8-24-2017

Vocabulary gamification vs traditional learning instruction in an inclusive high school classroom

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VOCABULARY GAMIFICATION VS TRADITIONAL LEARNING INSTRUCTION IN AN INCLUSIVE HIGH SCHOOL CLASSROOM

by

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A Thesis

Submitted to the
Department of Interdisciplinary and Inclusive Education
College of Education
In partial fulfillment of the requirement
For the degree of
Master of Arts in Special Education
at
Rowan University
August 6, 2017

Thesis Chair: S. Jay Kuder, Ed.D

Dedications

I would like to dedicate this thesis to my family for their unwavering love and support through this endeavor, my wonderful students, and colleagues who have encouraged me to never stop learning.

Acknowledgments

I would like to express my deepest appreciation and gratitude to Professor S. Jay Kuder and the faculty at Rowan University for their guidance and help throughout this Master's Program. I look forward to implementing my knowledge as an educator to better enhance the education of my students in the years to come.

Abstract

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The purpose of this study was to examine the effects of vocabulary quiz scores when *Kahoot!* game-based response system was implemented as a competitive game for vocabulary review, alternating with a traditional review worksheet. The study was conducted in a public high school in Monmouth County, NJ across two 10th grade English classrooms with general education and special education students ranging in age from 15-16 years old who reside in Central New Jersey. Vocabulary quizzes were administered weekly over twelve weeks. Participants in this study consisted of 36 general education students and 14 special education students. Results of the study show that vocabulary quiz scores were marginally higher when the traditional worksheet was utilized.

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Chapter 1

Introduction

Throughout my teaching experience at the high school level, I have observed that many students have difficulty comprehending the meaning of vocabulary terms related to the literature studied in English class. Vocabulary has been a component of the English literature curriculum for a very long time. Traditional vocabulary reviews have included fill in the blank worksheets, flashcards, or matching exercises. While some of these reviews remain beneficial, in today's technologically advanced society, teachers and students are strongly encouraged to use technology in the classroom.

Some students are initially able to memorize the definition of a word and then ultimately utilize it correctly in contextual sentences. This student has the ability to create a "hook" to help them memorize a specific vocabulary word. The "hook" is meant to represent anything that will help them remember the word; whether this is a symbol, a synonym, or pneumonic device. For example, the word 'solemn' begins with the letter 's' such as 'sad', 'sorrow', or 'serious' which represent synonyms to the word 'solemn.'

Students with learning disabilities often have difficulty with certain vocabulary terms, especially words that are rarely used in daily conversation, but rather, appear solely in literature. Although students with learning disabilities may struggle to use memorization skills effectively, students without learning disabilities often know the best way to recall information and apply that knowledge to contextual sentences when needed. The ability to simply recall a definition does not imply that the student truly comprehends the meaning of the word. The student should be able to demonstrate how to properly use

the word in a sentence while utilizing the word's correct part of speech. The goal of vocabulary instruction is to teach students terms that exist within the literature, thereby making the literature more meaningful. According to Beach, Sanchez, Flynn, and O'Connor, (2015) "…extending adolescents' vocabulary knowledge through direct and explicit vocabulary instruction is a worthwhile endeavor for all subject area teachers, including teachers of struggling readers and students with a learning disability (p. 36)."

Students at the secondary level, especially in today's technology-driven world, are rarely seen without a technological device such as a cell phone, tablet, or laptop. One potential method that may help secondary-age students learn new vocabulary is the use of technology. It was observed that when technology was introduced a learning tool in my classroom, excitement built and motivation was very high. "The challenge for educators is to move from basic surface level use of technology to more integral use of technology in enhancing learning" (Penuel, 2006, p. 332). Unfortunately, not all teachers are eager to implement multimedia in their classrooms. Some teachers may not feel comfortable using technology due to dislike, and feel as if the technological software is too challenging and time consuming to learn how to use. Technology continues to advance both inside and outside of the classroom in today's 21st century. Standardized testing has evolved to include technological components, such as using computers to read, annotate, write essays, as well as answer multiple choice and analytical reading comprehension questions. Gone are the days when paper meets pencil and the grading process took a great deal of time. Technology permits instantaneous scores. Teachers must keep up with the advancements because today's students are very technologically savvy. According to Musti-Rao (2017), when technology is integrated in a meaningful way, the benefits apply

to both the teacher and the student. This is especially true in schools where the achievement gaps are wide and students are struggling to meet grade-level requirements.

The purpose of this study was to examine the effectiveness of implementing technology software in the 10th grade English classroom. The specific technology software used was *Kahoot!* which is a mobile application game-based response system (GSRS). I believe students who are offered technology-based learning for vocabulary review will perform better on vocabulary quizzes than without the use of technology.

Research Problem

The questions to be answered in this study include:

1. What is the difference in student vocabulary quiz scores using *Kahoot!* versus traditional instruction?
2. What is the difference in vocabulary scores between general education students and special education students when *Kahoot!* is used as a vocabulary review?

This study was conducted in Monmouth County, New Jersey, across two classrooms with general education and special education students ranging in age from 15-16 years old who reside in Central New Jersey. The students in two 10th grade English classrooms were designated as the subjects for this study. In this curriculum, students explored the theme of heroes in mythology, legends, tragedies, and contemporary fiction. Composition, grammar, and vocabulary were reinforced in each unit. Vocabulary quizzes were administered weekly over twelve weeks. *Kahoot!* was implemented as a competitive game for vocabulary review, alternating with a traditional review worksheet. The

worksheet contained fill in the blank sentences, where students had to choose the correct vocabulary word from the word bank provided. Both the *Kahoot!* game and the traditional review worksheets were created by myself.

It was hypothesized that vocabulary scores would be higher when *Kahoot!* was implemented compared to vocabulary scores that utilized the traditional fill in the blank worksheet. It was further hypothesized that the special education students would have a higher percentage score increase than the general education students. On a weekly basis, the vocabulary quiz class average was calculated and compared. In addition, the data compared the general education students' vocabulary scores to that of the special education students' vocabulary scores.

Key Terms

Gamification: The process of using game thinking and game mechanics to engage audiences and solve problems (Zichermann, 2012 as stated in Abrams and Walsh 2014).

Implications

Varied learning tools such as gamification, were important because teachers must differentiate instruction by using technology in the classroom. Vocabulary instruction with the use of technology allowed the students themselves to become a part of the lesson as opposed to being lectured to. Technology and the engaging atmosphere it created provided struggling students an opportunity to learn in an interactive environment. Students with and without learning disabilities benefit from multi-sensory lessons in which they contribute to the review lesson. Vocabulary is much more than simple recall; it is a skill that students need to master at each grade level as well as on standardized tests

such as the PARCC, SAT, and ACT. These exams are essential to college acceptance and higher education.

Summary

Vocabulary skills at the high school level are imperative. Poor vocabulary retention and the inability to apply these words to literature have negative effects on reading comprehension. Gamification is a method that enables students to achieve better vocabulary quiz scores, thereby improving their vocabulary lexicon.

My hypothesis was that high school students who participated in the *Kahoot!* review game had improved scores compared to the traditional review. It was also hypothesized that the special education students exhibited a higher growth percentile than the general education students. The goal of vocabulary gamification was to excite, motivate, and stimulate participation and retention of new terms.

Chapter 2

Literature Review

Many high school students find difficulty in decoding grade-level vocabulary words as it applies to the literature they read. Baumann and Kameenui (as cited in Bryant, Goodwin, Bryant, and Higgins, 2003) state that the ability to comprehend vocabulary corresponds with the ability to comprehend several components of a given word. For example, prefixes, root words, suffixes, and etymology of a word are also important in determining a word's meaning. In addition, vocabulary instruction can and should include the term's part of speech, definition, synonyms, antonyms, and proper use of contextual sentences. Simply memorizing the definition of a word does not mean that true comprehension of the vocabulary word was mastered. Moreover, students learn vocabulary terms in different ways, as each individual has unique skills and preferred learning styles. Educators must use a variety of teaching modalities such as visual, auditory, and kinesthetic to best meet the needs of each student. According to Jitendra, Edwards, Sacks, and Jacobson, (2004) some important teaching modalities include mnemonic strategy instruction, cognitive strategies instruction, direct instruction, constant time-delay instruction, activity-based methods, and computer-assisted instruction.

Importance of Vocabulary Learning

Children are often read to at a young age and are therefore exposed to stories, letters, and sounds before they are old enough to construct meaning from those sentences and stories. Vocabulary and literature go hand in hand, and teaching vocabulary terms

before and during reading as a part of the English literature curriculum is essential in order for students to make sense of the text they read. Essentially, reading the literature *prior* to learning vocabulary terms in the literature would serve no purpose. According to Beach, Sanchez, Flynn, and O'Connor (2015), specific vocabulary instruction is essential to improve students' success in diverse classrooms where many students are struggling readers. Their review of previous research indicated that a concrete framework with modifications for learning disabled students ensures instruction that is more beneficial to struggling readers. The US Department of Education (2013) found that students with disabilities scored 40 points below their peers on the 12th grade assessment of reading on the National Assessment of Educational Progress. In support of this, Baker, Simmons and Kameenui (1995), and Beck and McKeown (1991), both found the goal of vocabulary instruction is to strengthen students' ability to interact within language situations.

Interestingly, reading and vocabulary are tightly linked together. When individuals read, their vocabulary lexicon increases, and therefore, new vocabulary terms allow to better understand the literature (Elleman, Morphy, and Compton, 2009). Although vocabulary words and reading are closely connected, the process of learning new words can be daunting to struggling readers and students with learning disabilities. If a student does not enjoy reading because he or she finds it difficult, he or she will not be motivated to read. Struggling, unmotivated readers, as well as those with specific learning disabilities, ultimately need explicit vocabulary instruction. According to Beach, et al. (2015), "…teachers must select words carefully for explicit instruction…any word can be classified into one of three semi distinct tiers. Tier 1 are common words, such as *bury* and *large.* These words occur frequently in oral language and are likely known by

most adolescent readers, including struggling readers. If the words are not known, they can be explained with a simple definition or demonstration; thus vocabulary instruction is not necessary. The remaining two tiers represent a corpus of words otherwise known as academic vocabulary (p. 37)." Tier 2 words are words that a student would come across in multiple disciplines. Words such as *analyze*, *finite*, and *writhe* can be used in different subject areas. The goal is to improve students' access to a wide range of academic terms. Tier 3 words are related to domain-specific content. The word such as *edema*, *febrile*, and *dyspnea* are specific to the medical field and would not be common in daily conversation.

Finding meaning within text is the goal for progressing academically and applying knowledge outside of the classroom. Students must understand word meanings in addition to the main idea of the text they read. True reading comprehension cannot take place if vocabulary terms have not been learned. Every grade level requires different vocabulary terms depending on the curriculum, class level, and school district. For example, a 10th grade set of 10-12 weekly vocabulary words related to literature studied in class will differ from 11th grade vocabulary that may focus more on standardized tests such as the SAT. Ultimately, words that do not appear in literature or conversation tend to be more difficult for students to learn.

Part of the importance of finding meaning within text is the ability for students to use prior knowledge regarding vocabulary terms. Activating prior knowledge requires students to ask themselves questions such as "where have I heard this term before? Does this word sound like another word with similar meaning?" This prior knowledge and metacognitive skill can help students determine a word's meaning if he or she is unable to determine the meaning based on the word's contextual use in a sentence. The ability

for students to ask questions is very important, and is encouraged by educators. True learning cannot occur if students do not ask questions to clarify any confusion.

Vocabulary Difficulties of Students with Learning Disabilities

Students with learning disabilities sometimes struggle to learn new vocabulary terms. Kennedy and Ihle (2012) stated that it is unlikely that students with learning disabilities will receive the type and amount of reading instruction needed to improve reading ability and obtain success within the content's standards. In addition, Brownell Sindelar, Kiely, and Danielson (2010) suggest reframing the qualifications of special educators to include content expertise. This expertise may contribute knowledge, skills, and some measure of legitimacy to special education educators, especially when partnered with general education teachers.

A review of research findings for vocabulary instruction is lacking for students with learning disabilities. Three reviews have been conducted within the last fifteen years. Johnson, Gersten, and Carnine (1987) studied the effects of the number of vocabulary words presented to students with disabilities while utilizing computer-assisted instruction. Their study included twenty-five students in grades 9-12 who were matched based on vocabulary pre-test scores and randomly assigned to one of two treatments. The first treatment was the small teaching set consisting of 7 words, and the large teaching set consisted of 25 words. Results indicated that over a period of 11 instructional sessions, students in the small teaching set outperformed students in the large teaching set in terms of time required to reach satisfactory achievement.

Evidence-Based Methods for Teaching Vocabulary to Students with Learning Disabilities

Overall, there are many ways to assist students with learning disabilities in acquiring new vocabulary knowledge. Although students with learning disabilities tend to read less than their non-disabled peers and may have poor language skills, these students have every right to learn the same material as their classmates. Some students may have poor retention skills, poor verbal ability, or may simply not be given enough opportunities to use vocabulary terms in writing or daily conversation. Special education teachers have a vital role when it comes to modifying or tailoring instruction to appeal to the specific learning styles of their students.

One study conducted by Condus, Marshall, and Miller (1986) examined the key word mnemonic strategy as a means to improve vocabulary learning and retention. Sixty students (48 males and 12 females) with an identified learning disability in reading participated. Based on results of the *Peabody Picture Vocabulary Test-Revised*, students were divided into two groups, high and low receptive vocabulary abilities, and randomly assigned to one of four conditions: keyword-image, picture-context, sentence-experience context, and control. Fifty vocabulary words were selected from sixth and eighth grade curriculum. The words were divided into five groups of ten. Seven resource teachers taught vocabulary across five weeks in 20-minute vocabulary lessons. Results showed that overall, students in the keyword-image exposure outperformed students exposed to the other conditions (picture-context, sentence-experience context, and control) under both immediate and long-term time intervals.

A second study by Shook, Hazelkorn, and Lozano (2011) implemented the Collaborative Strategic Reading (CSR) strategy within an inclusive ninth grade biology classroom. CSR is an interactive cooperative learning strategy whereby students contribute to classroom learning by assigned roles within groups. In this study, twenty-six students (14 males and 12 females) participated for eight weeks, five times a week, for 90 minutes. Vocabulary from a science textbook was the focus of this study. Students used vocabulary notecards initially as a means to define new terms in the biology lesson. Weekly vocabulary quizzes consisted of 20 questions worth 100 points. Students without disabilities displayed an average increase of 13 points in comparison to students with disabilities who improved by an average of 34 points.

Struggling, unmotivated readers, as well as those with specific learning disabilities, ultimately need explicit vocabulary instruction. According to Beach, et al. (2015), teachers must choose terms carefully for explicit instruction. Words can be classified into one of three semi distinct tiers. Tier 1 are common words, such as *bury* and *large.* These words are common in daily conversation and are likely known by most high school students. If the words are not known, they can be explained with a definition or demonstration making vocabulary instruction redundant. The remaining two tiers represent a quantity of words known as academic vocabulary. Tier 2 words are words that a student would come across in multiple content-areas. Words such as *analyze*, *finite*, and *writhe* can be used in various contexts. The goal is to improve students' access to a wide range of academic terms. Tier 3 words are related to domain-specific content. Words such as *edema*, *febrile*, and *dyspnea* are specific to the medical field and would not be common in daily conversation. The implications for instruction involve students making

connections between newly introduced words in sematic relation to words they already know. Successful learning of vocabulary words occurs when students relate words they already know to new vocabulary terms (Beach et al, 2015).

Finding meaning within text is the goal for progressing academically and applying knowledge outside of the classroom. Students must understand word meanings in addition to the main idea of the text they read. True reading comprehension cannot take place if vocabulary terms have not been learned. Every grade level requires different vocabulary terms depending on the curriculum, class level, and school district. For example, a 10th grade set of 10-12 weekly vocabulary words related to literature studied in class will differ from 11th grade vocabulary that may focus more on standardized tests such as the SAT. Ultimately, words that do not appear in literature or conversation tend to be more difficult for students to learn.

Part of the importance of finding meaning within text is the ability for students to use prior knowledge regarding vocabulary terms. Activating prior knowledge requires students to ask themselves questions such as "where have I heard this term before? Does this word sound like another word with similar meaning?" This prior knowledge and metacognitive skill can help students determine a word's meaning if he or she is unable to determine the meaning based on the word's contextual use in a sentence. The ability for students to ask questions is very important, and is encouraged by educators. True learning cannot occur if students do not ask questions to clarify any confusion.

Another method for the improvement of vocabulary acquisition was discussed by Seifert and Espin (2012). The specific method in the study was the use of three types of

reading interventions: text reading, vocabulary learning, and text reading plus vocabulary learning. The authors noted that high school students were expected and encouraged to transfer their reading skills across multiple subject areas. Difficulty still exists for students with learning disabilities in regards to being able to apply reading comprehension skills to subjects that involve complex literature, such as science textbooks. Often times these textbooks contain challenging vocabulary which in turn, affects reading comprehension. The goal of reading intervention on students with learning disabilities, as determined by Seinfert and Espin (2012), was to ascertain whether the interventions would have an immediate and direct effect on the ease in which students read science text. Twenty 10th grade students (11 male, 9 female) with learning disabilities were selected from five high schools in a large metropolitan area. Seinfert and Espin implemented text-reading interventions by beginning with word recognition. Ten vocabulary words were selected and pronounced correctly by the teacher. Next, students were required to repeat each of the ten words aloud twice. Following this, the teacher and students took turns reading passages from the science textbook that incorporated the new words. Utilizing this method enabled the students to understand the ways in which the vocabulary terms had relevant meaning to the passage. This study proved significant success in two areas: the first being vocabulary matches and the second being improved passage comprehension.

Use of Technology for Teaching Students with Learning Disabilities

Technology continues to grow rapidly in today's culture. Adolescents especially are often technology-savvy and have a wealth of information readily available to them at their very fingertips. Cell phones, laptop computers, handheld tablets, Smart Boards and

televisions all serve as a few examples of devices used to obtain and project information. Many educators use technology in the classroom in an effort to make learning more easily accessible, creative, and simply fun. However, the National Education Association reported that only 19 states have technology requirements as part of the teacher licensing requirements as of 2008. Not all teacher preparation curriculums have incorporated the use of technological skills. Musti-Rao (2016) feels that there are gaps between meaningful curriculum and instruction and technology. Since that time, teachers have been provided with ideas, resources, and training on how to integrate technology into evidence-based practices in their classroom.

Johnson, Gersten, and Carnine (1987) studied the effects of the number of vocabulary words presented to students with disabilities while utilizing computer-assisted instruction. Their study included twenty-five students in grades 9-12 who were matched based on vocabulary pre-test scores and randomly assigned to one of two treatments. The first treatment was the small teaching set consisting of 7 words, and the large teaching set consisted of 25 words. Results indicated that over a period of 11 instructional sessions, students in the small teaching set outperformed students in the large teaching set in terms of time required to reach satisfactory achievement.

Abrams and Walsh (2014) analyzed how students best learn vocabulary using adaptive technology and vocabulary instruction using online tools. During the 2011-2012 school year, Abrams and Walsh looked at two different environments—a university classroom as an after-school tutoring space for high school juniors from many public and private schools and the eleventh grade English classroom of an international school. The students in the after-school program were interested in learning vocabulary words that

would help increase their scores on the SAT. The international students were required to learn vocabulary related to the texts they read in school. Abrams and Walsh (2014) focused on Vocabulary.com and "The Challenge", a component of Vocabulary.com which allows students to learn more than just word definitions, but rather, promotes problem solving, working as a team, and independent learning. The study concluded that game-like aspects of the website was an "…effective hybrid teaching tool that honored independent and flexible learning opportunities (p. 57)." In 2011 Sandra Abrams sent e-mails to principals and guidance counselors of New York City public and private high schools within one New York City borough. Abrams offered free SAT vocabulary support sessions to fourteen diverse high school students over five 75-minute after-school sessions. Data collection included students' self-reports, and website-based statistics. Students reported feeling highly interested in enhancing their lexical repertoire. The average vocabulary quiz score was a 92% compared to a low "B" average prior to the implementation of the technology.

Using Technology to Teach Vocabulary to Students with Learning Disabilities

Two words often used in the world of technology and learning are 'gamification' and 'edutainment'. According to Zichermann as stated by Abrams and Walsh (2014) gamification is the process of using game thinking and game mechanics to engage audiences and solve problems. Gamification also includes game-like elements such as rewards, points, and top score leaderboards in non-game activities and environments, according to Kapp as stated by Abrams and Walsh (2014). Authors Abrams and Walsh define 'edutainment' as something different than 'gamification.' Edutainment is seen more as a game that is used to entertain the player with simple recall rather than truly

promoting educational challenges. Immediate feedback and challenge is essential to students to promote true learning rather than simple memorization skills. Memorizing vocabulary terms does not mean that a student knows how to apply the meaning to contextual sentences or scenarios.

As Jane Shields (2014) compares resources in her "Virtual Toolkit" article, the gamification platform *Kahoot!* serves as an interactive game students in my classroom utilize as a vocabulary review prior to the vocabulary quiz. Students in my own 10th grade English classroom feel motivated, excited, and eager to play *Kahoot!* with their peers. Earning points and appearing on a leaderboard displayed after each question within the game has been a highly engaging feature of *Kahoot!* and students try their best to earn points and appear on the leaderboard. The top five students on the leaderboard are chosen based on an accuracy and speed algorithm. Students who answer consecutive responses correctly, although not necessarily in first place on the leaderboard, appear next to a fire icon known as a hot streak. Adolescents in my classroom look forward to the competitive nature gamification has to offer, as well as the opportunity to use technology in the classroom. Students use cell phones or school-provided Chromebooks to access *Kahoot!* and review vocabulary.

Gamification ultimately promotes learning by allowing students to monitor their own learning. Students have a sense of control over their learning, and as teenagers, that sense of independence is valued. According to Abrams and Walsh, students can have control over learning with the use of technology because they can choose to play the game again outside of class and could decide the amount of time they wish to spend reviewing the material. Many students also enjoy the public recognition for their efforts

both in the classroom and on the site's leaderboard. Competition and reward continue to drive students' motivation to participate in technology-related games.

Kahoot! is meant to be played in a group atmosphere with healthy rivalry among players. Shields (2014) compares the group atmosphere of *Kahoot!* to a campfire setting in that there is debate and discussion after the game has concluded. Wang (2014) compared *Kahoot!* to other web-based, game-based platforms such as Socrative, Quizlet, Poll Everywhere, and Learning Catalytics. When *Kahoot!* was compared to all of the systems mentioned above, the most obvious difference is that *Kahoot!* focuses 100% on engaging and motivating the students. *Kahoot!* can be heavily integrated with social media such as Facebook, Twitter, Pinterest, and Google+. Students have stated they access *Kahoot!* after they leave the classroom.

Educators might be concerned that by using gamification in the classroom students would suffer from the wear-out effect, or simply put, lose interest (Wang, 2014). In the spring of 2013 at the Norwegian University of Science and Technology a survey was conducted to evaluate whether or not interest would decline with frequent use of *Kahoot!.* The survey compared the difference between using *Kahoot!* for the very first time vs. using *Kahoot!* frequently throughout a semester. Two cases were compared. The first case involved the assessment of *Kahoot!* played only at the end of a lecture to summarize key points among 206 female students. In the second case, *Kahoot!* was used in every lecture to summarize key points to 46 subjects. Eighty-five percent of the subjects were male while 15% were female. The results revealed no statistical significant difference between the two groups. Both groups agreed that they were engaged while playing. While some educators might think that there is a wear out effect, open-ended

comments from the survey of this particular study revealed that 90% of the students agreed that the game was still so engaging. When surveyed, the majority of students wanted to play *Kahoot!* at least once a week (94%) and over half of the students wanted to play it in every lecture (57%). I find most interesting from this article the fact that some students reported they paid *more attention* and focused *more* to what was being lectured in preparation for the competition, with the goal to win over classmates in the game. The results clearly show that the wear out effect is not a major issue—at least not for *Kahoot!*.

Conclusion

To conclude, there has been a scarcity of recent research regarding the effects of technology on vocabulary acquisition. Educators and students alike will benefit from different teaching modalities that appeal to various learning styles. Gamification such as *Kahoot!* allows students to monitor their own learning. When students are in control of their own learning, they retain the information presented to them rather than simply relying on memorization. Technology in the classroom often motivates students to enjoy learning, when used in conjunction with other modalities. A balance between technology-based games and traditional pen and paper reviews help prevent the wear-out effect of digital learning. Special education students and general education students would benefit from more studies comparing the effects of technology in the classroom on learning. The ultimate goal of an educator is to prepare all students for success not only within the classroom, but in their post-secondary schooling and careers as well.

Chapter 3

Methodology

Setting and Participants

This study took place in two general education English Literature classrooms in a suburban high school in New Jersey. A total of 50 students participated in this study. The ethnic breakdown was as follows: Thirty-two Caucasian, five African American, two Indian, and one Hispanic. The subject sample included 14 students who had been previously identified as eligible for special education services. Of those classified, the breakdown of student's classification is as follows: 10 Specific Learning Disability, 2 Multiply Disabled, 1 Other Health Impaired, and 1 Autistic.

Procedure

This study evaluated the comparison of a traditional method of teaching vocabulary words to a web-based game approach to vocabulary acquisition. For the traditional approach, students were provided with a vocabulary preview worksheet at the beginning of each week. The teacher provided the pronunciation of the new words for students to hear. Independently, students were to read sentences containing the new vocabulary words in context, and try to name the correct part of speech as well as the word's meaning. This was then reviewed as an entire class. Every other week, students completed a traditional worksheet that contained 10 to 12 vocabulary words' definitions, parts of speech, synonyms, and the use of contextual sentences. Students worked on their review independently for about 7 minutes. When all students finished, the teacher called on individual students to read the sentence and share their response. The student either

chose the correct vocabulary term to complete the sentence, or the student received assistance form peers if their response was incorrect.

On alternate weeks the web-based game was used. Students played a game-based quiz review called *Kahoot!* This vocabulary review contained fifteen to twenty questions related to the vocabulary word's definition, part of speech, synonyms, as well as picture association and use of contextual sentences. Students logged into the teacher-created quiz by using their real name or nicknames. One question at a time was displayed. Answer choices were color coded, and students respond by selecting their answers' color on their devices. Students were given between 10-30 seconds per question to answer on their cellphone or Chromebook, and received points based on speed and accuracy. After all students answered the given question, or time was up, whichever came first, the projector displayed a leaderboard identifying the top five students thus far in the game. The top five student names appeared on the leaderboard in ranking order as they proceeded through the review. A "fire" icon appeared next to the name of the student who answered multiple correct questions consecutively, known as a "hot streak." Motivation and excitement was very high during this game, and students enjoyed the competition.

"*Kahoot!* was the result of the Lecture Quiz research project initiated in 2006 at the Norwegian University of Science and Technology (NTNU)" (Wang, 2015, p. 220). Developers wanted to design *Kahoot!* to mimic a game-show type setting. In this game-show type setting, the teacher would take on the role of the game-show host, while students would take on the role of the contestants who are in competition with one another for the correct answer and ultimately, highest winning score (Wang, 2015). The objective of using *Kathoot!* was to evaluate whether students achieved higher vocabulary

scores on their quizzes. Motivation continued to represent a driving force behind technology such as *Kahoot!* because teachers want their students to feel successful in the classroom and to truly enjoy learning.

Variables

The dependent variable in this study was the vocabulary quizzes themselves. The assessment was composed of 10 to 12 vocabulary questions. Students demonstrated knowledge of vocabulary definitions, parts of speech, as well as the ability to use the vocabulary term in contextual sentences. In addition to this curriculum-based assessment, students were asked to circle "yes" or "no" regarding whether or not a sentence on the quiz was used correctly or not. This strategy allowed students to think critically about a word's definition in order to determine the word's correct or incorrect use in a given sentence.

The independent variable for this study was the game-based *Kahoot!* quiz created by the teacher. Students logged on to *Kahoot!* with a game code provided by the teacher and 'compete' for top score while answering review questions. Data collection consisted of recording the actual quiz grade administered the following day. Entries were made into a grade book for comparison at the end of the 12-week study.

The research design is quantitative research that incorporated alternating interventions. Two different teaching modalities were used in this study. The traditional review took place on weeks when an odd numbered unit was introduced, such as units 1, 3, 5, 7, 9, 11. *Kahoot!* review took place on weeks when an even numbered unit was introduced, such as units 2, 4, 6, 8, 10, and 12. At the end of the study, classroom quiz

score averages on odd and even weeks were compared. In addition, comparison was made between quiz scores of general education students and special education students.

Chapter 4

Results

Summary

In this study, the effects of traditional review worksheets and technology gamification instruction in the high school English classroom were analyzed. Two classes participated in the study, with two classes receiving the intervention with the teacher instructing the class. The intervention implemented was *Kahoot!* gamification system and a traditional worksheet as reviews prior to vocabulary quizzes. The research questions to be answered were:

1. What is the difference in student vocabulary quiz scores using *Kahoot!* versus traditional instruction?
2. What is the difference in vocabulary scores between general education students and special education students when *Kahoot!* is used as a vocabulary review?

Over the course of twelve weeks, students' vocabulary quiz scores were assessed after two different methods were implemented. On odd numbered weeks, students were given a traditional review worksheet as a vocabulary review prior to the weekly vocabulary quiz. On even numbered weeks, students participated in a Kahoot! vocabulary-related game which served as the review prior to the vocabulary quiz. Each review took place one day before the quiz.

Group Results

Table 1 shows the vocabulary quiz score averages for the 36 general education students when traditional reviews were implemented as well as the mean score when *Kahoot!* was used.

Table 1

General Education Student Traditional vs. Kahoot! Mean Vocabulary Scores

Number of General Education Students	Traditional (%)	*Kahoot!* (%)
36	95.23	94.09

The difference between the mean vocabulary scores is 1.14. This indicates that there was no statistical difference between the traditional review and the game-based response system review in this study.

Table 2 shows the vocabulary quiz score averages for the 14 special education students. Table 2 specifically displays the vocabulary quiz score mean when traditional reviews were implemented as well as the mean score when *Kahoot!* was used.

Table 2

Special Education Student Traditional vs. Kahoot! Mean Vocabulary Scores

Number of Special Education Students	Traditional (%)	*Kahoot!* (%)
14	84.89	83.32

The difference between the mean vocabulary scores was 1.57. This indicates that there was no statistical difference between the traditional review and the game-based response system review in this study.

Table 3 shows the vocabulary quiz score averages for the combined general education and special education students. Table 3 specifically displays the vocabulary quiz score mean when traditional reviews were implemented as well as the mean score when *Kahoot!* was used.

Table 3

A Comparison of Traditional & Kahoot! Vocabulary Review Across General Education & Special Education Students

	Number of students	Traditional Mean Score (%)	*Kahoot!* Mean Score (%)	Difference (Traditional-*Kahoot!*) (%)
General Education	36	95.23	94.09	1.14

Table 3 (continued)

	Number of Students	Traditional Mean Score (%)	*Kahoot!* Mean Score (%)	Difference (Traditional-*Kahoot!*) (%)
Special Education	14	84.89	83.32	1.57
Combined (General Education & Special Education)	50	92.33	91.07	1.26

In Table 3, the results are presented as a comparison between traditional review and *Kahoot!* Vocabulary review across general education and special education students. The difference between the combined traditional mean score and the Kahoot! mean score is 1.26. This indicates that there was no statistical difference between the traditional review and the game-based response system review in this study when special education and general education students are combined.

Chapter 5

Discussion

This study examined the effects of the traditional review worksheet method versus the game-based response system method *Kahoot!* on vocabulary quiz scores over twelve weeks. The hypothesis for this study tested whether or not the *Kahoot!* review game would improve weekly vocabulary quiz scores compared to the traditional worksheet used for instruction. Based on previous literature, it was hypothesized that special education students would exhibit a greater improvement in quiz scores than the general education students. The study involved fifty 10th grade English students from two classrooms in a Central New Jersey public high school. The results showed that the difference between the combined traditional mean score and the *Kahoot!* mean score was marginal. There was no significant difference between the traditional review and the game-based response system review in this study when special education and general education students are combined.

Johnson, Gersten, and Carnine (1987) conducted a study of 25 students with disabilities. One group received computer-assisted technology during vocabulary instruction in the high school setting over 11 instructional sessions. Results showed students reached satisfactory achievement in a shorter time frame when two groups were compared.

A semester-long study using *Kahoot!* was compared to using *Kahoot!* for the very first time in 2013 at the Norwegian University of Science and Technology. This study assessed whether or not students would suffer from the wear-out effect. The results

revealed no significant difference between the two groups when two cases were compared. However, students in both of those groups agreed they were engaged when actively learning.

Comparing the results of my study to the above stated research, the vocabulary quiz score analysis does not support the hypothesis, as there was no significant increase in scores when *Kahoot!* was used for either the students with exceptional learning needs or the typically developing students. In fact, the scores from traditional worksheets were marginally higher. However, students did enjoy the active learning aspect of gamification as determined from verbal feedback and their request to play *Kahoot!*.

Limitations

The sample size of this study was limited to only fourteen 10th grade special education students and 36 general education students. In order to more accurately determine an effect size, a much larger sample would be required. The sample was also restricted to students from an upper middle class school district with low levels of poverty and crime. The sample did not include students from various socioeconomic and ethnic backgrounds.

Only vocabulary quiz scores related to English curriculum were assessed. Significant differences may be apparent in different subject areas that challenge different styles of learning. Another limitation for this study is the 12-week duration in which the vocabulary reviews and assessments were given. A study over a longer period of time might yield different results. Lastly, there is always the risk that *Kahoot!* game-based

learning platform could be down or inaccessible, while the traditional paper worksheets would be readily available.

With regards to students with disabilities, further research is needed to ascertain whether *Kahoot!* requires speed, dexterity, and the ability to focus without distraction from the visual and audio effects of the game. While this may help some students, these effects may also hinder some special education students.

Practical Implications

Although there were lower vocabulary quiz scores when *Kahoot!* was implemented, implementing game-based systems in the classroom, observation of student performance suggests that there were some benefits. For example, the audio and visual effects of the game provided more instantaneous feedback and reinforcement, making the game a more stimulating teaching method. Alternating between weeks with *Kahoot!* helped prevent the wear-out effect and boredom that comes from overuse of traditional instructional methods. Students demonstrated higher motivation and engagement with the activity due to the level of competition offered in the game that does not exist when using traditional worksheets. Both general education and special education students enjoyed the friendly rivalry as players in the game.

Future Studies

Future studies can advance the fields of general education and special education by testing and comparing the effects of different game-based response systems in both populations. Currently available programs Socrative, Quizlet, Poll Everywhere, Jeopardy, and Learning Catalytics each with separate advantages and disadvantages to consider

when implementing. High school students in today's society are surrounded by technology, as it has become an integral part of their everyday lives since childhood.

Future studies could also compare the effects of game-based systems in subjects beyond vocabulary, which primarily tests comprehension. This research can also be expanded to include students as young as elementary school and as old as college level students. Specifically, researchers and teachers in special education may consider investigating the use of technology among students with a specific learning disability such as Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder, Asperger's Syndrome, Autism Spectrum Disorders, and Down Syndrome.

Conclusion

This study sought out answers to the following questions: (1) Is there a difference in vocabulary quiz scores when *Kahoot!* is used on alternate weeks in lieu of a traditional worksheet as a vocabulary review? (2) What is the difference in vocabulary scores between general education students and special education students when *Kahoot!* is used as a vocabulary review? The data illustrated that overall students' vocabulary quiz scores were marginally higher when the traditional review worksheet was used.

As technology advances there is a potential to advance student comprehension by incorporating new methods of teaching and testing in the classroom. While the findings from this study do not suggest a difference in vocabulary test scores as a result of the *Kahoot!* game-based system, there are other applications of game-based systems to improve learning in the classroom and researchers and educators should continue to seek out these innovative approaches.

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