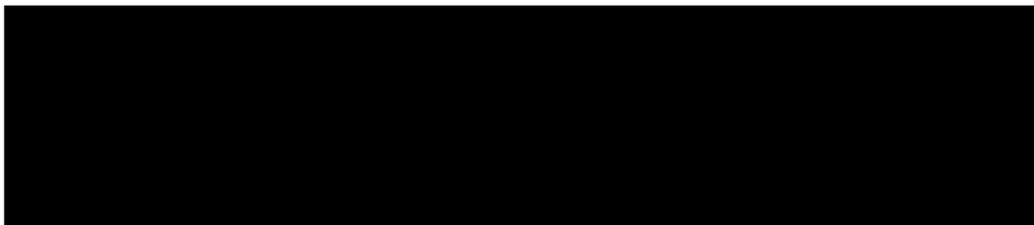
██████████ will release the college email addresses for students enrolled in SDV 100 once Amanda provides us with the final IRB approval. The data will exclude all students enrolled in SDV 100 who are still enrolled in high school (also a dual enrollment course).

Should you have any questions or require additional information, please do not hesitate to let me know.

Sincerely,

A handwritten signature in blue ink, appearing to be "S. B.", written over the word "Sincerely,".





2/1/2017

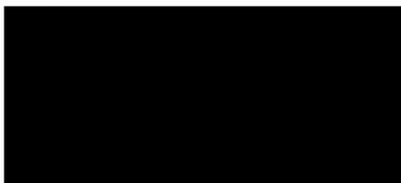
Ms. Amanda K. Carpenter-Horning



Dear Ms. Carpenter-Horning,

 has now had the chance to review your research request for the dissertation project titled "The Effects of Perceived Learning on Open Sourced Classrooms within Community Colleges in the Southeastern Region of the United States". We are in agreement to grant you provisional approval to conduct this research surveying  Community College students, pending IRB approval.

Best regards,





February 2, 2017

Amanda K. Carpenter-Horning



IRB #: 17-020

Protocol Title: **The Effects of Perceived Learning on Open Sourced Classrooms**

Dear Amanda:

I am pleased to notify you that the  Institutional Review Board (IRB) has granted approval to the captioned research project. This approval provides permission to begin the research activities outlined in the IRB-approved application and supporting documents.

Approved as: **Expedited**, under 45 CFR 46.110

This expedited approval was possible because the protocol was previously approved by the IRB at Liberty University.



**February 2, 2017**

Expiration Date: **February 1, 2018**

Continuing Review Due Date\*: **December 3, 2017** (60 days prior to the expiration date)

\*A continuing review request for this project must be submitted if activities covered under this protocol, including data analysis, are to continue beyond the expiration date listed above.

All investigators are required to comply with the researcher requirements outlined at:



. Please review these responsibilities before the commencement of your research.

**Changes in Protocol:**

Plans to deviate from the approved protocol and/or supporting documents must be approved by the IRB prior to the implementation of any changes.

Unplanned variance in protocol that could adversely affect the safety or welfare of subjects must be reported to the IRB within 10 days of discovering the variance.

**Close Out Report:**

A Close Out Report must be provided the [REDACTED] IRB within 30 days after the expiration date, providing a summary of the project and results. This report is available at

[REDACTED]

The [REDACTED] IRB thanks you for permitting us the opportunity to review the project.

We look forward to learning of your results.

---

[REDACTED]

Sincerely,

[REDACTED]

[REDACTED] Vice President of Academic and

Student Affairs cc: [REDACTED]

[REDACTED]

[REDACTED]

February 28, 2017

Dear Ms. Carpenter-Horning:

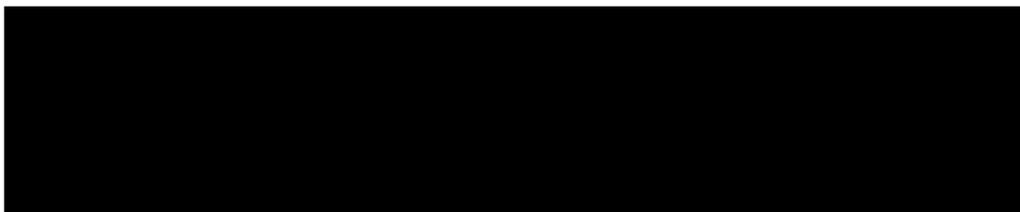
The [REDACTED] Research Review Team met and reviewed your research proposal: *The Effects of Perceived Learning on Open Sourced Classrooms Within Community Colleges in the Southeastern Region of the United States*. We approve your moving forward with your study at John Tyler Community College, contingent upon students agreeing to participate in your study.

Please contact the Office of Institutional Effectiveness to let us know how you would like to proceed. They can be reached at [REDACTED] or by email [REDACTED].

Sincerely,

[REDACTED]

[REDACTED]



3/8/2017

Amanda Carpenter-Horning

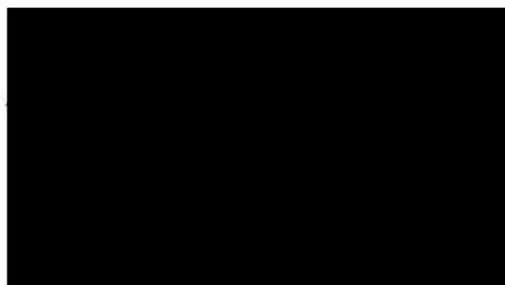


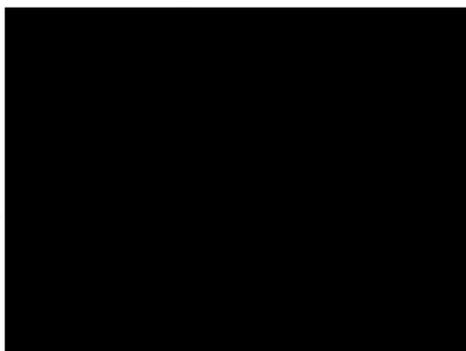
Dear Amanda,

This letter is to let you know that the Institutional Review Board for [REDACTED] has reviewed your research request and decided to grant you permission to obtain data from [REDACTED] to use in your study "The Effects of Perceived Learning on Open Sourced Classrooms within Community Colleges in the Southeastern Region of the United States." As stated in your provided materials, we expect you to uphold the integrity of professional research and protect the privacy of all individuals who participate in this study.

We look forward to working with you and accommodating your request.

Sincerely,





March 10, 2017

Ms. Amanda Carpenter-Horning  
Doctoral Student  
Liberty University

Dear Ms. Carpenter-Horning,

The Office of Institutional Research and Effectiveness at [REDACTED] has reviewed the packet of information you provided for your proposed research on "The Effects of Perceived Learning on Open-Sourced Classrooms within Community Colleges in the Southeastern Region of the United States". Based on that review, the College has granted approval for your research.

Please note, however, that [REDACTED] must receive documentation of complete approval from your institution's IRB before you proceed with your research at the College, and that all research activities must be carried out in accordance with the documentation you submitted and in adherence to our [REDACTED] Principles of Practice.

If you have any questions or concerns regarding the contents of this letter, please let me know. I wish you the best in your research.

Sincerely,



## Appendix C

### IRB Permission Letter & Consent Form

# LIBERTY UNIVERSITY

## INSTITUTIONAL REVIEW BOARD

February 9, 2017

Amanda Carpenter-Horning  
 IRB Exemption 2734.020917: The Effects of Perceived Learning on Open-Sourced Classrooms  
 within Community Colleges in the Southeastern Region of the United States

Dear Amanda Carpenter-Horning,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(2), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

- (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
- (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and
  - (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at

[REDACTED]

Sincerely,

[REDACTED]

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

**LIBERTY**  
 UNIVERSITY

*Liberty University | Training Champions for Christ since 1971*

The Liberty University Institutional  
Review Board has approved  
this document for use from  
2/9/2017 to --  
Protocol # 2734.020917

## CONSENT FORM

THE EFFECTS OF PERCEIVED LEARNING ON OPEN SOURCED CLASSROOMS  
WITHIN COMMUNITY COLLEGES IN THE SOUTHEASTERN REGION OF THE UNITED  
STATES.

Amanda Kay Carpenter-Horning  
Liberty University  
School of Education

You are invited to be in a research study of the effects of statistical differences in perceived learning scores of students enrolled in open-sourced courses using traditional textbooks. You were selected as a possible participant because you completed a first-year seminar course (SDV 100) during the Fall 2016 semester and received a grade of "D" or higher. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

Amanda Kay Carpenter-Horning, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

**Background Information:** The purpose of this study is to determine, utilizing the CAP Perceived Learning Scale (Rovai, 2009), if students using open-sourced material in online courses perceived learning differently from those using traditional textbooks.

**Procedures:** If you agree to be in this study, I would ask you to do the following things:

1. Complete two screening questions to finalize your eligibility to participate. This portion of the study will take approximately two minutes and will be anonymous.
2. Answer one question related to learning materials in your first-year seminar course. This portion of the study will take approximately one minute.
3. Answer a nine-question survey related to your learning experiences in your first-year seminar course. The nine-question survey will take approximately ten minutes to complete and will be anonymous. You may discontinue completing the survey at any time. The survey portion of the study is anonymous.

**Risks and Benefits of being in the Study:** The risks involved in this study are minimal, no more than you would encounter in everyday life. Participants should not expect to receive a direct benefit, however, participation may benefit society by expanding the body of knowledge on the topic of open educational resources.

**Compensation:** At the end of the survey, you will be given the option to enter a raffle to win one of four \$50 Amazon gift cards. Entering the raffle will be confidential and the researcher will only contact the four recipients. Also, raffle entry will not link participant identities to their responses.

**Confidentiality:** The records of this study will be kept private and password protected. Data for this research project will be saved on a password-protected computer and on the password-protected, SurveyMonkey platform. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records. Any data collected will be

## Appendix D

### Student Recruitment Message and Follow-Up Message

#### RECRUITMENT MESSAGE

<Insert Date>

Dear Potential Participant:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctorate degree in education. The purpose of my research is to determine if students using open source materials perceive learning differently from those using traditional textbooks in college coursework. I am writing to invite you to participate in my study.

If you are 18 years or older as of August 22, 2016, enrolled in a freshman seminar course ( [REDACTED] ) during the Fall 2016 semester (August - December), passed the course with a “D” or higher, and are willing to participate you will be asked to do the following:

1. Complete two screening questions to finalize your eligibility to participate. This portion of the study will take approximately two minutes and will be anonymous.
2. Answer one question related to learning materials in your first-year seminar course. This portion of the study will take approximately one minute.
3. Answer an anonymous screen questionnaire (2 minutes), followed by an anonymous online survey (10 minutes). More detail information can be provided in the consent document.

At the end of the survey, you will be given the option to enter a raffle to win one of four \$50 Amazon gift cards. Entering the raffle will be confidential and the researcher will only contact the four participants.

To participate, go to <insert SurveyMonkey link>. A consent document is provided as the first page that you will see after you click the survey link. The consent document contains additional information about my research. Please click on the survey link at the end of the consent information to indicate that you have read the consent information and wish to participate.

Sincerely,

Amanda Kay Carpenter-Horning

Liberty University, Graduate Student

**FOLLOW-UP MESSAGE**

<Insert Date>

Dear Potential Participant:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctorate degree in education. Last week, an email was sent to inviting you to participate in a research study. This follow-up email is being sent to remind you to complete the survey if you would like to participate and have not already done so. The deadline for participation is <ten business days after first message is sent>.

If you choose to participate, you will be asked to complete two screening questions, nine survey questions, and, if desired, enter a raffle to win one of four \$50.00 Amazon gift cards. It should take approximately ten to fifteen minutes for you to complete the procedures listed. Your participation is anonymous, and no personal identifying information will be required. Your participation in the raffle will be confidential and I will only contact raffle winners.

To participate, go to <insert SurveyMonkey link>. A consent document is provided as the first page that you will see after you click the survey link. The consent document contains additional information about my research. Please click on the survey link at the end of the consent information to indicate that you have read the consent information and wish to participate.

Sincerely,

Amanda Kay Carpenter-Horning

Liberty University, Graduate Student

## Appendix E

### RandomPicker Raffle Example Submission

# Amazon Gift Card Raffle Entry Form

Thank you for taking the time to participate in this research project. Entering this raffle will be confidential and the researcher will only contact the four winning recipients. Entering the raffle will not link participants identities to survey responses. The researcher will only contact you if you are one of the gift card recipients.

Gift card recipients will be contacted no later than June 5, 2017.

---

**Email**

Submit Contest Entry Form

## Appendix F

### First-Year Seminar Course Learning Outcomes

AREA	TOPIC	LEARNING OUTCOME(S)
1. Career Exploration and Development*  <i>Provides students with an overview of career options</i>	1.1 Career Exploration**	Students will articulate three potential careers based on their interests, values, and abilities. <i>Note: Students will utilize the Virginia Education Wizard to accomplish this task.</i>
	1.2 Career Planning	Students will select or confirm their preferred program of study based on their career exploration.
		Students will articulate the step(s) they need to take in order to achieve their career goal(s).
2. College Resources  <i>Provides students with an overview of general college resources</i>	2.1 Student Web Portal	Students will activate their student username and password.
	2.2 Student Information System	Students will demonstrate competence in using the student information system by: <ul style="list-style-type: none"> <li>a) accessing the student information system;</li> <li>b) accessing the student center</li> <li>c) setting user preferences;</li> <li>d) searching for classes</li> <li>e) accessing financial statement</li> <li>f) printing class schedules</li> </ul>
	2.3 Instructional Technology / Services	Students will activate their college email accounts.
		Students will access Blackboard
	2.4 College Catalog	Students will identify where they can access the College Catalog in print and / or electronic format.
	2.5 Student Handbook	Students will identify where they can access the Student Handbook in print and / or electronic format.

AREA	TOPIC	LEARNING OUTCOME(S)
	2.6 Library Resources	Students will identify three resources / services available in the college library.
	2.7 Student Services	Students will identify and describe three offices / services that are available to them (e.g. tutoring, disability services, financial aid, etc.).
3. College Policies  <i>Provides students with an overview of important college policies</i>	3.1 Academic Integrity / Student Conduct / Classroom Etiquette	Students will identify three of their responsibilities as members of the college community.
	3.2 Student Rights & Responsibilities	Students will identify at least two policies that affirm their rights as members of the college community (e.g. Student Grievance / Appeals; Statement of Rights and Responsibilities, etc.).
	3.3 Academic Standing	Students will articulate the College's criteria for good academic standing.
4. Academic Planning*  <i>Provides students with information related to academic programs and how students can achieve their academic goals</i>	4.1 Curricular Offerings**	Students will be able to distinguish between university parallel/transfer and applied programs.
		Students will select the appropriate curriculum and electives within that curriculum based on their career goal(s).
	4.2 Course Offerings	Students will identify all courses required for completion of program, understand both course, and program prerequisites.
	4.3 Academic Plan	Students will develop academic plan.
5. Academic Skills*  <i>Provides students with an overview of information related to optimal academic performance</i>	5.1 Learning Styles**	Students will review multiple learning styles and identify their preferred learning style.
	5.2 Classroom Skills	Students will review two note-taking strategies and identify their preferred method of note taking.

AREA	TOPIC	LEARNING OUTCOME(S)
		Students will identify three strategies for test taking.
	5.3 Academic Preparation	Students will identify their optimal time, place, and setting for studying.
		Students will identify three memory strategies.
		Students will identify three strategies for managing reading.
	5.4 Critical Thinking Skills	Students will articulate three aspects of critical thinking such as: <ul style="list-style-type: none"> <li>a. Identifying faulty logic</li> <li>b. Problem-solving</li> <li>c. Asking questions / Probing</li> <li>d. Etc.</li> </ul>
6. Life Management* <i>Provides information on how to manage various aspects of their lives.</i>	6.1 Time Management	Students will review two strategies and tools for managing time and will articulate their preferred method.
	6.2 Financial Literacy**	Students will articulate the benefits and risks of the three aspects (e.g. credit, savings, and budgeting) of money management.
		Students will develop a personal budget.
6.3 Goal Setting	Students will articulate the steps in developing and implementing personal goals.	
7. Social / Interpersonal* <i>Provides information on how to effectively interact with others</i>	7.1 Diversity	Students will articulate three ways individuals are diverse and how diversity impacts society.
	7.2 Communication Skills**	Students will identify three elements of effective communication (e.g., active listening, verbal and non-verbal messages, etc.).
8. Wellness*	8.1 Stress Management**	Students will identify three techniques/strategies for managing anxiety / stress.

AREA	TOPIC	LEARNING OUTCOME(S)
<i>Provides information on how to maintain a healthy lifestyle.</i>	8.2 Decision Making	Students will identify three challenges to making healthy life decisions and develop three to five strategies on how to manage each challenge.
	8.3 Mental Health	Students will identify symptoms of distress and mental illness and articulate two to three resources that can access for assistance.
	8.4 Physical Health	Students will identify three strategies to achieve and / or maintain a healthy (physical) lifestyle.