The Untapped Superpower of Comics:

The Positive Effects of a Comic Reading Curriculum in a Special Education Classroom

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ABSTRACT

The purpose of this mixed methods action research case study was to determine if the use of a researcher-created comic reading curriculum would improve students' knowledge of Tier Two academic vocabulary, increase oral reading fluency rates, and lead to increased levels of student engagement in a pull-out special education classroom. A multiple-choice vocabulary pretest was administered at the start of the study, followed by a nine-week intervention period in which students were instructed with a researcher designed comic curriculum. The vocabulary test was administered again at the conclusion of the study. A running record was used as the assessment to determine student reading fluency growth. The data (scores) collected from the running record examined any effects in student oral reading fluency from the first day of research to the ninth week of research. The researcher, acting as a participant observer, took daily notes in a field log with attention to behaviors of student engagement. The four student participants were selected by the researcher. The researcher taught for nine weeks, thirty minutes a day. The data from the pre and posttest was analyzed using a paired sample t-test to determine if the scores of participants showed a significant improvement. The data collected from the running records of reading rates for each student were analyzed using linear regression analysis to determine if improved reading rates were statistically significant. Observational data was entered into Dedoose qualitative data analysis software and analyzed using a Grounded Theory (Glaser et. al. 1968) approach in which new theories emerged through a deductive process. The results of the t-test showed that all students made significant improvements in knowledge of the targeted Tier Two vocabulary. Analysis of running records showed that only one student had a significant increase in their rate of oral reading fluency. All students exhibited increased behaviors of engagement as demonstrated by their abilities to complete three tasks in a session and to contribute to a positive learning environment. The results imply that practitioners could use a comic curriculum with similar components to achieve positive academic outcomes for students receiving special education support. Future research of a similar curriculum might focus on its potential uses for English Language Learners.

Keywords: *Dual Coding Theory, Comic Curriculum, Tier Two Vocabulary, Fluency, Student Engagement.*

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CHAPTER 1:

A Comic Book Curriculum for Reading

Introduction

The topic of this mixed methods action research case study was to determine if a curriculum presented as a comic book (combining juxtaposed text and images in a sequential format) had a significant effect on vocabulary acquisition of Tier Two academic language, oral reading fluency rates, and positive behaviors of engagement for students with learning differences in a reading intervention setting. For this study, Tier Two vocabulary has been defined as words that are needed in an academic context and provide access to more complex topics and discussions outside of the everyday.   Tier Two vocabulary can be thought of as more mature words for expressing concepts that younger children may already be familiar with. For example, a Tier Two version of the word angry is furious. A Tier Two version of the word lucky is fortunate. According to reading researcher Warwick Elley (1988), knowledge of academic vocabulary is the single greatest indicator of future academic success for young people. Teaching Tier Two words to young learners improves their language abilities and boosts confidence.

Comics have been defined by theorist and comic artist Scott McCloud (1994) as sequential narrative artwork meant to induce a feeling or convey information to the reader. Comics employ a colorful and rhythmic visual language unlike any other form of print media. In the 1930's, superhero comics like Superman emerged as a voice for the younger generation. Over the years, comics have also been used to sell newspapers (Murray, 2016) and promote political ideologies. However, in the 1950's, comics were vilified as a cause of juvenile

delinquency and youth violence (Wertham,1954). For most of their history, comics have been

maligned by schoolteachers as literary junk food with no place in the classroom (Hutchinson,

1949).

Not until recently have long form comics, under their more respectable alias graphic

novels (Eisner, 1976), begun to find a place on the bookshelves of elementary school classrooms

and libraries. Teachers are beginning to see the value of this engaging form of literature as a

pedagogical tool for students of all ages. With bold imagery and short, digestible bursts of

dialogue, comics can be particularly engaging for reluctant readers (McGrail et al, 2018). By

conveying information through a combination of text and images, comics utilize a form of visual

literacy that is particularly relevant for teaching twenty-first century technology standards

(Massachusetts Department of Elementary and Secondary Education, 2007).   In 2019, comic

artist Jerry Craft won the Newberry Medal, for his graphic novel *New Kid.* By attaining this

highest of honors for children's literature, Kraft has helped to establish the legitimacy of comics

and graphic novels for future generations, (Leon, 2020).

Problem Statement

Despite the growing acceptance of comics and graphic novels as a viable literary form for

sustained silent reading time in classrooms, the use of comics as a curricular tool is still a

relatively new domain for most educators. Researchers have begun to explore the benefits of

using comics to aid in comprehension and vocabulary acquisition, but this researcher has not

discovered a comic curriculum that specifically targets students with individualized education

programs (IEPs) who require strategic intervention in reading, comprehension, or writing.

According to experts in the field (Learning First Alliance, 2013), these are the students who most need reading material that is engaging, concise, and easy to comprehend.

According to comic artist and theorist Scott McCloud (1993), comics are a combination of words and images presented in sequential format to convey meaning or evoke an aesthetic response in the reader. McCloud theorizes that the commingling of words and images creates a complex interaction in the mind of the comic book reader. The words and pictures work together to create a meaning that is somehow greater than the sum of its parts. This researcher believes that a comic created with the specific intention of increasing knowledge of Tier Two academic vocabulary and improving oral reading fluency rates has the potential to be a great resource for struggling readers, students with dyslexia, and English language learners.

Existing Research

Studies have shown that comics are particularly engaging for beginning readers and students with dyslexia. One recent study (McGrail et al, 2018), showed how pre-service teachers who initially doubted the efficacy of using a leveled comic book curriculum, came to see their value after using the Toon Books series in an intervention setting for young students with dyslexia. The teachers in this study noted that the students were more excited to read the Toon Books and more talkative during reading discussions than they'd been with previously used intervention materials. Another recent study (Boermann-Cornell, 2016) demonstrated how comics can promote critical thinking skills during book club discussions with early readers. It's also been shown that focused interventions which utilize comics can improve vocabulary acquisition for students with moderate to severe learning differences that affect reading (Rothenberger, 2019). Most of the existing research on the use of comics in instructional

settings mentions the high levels of engagement and enjoyment that they provide for elementary age students.

Researchers have focused on how reading comics that traditionally employ a combination of text and pictures to tell a story, can help students to develop visual literacy skills that are crucial in the 21ˢᵗ century. Comic readers synthesize text with vivid visual imagery in a complex process that employs higher order thinking skills to make meaning (Pantaleo, 2018). This process of synthesis was first discussed by the researcher Allan Paiviao (1986) whose dual coding theory states that information presented in a combination of text and images is easier to remember and understand. Some researchers go so far as to say that the aesthetic appreciation of visual imagery combined with text gives young readers a more meaningful experience than text-only books can offer (Bender, 2018).

Other researchers in the field have begun designing comics to teach specialized curriculum for older students as well. One case (Kara, 2020), demonstrated how comics could provide a virtual zone of proximal development (ZPD) for her graduate school students in a qualitative research class. The ZPD was first discussed by Soviet era psychologist Lev Vygotsky (1978). He defined this as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978). Kara (2020) theorized that the immersive and critical experience of making meaning from reading a lesson presented in comic form provided the reader with a virtual ZPD like the one created by a teacher in a classroom environment. Kara found that the comic curriculum was more like a lived experience, and therefore more meaningful for her graduate students than reading a textbook. Kara found that the comic format leant itself well to

teaching the ambiguous concept of interviewer bias in research collection. Comics force the

reader to synthesize textual, visual, and aesthetic information and draw conclusions of their own

as the story moves from panel to panel (McCloud, 1994).   This critical process of meaning

making on the part of the reader is just beginning to be understood in the field of existing

research.

Purpose

The purpose of this mixed methods action research case study was to determine if the use

of a comic book curriculum leads to improved vocabulary acquisition for students with learning

differences in an intervention setting. This researcher also examined if the comic book

curriculum positively improved rates of reading fluency for student participants over the course

of the intervention. Additionally, the researcher examined student behaviors of engagement with

the intervention by recording post-session notes in a field journal to qualitatively analyze

emergent themes related to the student participants' experience of the comic book reading

intervention curriculum. The setting for the study was a small group reading intervention

classroom and the participants were four upper elementary students (grades 4-6) with mild to

moderate learning differences. The researcher used a pretest posttest model to measure student

knowledge of Tier Two academic vocabulary words and took weekly running records of oral

reading fluency rates of all participants.

Research Questions

Quantitative Research Questions

Research Question 1: How does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary affect vocabulary acquisition in a resource room setting for students below reading grade level?

Hypothesis

Null Hypothesis 1: Comparison of results of mean scores for all students on pre-intervention test of targeted Tier Two vocabulary words with post intervention test of targeted Tier Two vocabulary words will not show a statistically significant improvement.

Hypothesis 1: Comparison of results of mean scores for all students on pre-intervention test of targeted Tier Two vocabulary words with post intervention test of targeted Tier Two vocabulary words will show a statistically significant improvement.

Research Question 2: How does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary affect oral reading fluency rates in a resource room setting for students reading below grade level?

Null Hypothesis 2: The oral reading fluency rates of all participants will not show a significantly improved trend line over the course of the intervention as measured by having a p-value of greater than .05 using a linear regression model.

Hypothesis 2: The oral reading fluency rates of all participants will show a significantly improved trend line over the course of the intervention as measured by having an upward sloping trend line and a p-value of less than .05 using a linear regression model.

Qualitative Research Question

What effect, if any, will the comics-based curriculum have on student engagement as measured by observable behaviors including but not limited to their ability to complete 3 tasks in a session, transition to the intervention classroom smoothly, maintain focus on classwork throughout the session, and contribute to a positive classroom experience?

Significance and Relevance

Existing research has shown the effectiveness of using comics to teach vocabulary acquisition, comprehension, and critical thinking in a general education setting and for English language learners.   To this researcher's knowledge, there has been little research done on the efficacy of using a comics-based curriculum in a reading intervention setting working with students with learning differences that negatively impact their abilities in reading. Comics present text in short, easily digestible chunks in combination with engaging visual information presented in a sequential format. According to the Learning First Alliance (2000) these criteria are crucial for an effective reading intervention.

The intent of this study was to examine the effectiveness of a comic curriculum used in a small group intervention setting for the purpose of improving academic vocabulary acquisition and oral reading fluency rates. To this researcher's knowledge there have few studies of this type to date. For this reason, this researcher proposes that this study has made a significant contribution to the existing body of literature and this researcher feels that a reading curriculum presented in a comic book format could fill a void in the instructional literacy market. This researcher proposes that much of the available curricula for reading intervention is not visually interesting for students who are learning to read and experiencing challenges. This researcher is

interested in exploring how the multi-modal format of comics (combining text and imagery) can

be used as a tool to engage students with learning differences and encourage deeper levels of

understanding, critical thought, skill development, and creativity.

Delimitations

This study took place over a nine-week period in the Spring of 2022 in a small rural

Title-One Elementary school. A Title-One school is a school that is eligible for federal funding

because at least 40% of the student population comes from a low-income family (Stichter, et al,

2009). The four student participants in this study received special education services for

language-based learning disabilities that negatively impacted their abilities to read and

comprehend text. This population of upper elementary students (grades 4-6) were purposely

selected for having IEP goals that targeted reading fluency, comprehension, and writing. Parents

of the participants were provided with informed consent as to the nature of the study, an

explanation of how their identities and confidentiality would be protected, and an explanation of

their right to drop out of the study at any time. The research process involved data collection in

the form of a vocabulary pretest and posttest, collection of weekly running records of oral

reading fluency rates, and the qualitative observational records of the researcher. This researcher

acknowledges the demographic limitations presented by the relatively small sample size. This

study has yielded quantitative data on a new type of vocabulary and reading intervention for

students with language-based learning disabilities. The small sample size has allowed the

researcher to collect in-depth qualitative data on the experience of the students as they used a

new type of comics-based vocabulary intervention. This researcher proposes that this data

contributes to the existing knowledge base concerning literacy instruction for students with

language-based learning disabilities. This study lays the groundwork for further research and

offers insight for practitioners of a comics-based vocabulary curriculum in an intervention

setting.

Definition of Terms

Comic - juxtaposed pictorial and other images in deliberate sequence, intended to convey

information and/or to produce an aesthetic response in the viewer (McCloud, 1994).

Comic curriculum - an intentionally juxtaposed and sequential combination of text and images

for the purpose of conveying information and provoking an aesthetic response in the

reader that utilizes the nine elements of effective reading instruction as defined by

Learning First Alliance (2013).

Context - the process of total immersion in a scene on the part of the researcher to make

sense of it (Tracy, 2013).

Dual-coding theory - a theory of cognition which states that substantive information presented

through a combination of words and imagery improves reading comprehension and

memory. (Clark & Paivio, 1991b, p. 159)

Elkonin Box - an instructional method used in the early elementary grades to build phonological

awareness by segmenting words into individual sounds (McCarthy, 2008).

Emic - an approach to the study or description of a particular language or culture in terms of its

internal elements and their functioning rather than in terms of any existing external

framework (Tracy, 2013).

Explicit instruction - Explicit instruction involves a combination of evidence based

instructional practices used in concert to provide clear instructions, guided practice, and

task specific support and feedback to scaffold instruction for students until they have

mastered a new skill (Hughes & Riccomini, 2018).

Graphic novel - a work of fiction or nonfiction that tells a story using comic strips and that is

published as a book (Eisner, 1976)**.**

Grounded Theory - a common conceptual underpinning in qualitative studies. According to

 Glaser et al. (1968), in studies that utilize grounded theory, qualitative data should be

collected before the formulation of any theories about the topic being researched. Glaser

et al. (1968) hold that new theories should emerge through a deductive process of

analysis of data collected.

Morpheme - a meaningful morphological unit of a language that cannot be further divided (e.g.

in, come, -ing, forming incoming)(Bollinger, 1948).

Multi-modal text – a printed or digital text that presents information in a combination of

modalities, usually through a combination of text and image (Serafini, 2012).

Phoneme - any of the perceptually distinct units of sound in a specified language that distinguish

one word from another, for example p, b, d, and t in the English words pad, pat, bad, and

bat (Twaddell, 1935).

Self-reflection - an understanding of how the researcher's past experiences may color their

interpretation of data that are collected (Tracy, 2013).

Thick description - "contributes to credibility through extensive accounts, portrayals, and

depictions of interactions and communicative processes as they occur in the field. In

order to illustrate data's complexity, researchers are advised to show, meaning that they

provide enough detail that readers may come to their own conclusion about the scene."

(Tracy, 2013, p. 3)

Tier-two vocabulary words - words that are needed in an academic context and provide access

      to more complex topics and discussions outside of the everyday (Elley, 1988).

Title one school - a school in which at least 40% of the population comes from a low-income

      family. Schools meeting this criteria are eligible for federal funding (Stichter et al, 2009)

Socratic seminar - a formal discussion, based on a text, in which the leader asks open-ended

      questions. Within the context of the discussion, students listen closely to the comments of

      others, thinking critically for themselves, and articulate their own thoughts and

      responses to the thoughts of others (Griswold et al, 2017).

Zone of proximal development - the distance between the actual developmental level as

      determined by independent problem solving and the level of potential development as

      determined through problem solving under adult guidance or in collaboration with more

      capable peers (Vygotsky, 1978).

Conclusion

      Chapter 1 has provided an overview of this study. The acquisition of Tier Two vocabulary is crucial for student understanding of text, particularly as students move from the elementary to the secondary level. Tier Two vocabulary acquisition is particularly important for students with reading differences who may have less exposure to academic language. Comics deliver information to students in a format that is concise, engaging, and potentially more memorable than other modes of instruction. The central question of the study is whether the comic book curriculum is effective for teaching academic vocabulary in an intervention setting for students with reading differences that place them at risk.

      Chapter 2 of this study will discuss the history of comics, to give a sociological context to the potential barriers of using this medium in academic settings. Chapter 2 will include an in-

depth review of the literature surrounding the use of comics for instructional purposes at all

levels. Chapter 2 will also provide further insight into the conceptual underpinning of the **dual**

coding theory of learning as a strategic component of effective vocabulary instruction.   Chapter

3 will lay out the methodology of this mixed methods action research case study in detail.

Chapter 4 will provide a presentation of the results and Chapter 5 will provide a discussion of the

findings of this study.

Chapter 2: Literature Review

A Brief History of Comics and Graphic Novels

In his essay: *All that Glitters…Nostalgia and Censorship in the Golden Age of Comics,* Chris Murray (2016) discusses the history of comics in America and their impact as a voice for children and young adults since they first became broadly popular in the 1930's.   Murray asserts that the fantasy world of early comics, with a focus on young superheroes, provided an escape from the world that adults had created for children. Comic stories made no mention of school, chores, or early bedtimes, focusing instead on themes of fantastic superpowers and space travel. Murray states that comics predated rock and roll by two decades as a fun and rebellious voice for the young generation.

By the 1940's, comics reached the height of their popularity. Comic historians refer to this era as the golden age of comics (Murray, 2016). Comics were broadly popular, particularly with young people and World War II general infantry soldiers. Typical comic narratives of the golden age revolved around fictional superheroes like Captain America or Superman engaged in fierce conflict with Hitler, Nazi soldiers, and other real-life enemies. In this way, comics were employed as propaganda for the allied forces, with caped crusaders fighting for American values like democracy and civic welfare. In the Golden Age, comics were seen as fun and disposable entertainment. Most comics of this time were destroyed in large scale paper drives to support the war effort, making Golden Age comics rare and highly collectible.

When the war ended, comic book artists in the 1950's began exploring darker subject matter. Comic book publishers like Exciting Comics (EC Comics) expanded plotlines away from caped crusaders to themes of the supernatural, horror, and true crime. At this time, comics

came under increasing scrutiny after German American Psychiatrist, Dr. Frederick Wertham, published his best-selling novel *The Seduction of the Innocent* (1954). In his book, Wertham asserted that there was a direct connection between juvenile delinquency and comic books, particularly the horror comics of the EC imprint. Wertham based his conclusions on interviews with violent juvenile delinquents who stated that they were inspired to commit crimes after reading EC comics.

The popularity of Wertham's book in the McCarthy era led to a senate subcommittee investigation of comic books and the establishment of the Comics Code Authority (CCA). The CCA was a self-imposed censorship authority whose stated purpose was to ban depictions of violence and crime in comics. Throughout the 1950s and 60s, no comics were published without the CCA stamp of approval. The only EC comic title that survived the senate investigation was Mad Magazine.

Murray (2016) asserts that the true motivations of the senate sub-committee were not protecting innocent youth from graphic depictions of violence, but were in fact rooted in the fears of conservative politicians. He states that comics in the late 1940's and 50's were beginning to express opinions that were in opposition to conservative views, promoting ideals of social welfare and anti-fascism. Murray cites the example of Superman, whose creators Jerry Siegel and Joe Shuster were Jewish immigrants who'd fled encroaching fascism in Europe in the 1930's. Siegel and Shuster imbued Superman with the values of "truth, justice, and the American way", most clearly exemplified by Franklin Roosevelt's New Deal policies. Superman symbolized the political ideal of a transparent, big government that worked for social justice and public welfare. These ideals were becoming increasingly at odds with the political agenda of conservatives in the McCarthy era.

Comics in the 1950's like Superman helped young people feel as though they were stakeholders in society. According to Murray (2016), comics encouraged critical thought and civic engagement in young people. For this reason, conservatives of the time went to great lengths to label comics as a "poisonous" threat to the cultural ideals of the older generation. Comics can tell stories in an easily accessible format that is colorful and engaging. Murray (2016) believes that the political conservatives of the time feared a generation of young people who questioned their authority. For this reason, congress launched a set of senate subcommittee hearings that further tarnished the reputation of comics in the public eye and led to the establishment of the CCA. *The Seduction of the Innocent*, the senate sub-committee hearings of the 1950's, and the CCA have cast a long shadow.   Today many still perceive comics as a dangerous media capable of corrupting innocent young people.

The comic industry did survive and even flourish under the CCA in the 1960's and 1970's, the era known to comic historians as the Silver Age of Comics. The Marvel Comic Imprint flourished with comic plotlines revolving around teenage superheroes with everyday problems. Superheroes like Spiderman were as concerned with getting a girlfriend as they were with fighting crime. According to Paul Levitz (2015) it wasn't until Will Eisner created his seminal work *A Contract with God* in 1976 that comics began to acquire some of the perceived respectability they have today. *A Contract with God* depicted life in a New York City tenement apartment in the 1920's and 30's. It touches on themes of mortality, religion, and sexuality. Eisner cleverly titled his work a "graphic novel" instead of a comic, because he wanted it to find a home on library shelves next to other important works of literature. By using the label graphic novel, *A Contract with God* achieved a level of respectability not afforded to comics. Eisner's work ushered in a new era of long form comics. Today, graphic novelists use the comic form to

tell stories that deal with real-life issues and strive for literary merit beyond what was thought

possible in the Golden and Silver ages of comics. The rebranding of comics as graphic novels

has given them a level of respectability that teachers and librarians can support. Today, graphic

novels can be found on the shelves in most public-school libraries and classrooms.

Early Studies of Graphic Novels in the Classroom

In the Golden Age of comics, one researcher (Hutchinson, 1949) attempted to analyze the

potential usefulness of comics in the classroom as a teaching tool. Hutchinson used a collection

of popular comics to elicit classroom discussion and writing in the areas of social studies and

geography in elementary and secondary school classrooms in New Jersey. The results of this

qualitative study showed that students enjoyed reading comics in the classroom, comics

improved teacher/student relations, and that comics elevated student interest in reading. One

principal noted that comics stimulated a level of critical thought that extended beyond the

classroom setting. The study also included teacher surveys in which educators stated that there

was "no place for comics in the classroom because learning is serious business" (Hutchinson,

1949).

Another early study (Sperzel, 1948) assigned popular comic books of the era to fifth

grade students during independent reading time to determine if the comics produced gains in the

students' vocabulary knowledge or comprehension skills. Three groups of students were used in

this six-week quasi-experimental study. The Gates Reading test, a measure of vocabulary

acquisition, was given at the start and conclusion of the study. The control group (Group One)

continued reading assigned fifth grade materials. Groups Two and Three were assigned comic

books to read for thirty minutes a day. Group Three was told to compile a list of vocabulary

words that they didn't already know from their daily readings.   By the end of the study, all three groups had made gains in their scores on the Gates Reading Test, but none of the gains were statistically significant (Sperzel, 1948). The study concluded that although the comic reading time was neither good nor bad for the students, the students in Groups Two and Three were highly motivated by the opportunity to read comics in school.

Comics for Language Acquisition, Engagement, and Comprehension

A 2015 case study of twenty-eight Taiwanese eighth graders sought to measure reading comprehension, vocabulary acquisition, and engagement using English language comics in an English as a foreign language literature (EFL) class (Mei-Ju et al., 2015, p. 677). This ten week-study used pre and post-tests to take quantitative data measuring comprehension and vocabulary acquisition as well as pre- and post-survey results to qualitatively measure student engagement with comics. In the introduction, the authors noted the historical denigration of comics by classroom teachers and went on to cite several qualitative studies that have made legitimate arguments for the literary and artistic merit of comics (Gardner, 2014) as well as groundbreaking studies that support the efficacy of comics for EFL students and low-level readers (Liu, 2004). The theoretical foundation for this study rests upon the Dual Coding Theory (DCT) of cognition which states that substantive information presented through a combination of words and imagery improves reading comprehension and memory (Clark & Paivio, 1991b, p. 159).

> "Human cognition is unique in that it has become specialized for dealing simultaneously with language and with nonverbal objects and events. Moreover, the language system is peculiar in that it deals directly with linguistic input and output (in the form of speech or writing) while at the same time serving a symbolic function with respect to nonverbal

objects, events, and behaviors. Any representational theory must accommodate this dual

functionality." (Pavio, 1986, p 53).

In his writing, Pavio (1986) makes mention of several experiments in which response

time for comprehension questions was much faster for participants when information was

presented with images and text than when information was presented as text alone. Clark and

Pavio (1991) have used the DCT as the foundation for a new branch of educational psychology

stating that it has practical implementations for how teachers represent material for effective

comprehension learning and memory.   Clark and Pavio also assert that DCT has practical

implications for how teachers can improve instruction to accommodate for student learning

differences, improve student motivation and achievement, reduce test anxiety, and even to

improve the learning of motor skills.

Regarding the methods and results of the Mei-Ju (2015) study, participants were divided

into two groups of high and low performing students. Both groups showed improvement

between pre- and post-test results in the areas of vocabulary acquisition and reading

comprehension after the 10-week cycle. The test results were statistically analyzed using a

Pearson Product Moment Correlation as well as an independent samples t-test.   Although both

groups of students showed improved vocabulary and comprehension skills over the course of the

study, only the high performing group demonstrated results that were statistically significant. In

the qualitative survey measuring student enjoyment of comics, both groups reported an

enjoyment of reading comics in post-study survey data. Eighty-six percent of respondents

reported that they felt that reading comics was a great way to learn English.   The study

concluded by recommending the use of comics in the English language literature classroom. The

authors go on to suggest that future studies of this kind would be improved by a design with a

larger population and of longer duration.

Another recent qualitative case study (McGrail et al, 2018) sought to measure teacher

attitudes of graphic novels as a curricular tool. The researcher provided a collection of lexically

leveled comics from the publisher Toon Books to the participants, a group of pre-service

intervention teachers. The teachers used the Toon Books curriculum to teach guided reading

comprehension strategies to small groups of elementary-aged children. Most participants

reported some level of skepticism about the viability of comics as an effective tool for learning at

the start of the study. Over the course of the study, many of the participant's attitudes began to

shift. The teachers observed that the comics heightened levels of engagement on the part of the

young readers, leading to an observed increase in reading comprehension skills. By the end of

the study, all participants reported positive attitudes about the efficacy of comics as an

intervention tool.   In their post-study interviews, teachers stated that they observed that comics

increased their students' motivation to learn.   McGrail (2018) reported that teachers noticed

improvements in their student's reading fluency rates and their ability to read with prosody, or

appropriate inflection and feeling.

In another recent case study (Boerman-Cornell, 2016) researchers examined how comics

could be used to encourage critical thinking in early readers in second through fourth grade. In

this American study, the research questions focused on how graphic novels could be used to

facilitate robust conversations, develop multi-modal literacy skills, and encourage young readers

to make personal connections with the text.   The researcher defined the comic used for their

study, *Zita the Spacegirl* by Ben Hatke (2010), as a multi-modal text because it delivers the

narrative through a combination of text, imagery, and spatial information. The researcher

assumed the role of a moderate participant in this study of the twenty-nine students who volunteered to participate (Boerman-Cornell, 2016).

The setting was a graphic novel lunchtime book club in which participants were assigned to read a specific chapter prior to meetings. At each meeting, the researcher asked a routine set of questions that were coded to assess the students' abilities to make meaning through multi-modal text. The questions also measured their abilities to draw connections between the graphic novels and other forms of text or real-life experience. The coded results were analyzed into scored percentages measuring student ability to summarize, comprehend, and demonstrate critical thought while citing specific details of text and imagery to support their thinking.   The results also rated the students' abilities to make connections with their reading to emotions, other books, and real-life experiences.

The findings showed that the emergent readers regularly demonstrated critical thinking and emotional responses in their discussions of *Zita the Spacegirl*.   The young students drew comparisons to lived experience and were able to make inferences and draw conclusions about character motivations.   The findings indicated that participants drew their conclusions not just from the images or words alone, but from a combination of the two elements. In the discussion section the researchers claimed that this study presents another practical example of the dual coding theory at work. The dual coding theory of learning holds that by presenting new information in multiple forms of stimuli the learner will more effectively commit it to memory (Paivio, 1986). The researcher believed that because the young readers had coded their memories of the story in both visual and linguistic formats, they were easier to recall and think about critically. Boerman-Cornell (2016) concluded that the narrative format of the comic book encourages a deeper level of student engagement and critical understanding of the text than was

previously thought possible for readers at this early stage of development.   The researchers

claimed that this study demonstrates that even the youngest readers can read graphic novels and

actively engage in serious literary discussions about theme and character development while

finding connections between the literature, their own lives, and other stories. The authors

concluded the study by stating that teaching emergent readers multi-modal literacy skills with

graphic novels could provide them with the tools for critical thought that are necessary for

analyzing multi-modal content in the 21st century such as websites, advertising, and multi-modal

persuasive texts.

According to the Massachusetts Department of Elementary and Secondary Education

(2007), twenty-first century standards include developing skills in understanding and the creation

of multi-media material. One standard states:

"G9-12: 1.73 Use text, images, design elements, and media effectively to create unified,

well organized sites with effective navigation" (DESE, 2007, p. 21).

Another study, (Rothenberger, 2019) sought to determine whether reading a graphic

novel, *Coraline* by Neil Gaiman, would positively influence vocabulary acquisition for four

middle school students with learning differences including attention deficit hyperactivity

disorder (ADHD), communication disorders, and Down Syndrome.   The researcher collected

data over a four-week period in a self-contained classroom setting, three times per week during

English Language Arts lessons. A pre- and post-test was given to determine the effectiveness of

reading a graphic novel for improving academic vocabulary. In her introduction and literature

review, the researcher emphasized the importance of vocabulary acquisition for reading

comprehension.

Rothenberger reported that her students were highly engaged with and excited about reading the graphic novel. When questioned, students stated their preference for graphic novels over text-only books. One limitation the researcher discussed was that it was impossible to determine whether her students were really reading the book during silent reading sessions, or just looking at the pictures. At times, students would skip pages, requiring the researcher to remind them that they should read the story sequentially from the designated starting place to the designated ending place.

The results of this study showed that three out of four students showed a statistically significant improvement in their scores between the pre- and post-vocabulary tests. The Rothenberger noted that finding ways of engaging students in reading is a challenge for teachers of exceptional children. She credited the multi-modal representation of the graphic novel for her students' improved scores stating that the pictorial representation of new vocabulary words was beneficial to comprehension for students with learning differences. The author surmised that through a process of synthesis of word and pictures, student participants were able to learn the meanings of words that were previously unknown. In interviews the students reported that the "pictures helped them understand" (Rothenberger, 2019, p. 106) the vocabulary words. Rothenberger acknowledged the limitations of the small sample size, but believes that the positive results of most of the participants in the study supports the use of graphic novels as a significant tool for vocabulary acquisition. According to the Learning First Alliance (2013), vocabulary acquisition is one of the nine essential elements of effective reading instruction.

In summary, the common thread linking each of these studies is that graphic novels were found to be immediately engaging for all types of learners. English language learners, young students, and students with exceptional learning differences all demonstrated engagement with

graphic novels and a preference for graphic novels over text-only books. Students in each of

these studies demonstrated improvement in vocabulary, comprehension, and the ability to

discuss elements of plot, character, and theme. These studies offer strong evidence of the

viability of graphic novels as a tool for teaching comprehension skills and language acquisition

in the classroom.

Effective Vocabulary Instruction and Dual Coding Theory

      A study by reading researcher Warwick Elley (1989) sought to determine the importance

of discussion for the incidental acquisition of new vocabulary in classroom read aloud activities.

According to Mr. Elley:

     "…vocabulary is the best single indicator of intellectual ability, and an accurate predictor

     of success at school (1989, p. 2)".

This study utilized a pretest posttest model to determine vocabulary acquisition in three groups

of second grade students after exposure to new vocabulary words through in-class teacher read

aloud sessions. The control group was exposed to new vocabulary only in the context of the

story. In the experimental group the teacher led discussions and provided short explanations of

new vocabulary words as they came up in the context of the story. Results of the posttest

indicated that the students who were provided with teacher led discussions of the words made

significantly greater gains in vocabulary acquisition. The control group (read aloud only)

improved their results from pretest to posttest by a mean score of just 15% whereas the

experimental group (read aloud with discussion) showed a 50% gain in mean scores. Elley

(1989) concluded that children can acquire vocabulary from listening to engaging stories read

aloud and that this vocabulary acquisition is greatly improved by teacher-led discussions of new

words. Elley further stated that lower ability students can acquire just as many new vocabulary words in this way as their typically performing peers and that these gains can be long term.

One recent study (O'Connor et. al., 2019) sought to determine the effectiveness of teaching vocabulary to students with learning disabilities.   For this study, fifty-two sixth grade students with Individualized Education Programs (IEP's) that designated them as having learning disabilities were provided vocabulary instruction of Tier Two grade level texts in intervention settings. Over the course of twelve weeks, the students were taught four new high utility academic words per week. Instructional strategies involved providing multiple opportunities for practice and discussion, use of words in conversation and writing, and generalization of vocabulary across contexts. The results of a multiple-choice vocabulary post-test showed that most of the students involved in the intervention learned most of the words with a mean post-test score of 80-86% accuracy. The results of this study have implications for the effectiveness of rigorous vocabulary instruction for students with learning disabilities in an intervention setting.

In a critical analysis of current methods for vocabulary instruction, Moody et. al. (2018) discuss the importance of dual coding theory for instructional practice today. Vocabulary instruction based in dual coding theory focuses on the concreteness or imageability of new vocabulary words by combining definitions with images. The researchers (Moody et. al. 2018) stated that teachers should not assume that students will automatically connect the pictures with new vocabulary words. Words should be put in context with specific referents. Moody et. al. (2018) went on to discuss how students' background knowledge and understanding of the world is shaped into abstract forms called schemas that manifest in how they interact with others. Moody et. al. (2018) assert that these social interactions and the students' connection with the world are strengthened by vocabulary acquisition.   The acquisition of new vocabulary words

contributes to the students' ongoing process of building schemas, helping them to understand the world in new ways. Therefore, Moody et. al (2018) assert that for the use of visuals to be an effective means of vocabulary instruction, they must be mediated by social interaction in some form such as guided reading, teacher questioning, or student led discussion.   This social interaction allows the student to make connections between the words, the images, and their own lived experiences.

Meaning Making, and Higher Order Thinking

Much of the existing research on comics and graphic novels seeks to answer the question of what is it that makes them so effective for encouraging critical thought and higher order thinking.   One recent study (Pantaleo, 2018) found that when readers are processing the combination of text with pictures, they engage more deeply with the material than they would with text-only books.   The researchers found that the neurological process involved in the decoding and synthesis of text and image to make meaning while reading a comic is an act of higher order thinking. The unique comic language of visual cues, non-linguistic symbolic features, the use of color, and other visual components are all a part of the complex secret language of comics (McCloud, 1994).   The authors of the Pantaleo (2018) study found that the comic book reader utilizes a different combination of parts of the brain for decoding this secret language than those that are used while reading text-only books.

In another case study of a sixth-grade classroom in the suburbs of the Midwest (Bender, 2018), an ethnically diverse sampling of students was purposely selected to mirror the population of the community at large.   The research question posed was: how do students make meaning when reading graphic novels? Through the course of the study, six different sign systems for

meaning making in graphic novels emerged. The researcher found three sign systems associated with visual information, coded as: modes, composition, and conventions. The researcher coded three sign systems associated with textual information: reading strategies, metacognitive strategies, and literary devices. This research extends the base of known information about how students make meaning while reading graphic novels. According to this theory, graphic novels allow readers to make meaning by using multiple sign systems at a time (as many as six), while traditional texts only give readers one or two options for making meaning.

Data sources for the Bender (2018) study included a reading survey for all participants, assignments with visual stopping points, transcriptions of student/teacher conferences, small group discussions and journals. This qualitative data was analyzed using Grounded Theory to determine how the information sign systems coded above worked together in the process of meaning making. Grounded Theory is a common conceptual underpinning in qualitative studies. According to Glaser et al. (1968), in studies that utilize grounded theory, qualitative data should be collected before the formulation of any theories about the topic being researched. Glaser et al. (1968) hold that new theories should emerge through a deductive process of analysis of data collected. For the Bender (2018) study, the data was coded using NVivo qualitative data analysis software. The researcher found countless examples of students citing all six types of sign system in their critical discussions of the graphic novel text, *Roller Girl* by Victoria Jamieson. The researcher goes on to state that graphic novels are a viable curriculum choice for the classroom and that they should be considered essential reading for a well-rounded ELA classroom. The researcher stated that the multi-modal format of graphic novels contain a wealth of meaning for young readers.

Another study (Pantaleo, 2014) found that the act of making meaning from visual information for readers of graphic novels was a more active form of comprehension than it was for readers of text-only books.   The author found that "reading" the visual information in graphic novels was a skill that not all students intuitively understand.   The active synthesis of visual cues that takes place in the act of comprehension of graphic novels is by nature a critical experience.   According to the author, teaching students to understand the visual language of picture in comics may require explicit instruction on the part of the teacher. Explicit instruction involves a combination of evidence based instructional practices used in concert to provide clear instructions, guided practice, and task specific support and feedback to scaffold instruction for students until they have mastered new skills (Hughes & Riccomini, 2018). According to Pantaleo (2014), students learning to read graphic novels require explicit instruction to develop the skill of aesthetic appreciation. This level of intensive scaffolded support is necessary for students learning to understand the visual information contained within each frame of a comic. The reader needs to be able to think critically about the artistic elements of the comic in order to fully glean all the information intended by the artist.   Panteleo (2014) holds that the reader engages in active aesthetic criticism in concert with the decoding of written language to make meaning from comics.

The methodology that Pantaleo (2014) employed was a qualitative case study. The setting was a seventh-grade classroom in Vancouver, British Columbia. The data collected consisted of forty-two student responses written midway and at the conclusion of reading the graphic novel *Sidekicks* by Dan Santant. The responses were coded through a method of content analysis. Through this process, seventeen elements of art and design that lent semiotic meaning emerged. Through the course of studying and learning how to read the graphic novel form,

students became aware of the multiplicity of ways that meaning is communicated from the artist to the reader of the graphic novel. By not just reading but taking the time to "really see" each panel of the novel, the students developed an aesthetic awareness that contributed to their understanding of the events of the novel. The ambiguity of graphic novels opens the door for multiple interpretations of a work. This is a feature that will be touched upon again in another study (Linn, 2016). Just as a painting can produce a different set of feelings in the viewer, a graphic novel is not just read, but is aesthetically experienced differently by everyone.

Pantaleo concluded that the aesthetic experience that the reader of a graphic novel engages in while putting together a wealth of semiotic information is inherently critical and potentially much more profound than the experience of reading a text-only narrative. In her opinion, graphic novels are not only viable, but should be mandatory for English language classrooms in the twenty-first century.

In summary, each of the studies in this section make the case that the process of reading a graphic novel is inherently different from reading a text-only book. Graphic novels require the reader to interpret semiotic information from several sources simultaneously. This process involves criticism, synthesis, and analysis of a wealth of visual information in order to make meaning from the text. These studies have shown that in order to process and understand graphic novels, the reader must engage in higher order thinking skills and multi-modal thinking. In the following section, researchers argue that this type of thinking is increasingly relevant for literacy in the twenty-first century and will require new instructional practices.

Comics as Curriculum

One recent article (Barbre, 2019) argues that graphic novels represent a new form of literature in which the image, instead of being just an addendum to the text, plays an important role in the telling of the story. For this reason, it is important for teachers not to assume that they can employ the same teaching practices to graphic novels that they have traditionally used for text only materials. The author argued that the combination of imagery and text has become ubiquitous with the emergence of twenty-first century media in the ever-evolving formats of websites, memes, social media apps, and video games. Barbre argued that the explicit instruction of critical literacy skills as applied to twenty-first century media is crucial for fostering the education of civic minded citizens in a world of digital information and misinformation. The author of this study stated that graphic novels present a unique opportunity to instill a self-perpetuating set of critical literacy skills in students that will be crucial for them to thrive and make meaning in the digital age. The author stated that in this paradigm, it becomes the teacher's responsibility to select materials with "rich graphic imagery, engaging content, and effective pedagogy to facilitate greater understanding and empathy through the integration of both linguistic and visual texts" (Barbre, 2019, p. 140). Teachers will be tasked with broadening a student's understanding of what literature can be and to apply critical thinking skills of analysis, reflection, and investigation to new forms of visual and electronic literature.

Another recent study (Kara, 2020) provides an example of a broadened approach to instructional practices by using comics. For this study the researcher, with the help of an artist from the Center from Cartoon Studies in White River Junction Vermont, designed a short comic story that explored the qualitative interview process for her graduate level course on research practices. It was the researcher's opinion that students often find the subject of qualitative

research methods to be uninteresting. The researcher felt that the concepts of qualitative research could be most effectively taught through experiential learning, putting concepts and practices discussed in class to direct use in their field research. Kara wanted to devise an intermediate step to help students to enter Vygotsky's zone of proximal development before going into the field to conduct their own studies (Cherry, 2020). Kara found that by presenting the information in a **multi-modal** format, students were more likely to place themselves into the narrative of the interview process and begin to question what that process would look like for themselves. Kara's theory was that the comic would act as a virtual zone of proximal development, shortening the gap between her students theoretical understanding of interview concepts by showing them a real-life example of the complexities of interviewing human subjects. Kara found that the experience of reading the comic sparked a deeper experience of analysis and reflection in her students' group discussions than in previously taught classes when she had just used a textbook to cover the same subject matter.

Why could Kara's students more easily place themselves in the role of researcher in the cartoon than the textbook? The answer may lie in Scott McCloud's (1994) concept that cartoons are easy for all people to identify with on a universal level because of the childlike simplicity of the facial features of the comic protagonist. In McCloud's view, the cartoon character is not perceived by the brain as another person. The simplicity of the form becomes an empty vessel which the reader inhabits as they travel through the world of the cartoon. In McCloud's words "we don't just observe the cartoon, we become it" (McCloud, 1994, p. 36). This idea relates to Kara's (2020) theory that the comic text allowed readers to enter Vygotsky's zone of proximal development. In Kara's view, by reading a comic, her students weren't just reading a text, they were inhabiting the world of the protagonist as they interviewed subjects for a qualitative study.

Another recent study (Linn, 2016) chose to focus on the advantages of the graphic novel format for teaching critical literacy skills, this time in the 6th grade social studies classroom. In this case study, the research question revolved around the superiority of the graphic novel format for maximizing engagement and encouraging young students to self-identify as readers while reading a text that fostered understanding of the experiences of other cultures. Linn's question was, what is the appeal of graphic novels and how can they promote critical reading skills for adolescents?

The twenty-five participants of the study were all eighth-grade students. Many of the student-participants were immigrants from Central America, the Middle East, and Southeast Asia who read below grade level. Data was collected from online discussion boards, post-it notes placed in the book while reading, and small group interviews.   Through qualitative analysis of these data sources, the researcher found that the graphic novel format opened new avenues for reluctant readers who may have felt shut out by traditional literature.   She felt that the graphic nature of comics was more welcoming and approachable for multicultural students than text-only books. The researcher further found that the ambiguity of the juxtaposition of drawing and text in comics leaves room for interpretation and critical thinking for young readers who conversely, may take plain text books at face value, never questioning the author's veracity or motivations.

A recent article (Fenty, 2020) has outlined a comprehensive strategy for reading fluency instruction that utilizes comics or graphic novels in an intervention setting for students with learning disabilities in reading. The foundation for this strategy was based in part on the results of an eight-week study (Smetana & Grisham, 2011-2012) that measured oral reading fluency rates of five elementary aged students with learning disabilities in an intervention setting after the introduction of a graphic novel curriculum to support reading fluency. The researchers in

this study observed a change in reading behaviors of the students over the course of the eight-week period including unprompted discussion of the graphic novels that they were reading, use of newly learned vocabulary in their student writing, and reading of graphic novels during free periods like lunch and recess. Most importantly, the study measured and increased oral reading fluency rates of at least twenty-five percent for all students by the end of the eight-week period (Smetana & Grisham, 2011-2012).   The researchers concluded the graphic novels provided an authentic and highly motivating reading experience on which the students could practice decoding skills.

Fenty (2020) has suggested a few key strategies that intervention teachers working with students with learning disabilities should apply when developing a graphic novel curriculum that focuses on improving reading fluency.   One strategy is previewing the texts to determine readability and appropriateness for the students in their class and to determine appropriate stopping points for comprehension checks. She has also suggested that teachers should pre-teach Tier Two vocabulary and have students page through the reading to make predictions about the content. Fenty (2020) has suggested that the teachers should also select sections of the text that they will ask the students to read repeatedly and utilize these sections for regularly occurring one-minute timed readings. Another suggestion is giving students the option to answer summarization or comprehension questions in the form of a drawing in a small comic book frame provided by the teacher. Fenty (2020) concluded that graphic novels have a powerful potential to increase motivation and engagement of students with learning disabilities during reading intervention sessions.

Advantages of Small Studies of Dyslexia

A recent qualitative study by British researcher Jonathan Glazard (2010), explored the school experience of nine adolescent students with dyslexia. The researcher conducted a series of interviews with the students questioning them on topics such as their self-perceptions of dyslexia and the supportive or abusive roles of peers, teachers, and parents. By using direct quotations from the student interviewees, Glazard gives voice to the experience of these students.

One of the key findings of the study was that having an official diagnosis of dyslexia was a great boost to the self-esteem of the subjects. The diagnoses helped them to feel that they were not merely stupid or lazy, but that there was something different about how their brain functioned. Another key finding was that the students with dyslexia valued teachers who allowed them to complete assignments multi-modally, by providing choices other than written reports, such as drawings or videos. Interviewees also mentioned the multi-dimensional nature of intelligence, and many took solace in the knowledge that there were successful and famous people who also had dyslexia. The small sample size allowed the researcher to explore topics related to the student's experiences with dyslexia and school in detail. This study is significant because it provides valuable insight into the needs and experiences of students with dyslexia that can be applied by teachers and interventionists currently working with this population.

Summary

Researchers in the studies presented in this section discussed the importance of the explicit instruction of visual literacy in twenty-first century classrooms. The studies cited illustrate how the graphic and ambiguous nature of comics can cause the reader to empathize more deeply with the characters. This deeper level of empathy can cause readers to engage more

fully with difficult concepts in a graduate level setting and to develop an understanding of other

cultures more easily in middle school social studies classrooms. In all cases presented in this

section, graphic novels were used as a tool to further develop complex skills and ideas. Comics

can provide access to new vocabulary in the context of bold, easily digestible stories, with

engaging visual imagery that facilitates understanding. It is this researcher's opinion that a

comic curriculum that includes prompted student discussion and the explicit instruction of new

vocabulary in context could be a powerful instructional tool, particularly in an intervention

setting.

The next chapter will provide a detailed overview of the methods this researcher

employed for this qualitative action research case study of a graphic novel curriculum in an

intervention setting. This study will be built on the foundations established by existing research

cited in this literature review for the potential pedagogical uses of comics in the classroom. The

next chapter will provide details of the instruments, population, and methods for sampling and

coding of information collected for this study.

CHAPTER 3: Methods

Introduction

The purpose of this mixed methods case study was to determine what impact, if any, the use of a researcher-created comic curriculum had on the acquisition of Tier Two academic vocabulary words and the reading fluency rates for a small group of student participants (aged nine to twelve) who receive special education services for reading. This researcher collected quantitative data in the form of a vocabulary pretest and posttest and weekly oral reading fluency measures from a small group of students as they used a researcher designed comic book reading intervention curriculum over a nine-week period. This researcher, acting in the role of a participant observer, also collected qualitative observational data in a field log. The daily observations focused on the experience of the students as they used the curriculum and attended to the ways in which the comic curriculum affected levels of student engagement.

The academic Tier Two vocabulary words used in the curriculum were chosen by the researcher from the Hyde Park Schools Tier Two Vocabulary lists (2020). According to the Hyde Park Schools literature, this list represents a compilation of Tier Two academic vocabulary words that all elementary school children should have acquired by the end of sixth grade. The comic book curriculum created for this study utilized a combination of explicit instruction, guided reading, and prompted student discussion to teach the Tier Two vocabulary.   These teaching methods have been identified in the research of Warwick Elley (1988), to be effective practices to aid in the acquisition of new vocabulary words.

The research took place over a period of nine weeks. A multiple-choice vocabulary test was given at the start of the research period and was readministered at the end of the nine-week

period. I created one-minute timed oral reading fluency measures that were also administered to each student participant once a week for the duration of the study. The curriculum also included drawing, writing, and discussion activities that provided students with multi-modal ways to engage with the target Tier Two vocabulary words.

The study took place in a small rural school in western Massachusetts approximately 100 miles west of Boston and 60 miles north of Hartford. The school has a population of 129 students, with a student-teacher ratio of 10.6:1 (DESE, 2021). The participants in this study included four students ranging in ages from nine through twelve in the fourth, fifth, and sixth grades. The student participants in this study were identified by state and district measures as having a lower-than-average reading level. The student participants received special education services for reading in a setting outside of the general education classroom five times a week for thirty-minute sessions. Student participants were found to be eligible for special education services under a range of mild-moderate disability categories including attention deficit hyperactivity disorder (ADHD), autism spectrum disorder (ASD), and dyslexia. The study took place in a small group resource room setting. The students participants were purposely selected for the study.

According to reading expert Sally Shaywitz (2003), as much as 20% of the primary school student population experience reading difficulties. In the literature discussed previously, comics and graphic novels have been shown to be an effective tool for teaching vocabulary, comprehension, and critical thinking in a format that is engaging to young and old readers alike. Despite the promising potential of comics as a tool for literacy intervention, to date, I have yet to discover an intensive reading curriculum that uses comics for instructional purposes.

Design

  A mixed methods action research case study was chosen to address the research questions. This case study employed a triangulation design using parallel phases.   Quantitative and qualitative data were collected simultaneously to develop an in-depth understand of the effects of the intervention on Tier Two vocabulary acquisition, oral reading fluency rates, and the experience of the students with learning differences as they used the intervention over time. The student participants were given a multiple-choice pretest at the start of the intervention to measure their knowledge of the Tier Two words they would be learning. The same test was administered at the end of the program to measure vocabulary acquisition. The student participants were also given weekly one-minute oral reading fluency measures. For these measures students were asked to do a repeated reading of the text of the comic story that they'd read in the previous session. This text selection contained many of the target Tier Two words the students had read and discussed previously in picture-word activities and word reading lists. The picture word activities would be the students' introduction to the Tier Two vocabulary words. In the picture word activity, the Tier Two words were placed in a comic box or frame with three distinct multi-modal elements designed with the intention of easing decoding and aiding in comprehension of new vocabulary words. For the first element in this activity, students would first read the words that had been broken up into Elkonin boxes. Elkonin Boxes are boxes drawn around each syllable of a multi-syllable word to physically separate the syllables from one another. The second element was a picture that was meant to represent an example of the Tier Two word in context. The third element was a sentence that used the Tier Two word in context and served as a caption for the picture.

Figure 1. Picture/Word Component Examples

The oral reading fluency measures were taken to assess change over time in the reading rates of each of the participants to monitor positive or negative effects of the intervention on reading speed. A slower than average reading rate has been shown to negatively impact a student's comprehension of what they read (Learning First Alliance, 2013). All the student participants in this study had goals set out in their Individualized Educational Programs to increase their reading rates.

Qualitative data for this study was collected in the form of a field log. I acted in the role of a participant observer, recording field notes after each intervention session. Field notes focused on individual behaviors of each of the student participants, which elements of the curriculum were covered in the session, and other anecdotal information that provided insight into the research questions and deepened the understanding of the experience of the student participants as they took part in the intervention.

Quantitative Research Questions

Research Question 1: How does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary affect vocabulary acquisition in a resource room setting for students reading below reading grade level?

Hypothesis

Null Hypothesis 1: Comparison of results of mean scores for all students on pre-intervention test of targeted Tier Two vocabulary words with post intervention test of targeted Tier Two vocabulary words will not show a statistically significant improvement.

Hypothesis 1: Comparison of results of mean scores for all students on pre-intervention test of targeted Tier Two vocabulary words with post intervention test of targeted Tier Two vocabulary words will show a statistically significant improvement.

Research Question 2: How does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary effect oral reading fluency rates in a resource room setting for students reading below reading grade level?

Null Hypothesis 2: The oral reading fluency rates of all participants will not show a significantly improved trend line over the course of the intervention as measured by having a p-value of greater than .05 using a linear regression model.

Hypothesis 2: The oral reading fluency rates of all participants will show a significantly improved trend line over the course of the intervention as measured by having an upward sloping trend line and a p-value of less than .05 using a linear regression model.

Qualitative Research Question

What effect, if any, will the comics-based curriculum have on student engagement as measured by observable behaviors including but not limited to their ability to complete 3 tasks in a session, transition to the intervention classroom smoothly, maintain focus on classwork throughout the session, and contribute to a positive classroom experience?

Setting

The setting of this study was a PK-6 elementary building of a rural school district in Western Massachusetts. As of the 2020-2021 academic year, there were 129 students, with a student-teacher ratio of 10.6:1 (DESE, 2021). The school currently has a principal, two secretaries, eight classroom teachers, four learning support teachers, a speech and language pathologist, an adjustment counselor, a reading specialist, an art teacher, a music teacher, and a gym teacher.

The ethnic breakdown of student's attending the school in 2020-2021 was 4% Hispanic, 8% Multi-Racial, Non-Hispanic, and 88% White. Sixteen percent of the population of students are labeled as having disabilities. Thirty-eight percent of the student population were considered as having high needs. Thirty percent of the student population were considered economically disadvantaged (DESE, 2021). All students in the school are provided free lunch and breakfast.

The school has a one-to-one ratio of Chromebooks per student. Each classroom is equipped

with a Smartboard and a Redcat classroom audio system. There is a computer lab with enough desktop computers to accommodate twenty students.

There is one classroom per grade. The fifth and sixth grades are combined into two heterogeneous groupings based on ability. Students who are eligible for special education are provided services either within the classroom or in a resource room setting.

This study took place in a resource room setting with four separate groups. The student participants all received special education services in a separate setting to support a variety of language-based learning differences with a goal of increasing their abilities to access to the general education classroom curriculum. The supplemental Tier Two academic vocabulary curriculum was delivered in 30-minute sessions. The pretest was delivered at the start of the nine-week intervention period and the posttest was delivered at the end of the intervention period.   One-minute timed oral reading fluency measures were taken weekly by all student participants. I recorded observational field notes after each intervention session.

Participants

The participants for this mixed methods action research case study, were four elementary school students between the ages of eight and twelve. The participants were not randomly assigned for the purpose of this study. The participants were selected from the pool of upper elementary special education students whose individualized education plans (IEPs) specify that they receive pull out services for reading in a separate setting.   The IEP goals for these students were written to address a range of lower-than-average abilities in reading including comprehension, oral reading fluency rate, decoding, spelling, handwriting, idea generation, and limited vocabulary.   Although the primary goal of the researcher designed curriculum was

vocabulary acquisition, consideration was given to phonics, fluency practice, comprehension, spelling, and written language in the design of the two versions of the program.

The four students analyzed in this study, received support services for reading five times weekly for the entire nine-week period. All student participants for this study were males. There were two, ten-year-old students, and two, twelve-year-old students.   Demographically, in state reporting data the students were identified as white.   The student participants used the comic vocabulary curriculum five times a week for thirty-minute sessions. In the interest of confidentiality, student participants have been given aliases to protect their identities. See Table 1 for a complete analysis of student participants.

Table 1

Student Participants in the Control Group (Text Only Vocabulary Curriculum)

Name	Linus	Ernie	Kenny	Jimbo
Age	12	10	12	10
Gender	Male	Male	Male	Male
Grade	6	4	5	4
Disability Category	Multiple Disabilities Primary: Autism Spectrum Disorder Secondary: ADHD	Specific Learning Disability in Reading Dyslexia, Dyscalculia ADHD	Specific Learning Disability in Reading	Specific Learning Disability in Reading
How Disability Affects Student Learning	Slow processing speed affects ability to read fluently, decode unknown words and comprehend what he has read.	Executive Functioning issues affects ability to attend to lessons independently. Dyslexia affects ability to read and comprehend grade level text.	Dyslexia affects ability to quickly read and decode unknown words. Dyslexia affects ability to clearly understand what he has read.	Dyslexia primarily affects reading speed which leads to difficulty comprehending grade level texts.
Reading Lexical Level BAS and ORF	BAS: Level P With Limited Comprehension (Mid-Sixth Grade Expected BAS level = Y) ORF: 68 CWPM (Low)	BAS: Level L With Excellent Comprehension and less than 90% accuracy (Mid-Fourth Grade Expected BAS level = R) ORF: 20 CWPM (Very Low)	BAS: Level N With Satisfactory Comprehension (Mid-5th Grade Expected BAS level = T) ORF: 25 WPM (Very Low)	BAS: Level R with 95% accuracy and Excellent Comprehension (At grade level) ORF: 50 CWPM (Low)

The researcher, taking the part of a participant observer (Tracy, 2013) and primary instrument of qualitative data collection, immersed themself in the situation, implementing the comic book vocabulary curriculum. The researcher collected quantitative data in the form of a

vocabulary pretest and posttest as well as weekly oral reading fluency measures. The researcher also recorded qualitative data in the form of participant observation of classroom discussions and intervention activities. The researcher recorded observational data in a field log following each intervention session. The researcher sought to minimize any instructional bias by using scripted questions for discussion prompts and by adhering to a regular schedule of activities. Students were expected to complete three components of the curriculum per session in order to earn a success card in the classroom token economy system. Success cards could be traded for prizes once a week on "Fun Friday". The researcher also collected data in the form of student artifacts. One of the regular components of the program was a drawing activity in which students were asked to draw examples of the Tier Two vocabulary words and write a sentence to explain their drawings.

Research Ethics and Human Subject Protection

In preparation for this study, the researcher completed an online course in human subject research for social and behavioral sciences from the Collaborative Institutional Training Initiatives (CITI) and received a valid certificate for the time in which research will be conducted. The CITI training program provided the researcher with an understanding that it is crucial to protect the rights, needs, and privacy of participants involved in this study. Before engaging in the study, permission was granted by the principal of the elementary school to gain access to the site for the purpose of conducting research. An informational letter was provided to the parents or guardians of all student participants. The letter indicated the purpose of the study and provided parents the opportunity to have their student's information omitted from the study if they so desired (Appendix E).   Additionally, a research proposal was submitted to and

approved by the Institutional Review Board (IRB) of Slippery Rock University. The purpose of

the IRB is to provide external oversight to ensure that the rights of participants in this study will

be protected.

To mitigate researcher bias and to assess the accuracy of the findings of this study, the

researcher has triangulated data sources, providing ample time for observation, multiple modes

of data collection, and ample time for self-reflexivity and data analysis. According to Creswell

(2018), converging several sources of data through a process of triangulation is a means of

adding to the validity of a study.   The researcher's intention is to present an unbiased analysis of

the data collected from student participants.

Instrumentation and Protocol

This mixed methods action research case study involved the implementation of a

supplemental researcher designed reading intervention curriculum focusing on Tier Two

academic vocabulary words for elementary-aged students. The case study focused on the

phenomenon of the implementation of the comic book reading intervention over a nine-week

period. The comic book intervention took the form of a student workbook with six components

per lesson.

The researcher designed the comic book curriculum for the purpose of improving student

knowledge of academic vocabulary. The comic book curriculum was intended to be used with

older elementary students with learning disabilities that negatively impact reading rate and

comprehension. The comic curriculum was designed to be used with students who can read at a

minimum of the second-grade level and are learning to read multi-syllable words. According to

reading researcher Warwick Elley (1988), knowledge of academic vocabulary is the single

greatest indicator of future academic success. The comic curriculum utilized a combination of explicit instruction of Tier Two vocabulary words, exposure to the words in the context of a story, and opportunities for students to create definitions through active discussion and by creating their own comic style drawings.

While designing the curriculum, the researcher has considered the elements of an effective reading intervention as defined by the Learning First Alliance (2000) including a focus on phonics, fluency practice, comprehension, spelling, and written language. The comic curriculum presented the material in a combination of sequential text and image in a comic book format.

The six components of each lesson in the comic curriculum were divided into two parts to be delivered in two thirty-minute sessions. Students were expected to complete three components of the lesson per session. The six components were delivered in the following manner.

Lesson Part 1:

- Picture/Word – a presentation of new vocabulary words segmented into **Elkonin Boxes** to build awareness of individual phonemes. Each segmented target word was placed into a comic book style frame with an image meant to represent the word. Each frame also included a sentence that used the target Tier Two word in context. Students were expected to decode the word, read the sentence, and describe what they saw in the picture.

- Comic Story - The curriculum provided exposure to new vocabulary words in context in the form of short text or comic stories. The dialogue and narration of the stories were filled with the target Tier Two words that had been introduced in the Picture/Word component. The stories were read aloud by students. The comic stories were seven to

ten pages long. Students were expected to read approximately two pages of the story per

lesson.

- Comprehension Questions – After reading the two pages of comic text students were

    prompted to answer approximately six comprehension questions. The comprehension

    questions focused on defining the target Tier Two words in student friendly language and

    summarizing the plot of the stories. Students were provided prompts for which frame of

    the comic text to look to find answers to questions to aid in student independence with

    this activity.

Lesson Part 2

- Word List Reading – Students were asked to read fifteen to twenty Tier Two target words

    in list form. Words in the word list were not broken up into individual syllables and did

    not include picture definitions. Students were asked to provide a brief student friendly

    definition of each word out loud.

- Oral Reading Fluency Measure – Students were asked to read a text-only version of the

    comic story that they'd read the day before. After one practice reading, students were

    asked to read the text again in a one-minute timed trial. Students were asked to date and

    record their scores as correct words per minute.

- Comic Drawing Activity – Students were asked to select 4-6 target words from the

    lesson and draw a picture to represent that word. Students were asked to write a sentence

    to explain what the picture showed using the target word.

    Quantitative data was collected in the form of a vocabulary pretest and posttest, and

weekly oral reading fluency measures. (Appendix F) Qualitative observational data was collected

in a field log by the researcher at the conclusion of each intervention session. The observational

data collected addressed the research question of student engagement with the comic reading curriculum and captured emergent themes surrounding the phenomenon of the comic curriculum in the intervention classroom over an extended time period. Qualitative data was also collected in the form of student drawings and artifacts.

Procedure

The researcher gained permission from the district superintendent to conduct the proposed study in the school. Permission to conduct research was also granted by Slippery Rock University's governing Institutional Review Board (IRB). Informational letters (Appendix E) were provided to the parents of all students involved in the study. The letters informed participants of the purpose, duration, and content of the action research case study. It also provided parents a form to request that their students' data be omitted from the results of the study if so desired.

The researcher began the study in April of 2022 and ended in June of 2022. The study took place in the researcher's classroom during four separate small group or one to one intervention sessions. On the first day of the study, students were given a multiple-choice vocabulary test covering words that would be taught over the course of the study. This session lasted thirty minutes. For the next nine weeks, students participated in the study five times a week for thirty minutes sessions during their regularly scheduled reading intervention times. To ensure reliability of the results, the curriculum followed a scripted routine. The curriculum was designed to be a student-centered experience with the teacher acting as facilitator. On the last day of the study students were given the same multiple choice vocabulary test that had been given at the start of the study.

Analysis

The purpose of this study was to determine what effect if any the comic curriculum had on vocabulary acquisition of targeted Tier Two words in a small group intervention setting for students with lower-than-average reading abilities. The researcher analyzed pretest and posttest scores of the control and experimental participants to determine what impact, if any, the comics-based curriculum had on vocabulary acquisition.

The data (scores) collected from the pretest and posttests examined any effects that the comics curriculum had on vocabulary acquisition through comparative analysis of the mean scores of all participants between the pre- and post-tests using a paired sample t-test. The data was entered into a paired sample t-test calculator on statskingdom.com to determine if the mean scores of all participants showed an improvement that was statistically significant.

A secondary consideration of this study was to determine what effect, if any, the comics-based curriculum had on the oral reading fluency rates of the participants over the course of the study. The data from oral reading fluency measures was taken once weekly and represented numerically in the form of correct words read per minute. The data sets for each student's scores were placed on a graph and a line of best fit was created in Google Sheets to determine positive or negative trends in reading fluency rates.   The data points for each student were entered into a linear regression calculator on graphpad.com to determine if the p-value of the slope was significant enough to be caused by the intervention or if the trend in data was statistically random. A statistically significant slope on a trend line would have a p-value of less than .05. According to a recent article, the p-value of a trend line can be defined as:

"the probability under a specified statistical model that a statistical summary of the data (for example, the sample mean difference between two compared groups) would be equal to or more extreme than its observed value." (Grabowski, 2016, p. 1)

The qualitative question posed by this study was: what effect, if any did the comics-based curriculum have on student engagement as measured by observable behaviors including but not limited to their ability to complete three tasks in a session, transition to the intervention classroom smoothly, maintain focus on classwork throughout the session, and contribute to a positive classroom experience? According to Hyatt & Roberts (2019), qualitative studies occur in a naturalistic setting with small sample sizes. For this study student engagement will be defined as:

"the energy and effort that students employ within their learning community, observable via any number of behavioral, cognitive, or affective indicators across a continuum" (Bond et al, 2020, p. 1).

The researcher, as a participant observer collected observational data of intervention sessions in a field log. The researcher provided a clear set of expectations for student behaviors during lessons and read the scripted prompts provided for each lesson. Field notes were revisited at the end of each day and analyzed using an iterative approach in which emergent data was reflected upon and compared with existing knowledge touched upon in the literature review (Tracy, 2013). The field notes were entered into Dedoose qualitative data analysis software and the primary cycle coding took place after data was collected. The researcher became fully immersed in the data by reflecting on daily observations in the field log (Tracy, 2013). During primary coding, emergent ideas were reflected on and discussed with external parties with careful consideration to protect the confidentiality of participants. With the aid of the Dedoose

coding software, emergent primary cycle code words were used to label common themes of

student engagement that emerged over the course of the data collection period.

In the secondary cycle of coding, the researcher used the Dedoose program to arrange

previously identified emergent codes thematically under umbrella terms that made conceptual

sense.   The hierarchical codebook gave shape to a loose analysis outline of themes relating to

observed behaviors of student engagement.

Limitations

This researcher acknowledges that this study is limited ethnographically to a small group

of primarily white (non-Hispanic) participants in a rural setting. These limitations may affect the

generalizability of findings to other settings, situations, and experiences of more

ethnographically diverse schools. The study of the use of comics and graphic novels in reading

intervention settings is an emergent field. Because of this, this researcher believes that this study

has made a significant contribution to the existing body of knowledge of how comics and

graphic novels can be effectively used to improve both reading comprehension and fluency for

students with learning differences. It is the hope of the researcher that this study will also

provide insight into the experience of the students with reading differences that will be useful for

practitioners and researchers in the field of literacy instruction.

Summary

This chapter has explained the methods used in this mixed methods action research case

study of whether the implementation of a comics-based Tier Two vocabulary curriculum had any

significant effect on students' vocabulary acquisition in an intervention setting. The fourth

chapter will present the results collected from this research. The results will include a statistical

analysis of the results of pretest and posttest scores and oral reading fluency measures as well as

a narrative analysis of the qualitative observational data collected over the course of the study.

Chapter 4:

Findings

Introduction

This mixed methods action research case study was primarily concerned with the following questions:

1. How does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary affect vocabulary acquisition in a resource room setting for students reading below reading grade level?

2. How does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary affect oral reading fluency rates in a resource room setting for students reading below reading grade level?

3. What effect, if any, will the comics-based curriculum have on student engagement as measured by observable behaviors including but not limited to their ability to complete three tasks in a session, transition to the intervention classroom smoothly, maintain focus on classwork throughout the session, and contribute to a positive classroom experience?

The final steps in this action research case study were to analyze the quantitative and qualitative data collected and draw conclusions based on the evidence. A researcher designed comic book intervention was used in an intervention setting for the nine-week data collection phase. The pretest and post test results, oral reading fluency measures, and qualitative observational field notes were triangulated to determine if the initial hypotheses were correct, namely that the comic book reading intervention curriculum would lead to increased vocabulary knowledge, increased rates of oral reading fluency, and increased levels of student engagement. According to Creswell (2018), converging several sources of data through a process of triangulation is a means of adding to the validity of a study. The intention of this action research case study was to present an unbiased interpretation of the experience of a group of students with

learning differences as they used the researcher created comic style reading intervention. This

study was intended to serve as a basis for future practice and research in the use of comics as

instructional curricula.

Findings for Research Question One

Regarding research question one, (how does using a text and image-based comic

curriculum combined with the explicit instruction of academic vocabulary affect vocabulary

acquisition in a resource room setting for students reading below reading grade level?), student

participants were given a seventy-question multiple choice screening assessment to measure their

knowledge of the Tier Two academic vocabulary words that would be targeted in the comic book

intervention curriculum. In the interest of confidentiality, student participants have been given

aliases to protect their identities. The results of the screening measure can be seen in Table 2.

Table 2

Pre-Intervention Test Results for Knowledge of Targeted Academic Vocabulary

Before the start of the intervention, three of the four student participants scored lower than 75% when tested on their knowledge of the targeted academic vocabulary words. After the nine-week intervention period was over, the student participants were given the same seventy-question multiple choice test of the academic vocabulary that was targeted by the curriculum. The results can be seen in Table C. A pretest/posttest comparison can be seen in table D.

Table 3

Post Intervention Test Results for Knowledge of Targeted Academic Vocabulary

Table 4

Pre/Post Intervention Test Results Comparison for Knowledge of Targeted Academic
Vocabulary Words

Blue = Pre-Intervention, Red = Post-Intevention

At the conclusion of the comic intervention curriculum, three of the four student

participants scored 75% or better on the seventy-question assessment of knowledge of the Tier

Two academic words that were targeted by the comic book intervention curriculum. All students

showed significant gains in their knowledge of the targeted Tier Two academic vocabulary

words.

Statistical analysis of the pretest and posttest results supported Hypothesis 1: comparison of results of mean scores for all students on pre-intervention test of targeted Tier Two vocabulary words with post intervention test of targeted Tier Two vocabulary words will show a statistically significant improvement. The results of the mean of the student participants' pretest and posttest assessment scores were analyzed statistically using a dependent paired t-test to determine if the difference between student's pre- and posttest scores was statistically significant. Each students' pretest and posttest scores were entered into a paired t-test calculator on the Statisticskingdom.com website. Results of the dependent paired-t test indicated that there was a significantly large difference between the pre-test ($M = 59.5$,$SD = 22.5$) and posttest ($M = 84.5$,$SD = 9.1$) of targeted academic vocabulary indicating that the comic book intervention had a significant effect on the acquisition of the targeted Tier Two academic words for all student participants, $t(3) = 3.4$, $p = .043$.

Table 5

Pre-Test and Posttest of Targeted Tier 2 Vocabulary Words

■ Pre-Test   ■ Posttest

88%

40%

Kenny

Kenny, a fifth-grade student with a dyslexia diagnosis, showed a 48% increase in his knowledge of the targeted Tier Two academic vocabulary between the pre- and posttests. According to Beidas et. al. (2013), people diagnosed with dyslexia usually exhibit a deficit in the cognitive processes that control naming speed, (how quickly one recalls letters, numbers, shapes, colors, etc.), visual working memory (how long one can hold visual information in their working memory while recalling other information), and attention (the ability to stay focused on a given task). These cognitive differences negatively impact the person with dyslexia's ability to manipulate the individual phonemes or pieces of sounds that make up words so they can fluently read. People with dyslexia may show relative strengths with cognitive processes involving higher order executive functioning skills like visual spatial reasoning, empathy, and the ability to recall and discuss stories. Of relevance to this study, is a case study of a first-grade student with dyslexia. Weaver (1994) found that people with dyslexia are often more likely to focus on constructing meaning from words than decoding the words correctly. People with dyslexia often

develop other metacognitive strategies for learning words based on their meaning so that they can identify them in context without having to rely on decoding letters.

At the start of this study, Kenny's score of 40% on the multiple-choice vocabulary pre-test indicates that he had limited knowledge of the academic vocabulary words that were targeted in the intervention. Over the course of the study, Kenny was exposed to the vocabulary in the form of picture/image tasks, wordlist reading, in the context of comic stories, repeated readings, discussions, and drawing activities. At the end of the intervention, given the same multiple choice vocabulary test Kenny scored 88%. Results of the paired-t test indicated that there was a significantly large difference between Kenny's score on the pretest ($M = 40$, $SD = 0$) and his score on the posttest ($M = 88$, $SD = 0$), $t(0) =$ Infinity, $p < .001$.

Table 6

Jimbo, a fourth-grade student with dyslexia, demonstrated an 8% increase between the pre- and posttest results on the multiple-choice test of the academic vocabulary words targeted in this study. On previous district administered reading benchmark assessments, Jimbo typically

demonstrated satisfactory comprehension of slightly below grade level texts. Jimbo's academic

goals were focused on increasing reading fluency. Jimbo's pre-test score of 80% indicates that

he already knew most of the targeted Tier Two academic vocabulary words. Results of the

paired-t test indicated that there was a significant large difference between Jimbo's score on the

pretest ($M = 80$,$SD = 0$) and the posttest ($M = 88$,$SD = 0$), $t(0) =$ Infinity, $p < .001$.

Table 7

Pre-Test and Posttest of Targeted Tier 2 Vocabulary Words

Ernie, a fourth-grade student diagnosed with dyslexia and attention deficit hyperactivity

disorder, demonstrated a 42% increase between his scores on the pre- and posttest of targeted

academic vocabulary. On district given measures Ernie typically read at a rate of around twenty

words per minute on below grade level text passages. On district given benchmark assessments

Ernie typically displayed excellent comprehension of below grade level reading passages.

Results of the paired-t test indicated that there was a significantly large difference between

Ernie's score on the pretest ($M = 29$,$SD = 0$) and his score on the posttest ($M = 71$,$SD = 0$), $t(0)$

= Infinity, $p < .001$.

Table 8

Pre-Test and Posttest of Targeted Tier 2 Vocabulary Words

Pre-Test   Posttest

- 100%
- 91%
- 75%
- 72%
- 50%
- 25%
- 0%

Linus

Linus, a sixth-grade student with autism spectrum disorder and attention deficit

hyperactivity disorder demonstrated a 19% increase in scores between his pre- and post-tests of

the targeted academic vocabulary words. On district given benchmark assessments, Linus

typically read below grade level text passages with limited comprehension.   Over the course of

the comic intervention Linus was exposed to the targeted vocabulary words in multiple

modalities, through imagery, discussion, and drawing activities. Results of the paired-t test

indicated that there was a significantly large difference between Linus' scores on the pretest

($M = 72$,$SD = 0$) and posttest of the targeted academic vocabulary words ($M = 91$,$SD = 0$), $t(0)$

= Infinity, $p < .001$.

Findings for Research Question Two

Regarding research question two, (how does using a text and image-based comic curriculum combined with the explicit instruction of academic vocabulary effect oral reading fluency rates in a resource room setting for students reading below reading grade level) statistical analysis using a linear regression model did not find a statistically significant correlation between the comic book reading intervention and improved reading rates as measured by weekly oral reading fluency measures for all student participants. The results of this study did not disprove null hypothesis 2: the oral reading fluency rates of all participants will not show a significantly improved trend line over the course of the intervention as measured by having a p-value of greater than .05 using a linear regression model.

Student participants were given weekly oral reading fluency measures to track their individual reading rates as measured by correct words read per minute over the course of the nine-week intervention period to analyze positive or negative trends. The results for each student participant have been charted in tables E, F, G, and H.

Table 9

Linus' Reading Rates for Oral Reading Fluency Measures During Intervention Period

● ▬ Trendline for Reading Rate Over Time R² = 0.219

[Line graph: Y-axis labeled "Reading Rate in Correct Words Read Per Minute" ranging 0 to 125. X-axis labeled "Trials by Week (0 = Pre-Intervention/Baseline)" ranging 0 to 6. Data points: (0, 68), (1, 54), (2, 77), (3, 77), (4, 116), (5, 68), (6, 85). A pink trendline rises across the chart.]

Trials by Week (0 = Pre-Intervention/Baseline)

Linus' oral reading fluency scores were entered into a linear regression calculator on Graphpad.com.   Results of the linear regression indicated that although there was a generally positive trend in Linus' reading rate, his scores were clustered far enough away from the trend line that it could not be said with statistical certainty that this trend was a result of the intervention. According to the results of the linear regression analysis, there was not a significant effect between the comic book reading intervention and oral reading fluency rate for Linus, $(F(1, 5) = 1.402, p = 0.2896, p > 0.05, R2 = 0.2190)$.

Table 10

Kenny's Reading Rates for Oral Reading Fluency Measures During Intervention Period

Kenny's oral reading fluency scores were entered into a linear regression calculator on Graphpad.com.   Results of the linear regression indicated that the positive trend in Kenny's reading rate was statistically significant. His scores were clustered closely enough around the trend line that it could be said with statistical certainty that this trend was a result of the intervention. According to the results of the linear regression analysis, there was a significant effect between the comic book reading intervention and oral reading fluency rate for Kenny, $(F(1, 5) = 10.34, p = 0.0236, p < .05, R2 = 0.6740)$.

Table 11

Jimbo's Reading Rates for Oral Reading Fluency Measures During Intervention Period

Jimbo's oral reading fluency scores were entered into a linear regression calculator on Graphpad.com.   Results of the linear regression indicated that although there was a generally positive trend in Jimbo's reading rate, his scores were clustered far enough away from the trend line that it could not be said with statistical certainty that this trend was a result of the intervention. According to the results of the linear regression analysis, there was not a significant effect between the comic book reading intervention and oral reading fluency rate for Jimbo, $(F(1, 4) = 5.941, p = 0.0714, p > .05, R2 = 0.5976)$.

Table 12

Ernie's Reading Rates for Oral Reading Fluency Measures During Intervention Period

Ernie's oral reading fluency scores were entered into a linear regression calculator on Graphpad.com. Results of the linear regression indicated that although there was a generally positive trend in Ernie's reading rate, his scores were clustered far enough away from the trend line that it could not be said with statistical certainty that this trend was a result of the intervention. According to the results of the linear regression analysis, there was not a significant effect between the comic book reading intervention and oral reading fluency rate for Ernie, $(F_{(1, 5)} = 4.995, p = 0.0757, p > .05, R^2 = 0.4997)$.

Findings for Research Question 3

Regarding research question 3, (What effect, if any, will the comics-based curriculum have on student engagement as measured by observable behaviors including but not limited to their ability to complete three tasks in a session, transition to the intervention classroom smoothly,

maintain focus on classwork throughout the session, and contribute to a positive classroom experience?), the researcher collected observational data in the form of field notes after each intervention session. Intervention sessions were made up of mixed groupings of one, two, and sometimes three student participants.

Prior to the data collection phase, student participants were read a scripted informational letter, informing them that they would be taking part in an action research project that would help other teachers to understand new ways to teach vocabulary words. The letter went on to say that the researcher and the comic workbook were the subjects of the research project, not them. It went on to say that their participation in the class would provide important information about how the comic curriculum works. The letter informed students of the duration of the study, exactly what would be expected of them, and the possible benefits to them including knowledge of new vocabulary words, becoming faster at reading, and becoming better at drawing. Overall, students were excited to participate in the study once the pre-test phase was over. Considering the difficulty of the vocabulary words and the length of the test, it was difficult for most of the student participants to maintain focus on the pre-test in one sitting. All student participants became frustrated with the test after fifteen minutes had passed. For this reason, the pre-test was broken up into two separate sessions for all student participants.

In the data analysis phase, notes from the field log were typed into the Dedoose qualitative data analysis software program. The notes from each intervention session were sorted chronologically by date and time. Emergent themes in the text were coded in a primary cycle coding phase in which excerpted text was linked to code words that could be easily recalled. After this initial coding phase, the notes and codebook were revisited. The primary cycle codes were sorted again into hierarchical categories that included an umbrella "parent code" and

subordinate "child codes". The data was further sorted demographically into "descriptors" that included factors such as student ages, disability categories, and number of sessions per week. This descriptor data was cross referenced with each code in the data analysis section of the Dedoose program. The data was further sorted into excerpts that referenced each of the six components of the curriculum, (picture/word, comic read, comprehension questions, wordlist read, timed reading, comic drawing) to get an understanding of how each component of the program related to the research question of student engagement.

Through analysis of the field notes collected for this action research case study, several themes emerged around behaviors of engagement which had been operationally defined as the students' abilities to complete three tasks in a session, transition to the intervention classroom smoothly, maintain focus on classwork throughout the session, and contribute to a positive classroom experience. Themes also emerged around behaviors that created barriers to student engagement. It became the job of the researcher as the primary tool in the qualitative aspect of this case study to discern which behaviors of and barriers to engagement could be attributed specifically to the intervention curriculum, and which should be attributed to external factors. In full disclosure, this researcher has employed a pragmatic worldview in their approach to the analysis of data collected for this study. According to Creswell (2018), pragmatists believe that all research exists within a social, historical, and political context. According to the pragmatic worldview, the researcher must consider the rhizomatic or multi-layered nature of reality that is particular to a given place and time.

To give social context to the nature of the setting for this study, the reading interventions took place in a small classroom that was separate from the student participants' general education classrooms. Student participants in this study were older elementary students who

required specialized instruction in reading to develop skills that most of their classmates in the general education classroom had already mastered. The reading interventions took place in a separate classroom to provide instruction in a quieter, less distracting environment. Several of the student participants in this study were pulled out of their general education classrooms as often as four times a day to receive specialized instruction to address various social, emotional, and academic needs. Linus spent more than seventy percent of his day outside of the general education classroom.   All student participants in this study were segregated from their same aged peers to participate in the intervention sessions that were observed for qualitative analysis.

To provide further context to the geographical and historical boundaries of this study, the school where this study took place was in the woods of Western Massachusetts during the spring and early summer months of 2022. This was a particularly bad year for disease carrying tics which were rampant on the school's playground. The 2021-2022 school year also marked the school's return to in-person learning. Prior to that, for one and a half years the students had been attending school remotely to protect the community from the spread of Covid-19.   During the 2021-2022 school year there was a significant upward trend in problem student behaviors at all grade levels observed as increased office referrals, playground fighting, and non-compliant classroom behaviors. Three of the four student participants in this study had been previously suspended for their involvement in playground fights during the 2021-2022 school year.

Barriers to Engagement

The transition to the intervention room emerged as a barrier to engagement particularly for Kenny and Linus. There were eight excerpts coded in which Kenny had a rough transition to class. Several of these make mention of Kenny "clenching his fists, grinding his teeth, and

cursing" on his way to the intervention classroom. In several of the coded passages Kenny complained that he "hates coming here" and talked about how he wants to stop getting pulled out for reading. Other passages mentioned that Kenny was in a "grumpy", "lazy", or "bad mood that day". Transitioning to class emerged as a challenge for Linus as well. Several coded passages refer to Linus as being "unable to focus at first", being "distracted at the start of class", or wanting to "tell jokes" or "talk about UFO's instead of getting to work".   Ernie and Jimbo also frequently came to class "in a wild mood" or bringing a "chaotic energy to the session".

Schedule problems also came up in the coding as a barrier to engagement.   Students were occasionally pulled out of the intervention classroom to go to band class. More than three times, students left the intervention sessions halfway through because their general education classroom was engaged in desirable activities that they didn't want to miss, like visiting the pre-school classroom.   Many intervention sessions were missed altogether due to end of year activities including field trips, assemblies, and field day. Two excerpts coded mentioned that the "students were wild" on the Monday after spring break.

Another thematic barrier to engagement that emerged was coded as "distractions". There were two mentions of students being distracted by tics that had embedded themselves onto their arms or legs. There were three mentions of students being distracted by "sneezing" and "coughing". Ernie and Jimbo were frequently distracted by "Magic Cards", "Pokemon Cards" or "the prize box". Kenny was distracted while "fidgeting with fraction math manipulatives". Linus was distracted by wanting to "only draw dirt bikes or UFO's", "looking out the skylight for UFO's", and on one occasion by a Black Lives Matter in Schools poster "All lives matter! Isn't Black Lives Matter ridiculous?".

The final barriers to engagement that emerged were frustration and fatigue. These codes came up most frequently for Kenny and Ernie, the two students who are most profoundly impacted by dyslexia. In the researcher's opinion, frustration and fatigue were the only two coded barriers to engagement that could be directly linked to activities related to the comic reading intervention. There were three mentions of Kenny being fatigued by the wordlist reading activity. Ernie was mentioned as being fatigued after the picture/word activity and the wordlist activity. Twice Ernie said that he "needed a break from reading" and once asked if he could do the drawing activity instead, "cause I've read a lot today." There were three mentions of Ernie being frustrated by the comic reading activity and on one occasion he "dug in, so we stopped". Kenny and Ernie also both complained that the lettering of the dialogue in the first comic story was "too sloppy" and "hard to read". They complained less about the lettering of later comics which employed a more detailed style of lettering or used the Open Dyslexic font. Kenny and Ernie were also occasionally frustrated by the density of the text in the comic reading activity. The field notes mentioned that they were overwhelmed by the number of words in the dialogue boxes. There was one mention of Ernie being "frustrated when he left class that day".

Figure 2. Picture Word Component Detail

In the first two weeks of the program, Kenny, Linus, Jimbo, and Ernie were all unsure of

how to engage with the picture/word activity. In this activity, students were expected to read the

word which had been broken up into syllables framed by Elkonin boxes, read the sentence that

included the target word, and discuss what they saw happening in the picture until they had

arrived at a student friendly definition of the target Tier Two word. At the start of the program,

the students would read the word and the sentence, but were uncomfortable discussing possible

definitions of the words that they weren't familiar with. In the first two weeks, the researcher

modeled how to talk about the unknown words. By the third week, the students had become

more comfortable with talking about what they saw happening in the pictures and began creating

student-friendly definitions using their own words.

Engagement

As a general topic, engagement with whole lessons came up more often for student participants whose lessons were individual than for students in small group lessons. In the field notes, Ernie had eight mentions of being engaged with the whole lesson and three mentions of leaving class with a smile on his face. Kenny had three mentions of being generally engaged with the whole session. Kenny also had four mentions of being engaged with individual activities and three mentions of coming to class grumpy and becoming engaged as the lesson wore on. In the notes for one of the sessions, Kenny was "highly engaged throughout" while saying that "this class is a waste of my time". It was noted that Kenny enjoyed the story "Harsh Consequences" and that he liked being a part of the "experiment". He also offered suggestions and ideas for future comic stories that could be written for inclusion in the comic curriculum.

In the field notes, Linus had two mentions of being in a "good mood that day" and two mentions of engaging fully in all activities. On four occasions, the field notes mention that Linus started the class unable to focus but eventually became engaged. It was noted that Linus liked some of the comic stories saying, "Did you draw this?", "Do you love this book?", and "you're so good at drawing!". There were several mentions of him leaving class in a "good mood" or having a "big smile on his face".

Success Cards

One measure of student engagement that came up in the field notes was in relation to the classroom positive behavior supports system that was in place for every intervention session. In the coded data there was four mentions of the researcher "setting the expectation that we complete three jobs today in order to earn a success card". In the coded data there were nine mentions of students earning success cards for their work. In one session it was mentioned that Jimbo and

Ernie were "difficult to keep on task, but they ultimately seem to be motivated to adhere to my expectations". There were five mentions of students using their success cards on "Fun Friday" to buy things like "Pokemon Cards", "Gumballs", "Stretchy Fidgets", "Finger Skateboards", and a "vintage Superman comic".

Social Factors

Social factors embedded in the program as well as external to it also came up as a recurring theme in the coded data under the umbrella of engagement. As mentioned previously, all student participants were at first reluctant to participate in the picture/word activity in which they were asked to describe the pictures and find a student-friendly definition of the target word. As the students got more used to this activity, they started to enjoy "acting out" what they thought the words meant by incorporating physicality and gestures to their discussion. In the notes there were five mentions made of students "acting out" the picture word definitions. There were also several mentions of the students "acting out" the comic reading activity. Linus enjoyed giving the comic characters "funny voices" as he read. This type of "acting out" emerged spontaneously from the students and it contributed to a positive atmosphere during lessons.

Another social factor that emerged in the notes for Ernie involved inviting a friend from the general education classroom to encourage him during oral reading fluency tasks. Ernie was often reluctant to come to class for the sessions in which he came without Jimbo. On five occasions, Ernie brought a friend with him for the first ten minutes of his one-to-one sessions. For these sessions, Ernie was eager to read the Tier Two words on the wordlist activities and to read the large passages of text in the oral reading fluency measures. Ernie's friend would "cheer him on" for the timed readings. It was during these sessions that he logged his best scores and would leave class with a "big smile on his face".

Another social factor that was coded in the notes involved Linus expressing an interest in learning academic vocabulary so that he could "sound like a sixth grader". Linus, who spent most of his day outside of the general education classroom, often talked about the importance of appearing "smart" in school and was eager to fit in with the other students. Linus was one of the only students that tried to use the target words when answering the comprehension questions. He would also talk about the words he'd learned that day with his other teachers. Linus was very excited when the researcher shared a picture of a dirt bike that he'd made in the comic drawing activity with one of the artists who'd contributed a comic to the curriculum.

Curriculum Components

In coding of the field notes, it also emerged that relative engagement with the curriculum varied depending on which component the students were working on. The picture/word activity became popular with student participants once they understood that they were expected to talk with each other about the words. Students would occasionally take the discussion off-topic or become dangerously physical in their "acting out" of the words but would generally be easily redirected to focus on the activity itself. Another coded theme that emerged in the field notes for some of the curriculum components was meaning making. Students would often relate the words to their own lives to come up with definitions for words like solution and viable. Once when the target word was diagram, Linus pulled out a diagram of an engine that he had in his pocket. Students would occasionally be confused by words that sounded like other words. For example, Kenny confused the word demolish for abolish. Through active discussion of the words and pictures, the researcher was able to identify misunderstandings and help students find accurate definitions of target words.

For Kenny and Ernie, the Elkonin boxes in the picture/word activity were very helpful for decoding unfamiliar multisyllable words. These students had a much easier time reading the target words in the picture/word activity than in the wordlist reading activity in which the words weren't broken up for them. Linus drew his own Elkonin boxes around target words when he was creating his picture definitions during the student created comic drawing activity.

For the comic reading activity, Linus and Kenny had several occasions in which they mentioned liking the story, the drawings, or the subject matter of the comics. Linus liked the story called *Hostile Invasion*, "because it was about aliens". He frequently commented how much he liked the drawings. Kenny liked the story *Harsh Consequences* because it was "gross" and *Zaptastico*, because he liked the Creature from the Black Lagoon character. Linus was also quite interested in *Zaptastico*, particularly the God of Thunder character who threw lightning bolts. Linus made several drawings of this character in his free time outside of the reading intervention. Ernie preferred the *Drowsy Passage* comic by artist Chris Kerr because it had fewer words than the other stories. Jimbo and Ernie both became silly while reading Kerr's story about snails riding dirt bikes.

It was noted that all the students occasionally struggled with reading the target words in the context of the comic story readings, and that they had to be prompted to go back and correct their decoding errors. The amount of text in each panel often caused Kenny and Ernie to become fatigued as well. Ernie and Jimbo would take turns reading one panel each and this seemed to help Ernie to complete the task. The researcher would stop the students every few panels to discuss what was happening in the story. When misunderstandings of the story arose, the researcher prompted students to go back to reread specific panels to clarify their understanding.

This form of scaffolded instruction on the part of the researcher emerged as another example of active meaning making within the curriculum.

It is important to recall here some of the theoretical research into meaning making in graphic novels which holds that the combination of visual and narrative information formatted in sequence requires the reader to engage critically with the material while reading it. One theory holds that the reader must employ as many as six different modes of comprehension (Panteleo, 2014, Bender 2018). The researcher considered the fact that students would not automatically understand how to process the combination of visual and textual information in the comic read activity. It emerged during the implementation of the curriculum that it was necessary to prompt students to revisit panels of the comic and take a longer look in order to fully process the information.

Comprehension Questions

The comprehension questions activity emerged as an important step for meaning making of the target vocabulary words for all students. Most of the comprehension questions that came at the end of the two-page comic reading activities involved questions that included the target words and were intended to serve as a checkpoint to assess students' understanding of the use of those words in context. Most of the answers for the comprehension questions could be found directly in the panels of the comic text. Kenny and Jimbo could often recall the answers to the questions from memory, but Ernie and Linus usually needed to refer to the text of the comic story to find the answers. This was not a skill that any of the students had at first. There were several mentions in the field notes from the first two weeks of the program of students being reluctant to go back into the story to look for the answers. Other coded data for this activity

mentioned the researcher needing to prompt the students to "go deeper" with their answers and to "say the answer in a complete sentence please".

By the third week, it became apparent that scanning the text of the comic for target words was a challenge for all the students. To further scaffold the comprehension questions activity, the researcher numbered the frames of the comic and included the numbers of the frames in the corresponding comprehension questions so that students would have an easier time locating the target words. In subsequent lessons, the comprehension questions became more of a self-directed activity for the students. By the sixth week, Ernie and Jimbo were "racing each other" to find the answers. They enjoyed scribbling out the questions after completing them.

Figure 3.   Individual Frames of the Comic Read Component

The comprehension question activity also provided an opportunity for inferencing and critical thought through guided discussion. In one of the early discussions of the *Hostile Invasion* story Ernie asked, "Why can't they just kill the aliens?". The researcher directed Ernie back to the panel of the comic which showed that the aliens could "tolerate" extreme heat. The researcher discussed the possible meaning of this target word with Ernie then referred him to the panel that discussed the need to find a "viable solution". When asked what the word viable meant, Ernie responded "a solution that works". Kenny discussed the scientist's process of "experimenting to find a solution" to the problem of the alien invasion and Linus made an "accurate prediction" of the solution to the scientist's problem.   At the end of the story Linus was able to summarize the plot but was confused as to why the scientists didn't just "throw the golf balls" at the aliens. Through guided discussion and referring to the part of the story where the scientists "hit them with their energy beams" to no avail, Linus concluded that it was "better to outsmart them".

Wordlist Read and Oral Reading Fluency Components

On the second day of each lesson, student participants were required to read text without pictures in the form of a wordlist of target words and the oral reading fluency measure components. These components were intended to improve students' automaticity with decoding of the Tier Two vocabulary words in isolation as well as in context. In the field notes there were eight entries that described each of the students reading through the wordlist smoothly. There were also several mentions of students getting "hung up" on some words and making common decoding errors. In these instances, the notes mentioned that the researcher would refer students

to the fold out "cheat sheet" which included visual comic reminders of common reading rules such as the soft c sound (c says the /s/ sound when followed by i, e, or y).   The "cheat sheet" provided a student-centered form of scaffolded instruction in which participants corrected their decoding mistakes independently.

The field notes also mentioned that the researcher used the wordlist reading activity as an opportunity to reinforce students' understanding of the meaning of each word by asking them to provide a definition in their own words. This proved to be too much for students like Kenny who said, "I can read the words but it's hard to talk about what they mean." In later sessions, the field notes mentioned that the researcher would provide a student-friendly synonym for each word after the students read them in order to reinforce their meaning. It became apparent that for students with dyslexia, the focus of the wordlist reading component should be decoding not meaning making.   There were two mentions of Kenny and Ernie becoming fatigued with this activity and only reading half the list.

Early field log entries mentioned that most students found the oral reading fluency activity to be less interesting than the comic reading activities. For this activity students were expected to read through a half page excerpt of the comic dialogue and then read it a second time in a one-minute timed trial. One entry mentioned Linus saying, "I hate this, I wish it was over". The log mentions that all students became fatigued by this activity at some points.

After the first two-weeks, the students began to take an interest in the idea of "beating their score" from the last lesson on the timed oral reading fluency measures.   Kenny seemed to be motivated by the idea that "if I read fast enough, then I won't have to come here anymore". There were fifteen coded mentions of students improving their scores on repeated readings of the same text. As previously mentioned, the oral reading fluency component emerged as a chance

for Ernie to show off his improved reading skills to a friend from the general education class

who would come to "cheer him on". As students began competing against themselves to

improve their scores the oral reading fluency task became more game-like and engaging.

Comic Drawing Component

It was noted in several entries that after engaging in the wordlist reading and the oral reading

fluency measures, students were usually ready for a break from reading. In one entry Ernie says,

"Can we draw now? I've done a lot of reading today". The comic drawing component was the

last activity of the second day of each lesson, and it emerged as one of the most engaging

opportunities for students to make meaning from the target vocabulary words. For this activity,

students were expected to select four words from the target wordlist, write the word in a blank

comic frame and draw a picture that exemplified what the words meant. Students were then

expected to write a sentence that described the picture using the target word.   This activity also

required scaffolded explicit instruction during the first few weeks of the program.

In the first few weeks of instruction, all the students created drawings that were copied from

the examples in the picture word component. Students were instructed that they were free to be

creative and make up their own drawings to exemplify the target words. As students explored

this freedom, it was necessary to remind them of the expectation that the drawings should

somehow represent the target word. Ernie and Jimbo had a session in which all their drawings

involved harming their general education classroom teacher. Linus had several sessions in which

all his drawings incorporated dirt bikes or UFO phenomena. From the start, Kenny quickly

produced drawings that were relevant to the target words.

Figure 4. Linus' Comic Drawing Examples

Figure 5. Kenny's Comic Drawing Examples

Figure 6. Ernie's Comic Drawing Examples

Figure 7. Jimbo's Comic Drawing Examples

Each of the twenty-three coded excerpts for the comic drawing activity mentions that the students were highly engaged with this task. After spending ten minutes creating their drawings, the students would take a few minutes to share them with the class and discuss what was going on in their pictures. The student's drawings were little more than stick figures, but they were able to convey the meaning of the target words and were often humorous. The students became very animated when discussing their drawings and often acted out the situation in each frame for the class.

Discussion

This action research case study focused on how a researcher created comic book intervention affected student vocabulary acquisition, reading fluency rates, and engagement in a

reading intervention setting over a nine-week period. Regarding vocabulary acquisition, through statistical analysis using a dependent paired t-test it was determined that the difference between the mean of student's pre- and posttest scores was statistically significant. The effectiveness of this comic curriculum for teaching academic vocabulary words relates to Rothenberger's (2019) study in which students in an intervention setting were effectively taught academic vocabulary using the graphic novel *Coraline* by Neil Gaiman (2012). It also echoes O'Connor et. al.'s (2019) study which confirmed the effectiveness of explicit instruction of academic vocabulary for students with learning disabilities in an intervention setting.

Regarding whether the comic curriculum led to increased reading fluency rates for student participants, all four student participants showed an upward trend in oral reading fluency rates over the course of the nine-week study. Under linear regression analysis, only one of the four student-participants showed a score that was statistically significant. Although these results do not prove the efficacy of the research created comic-curriculum for increasing oral reading fluency rates, they do reflect the Smetana & Grisham (2011-2012) study which concluded that comics provide an authentic and highly motivating experience for students to practice decoding skills. Like the Smetana & Grisham study, student participants were observed using the academic vocabulary outside of the intervention sessions. This comic curriculum also provides a practical application of Fenty's (2020) suggestions for using a comic curriculum for reading intervention. Specifically, the curriculum makes use of Fenty's suggestions to pre-teach academic vocabulary words, provide opportunities for students to make predictions about the text, and to follow up short readings with comprehension questions.

The third research question focused on student engagement, specifically what effect, if any, did the comics-based curriculum have on student engagement as measured by observable

behaviors including but not limited to their ability to complete three tasks in a session, transition to the intervention classroom smoothly, maintain focus on classwork throughout the session, and contribute to a positive classroom experience?

In the coded data collected in the researcher's field log, it was noted that the transition to the intervention classroom from the general education classroom was a barrier to engagement for all students and that the comic intervention had no observable effect on easing this transition. Three of the four student participants were observed to have frequent "rough" transitions from the general education classroom to the resource room setting, stating that they were resentful of having to be segregated from their same aged peers for reading lessons. The fourth student participant required five to ten minutes of transition time at the start of class to acquire the focus necessary to complete his daily lessons. The observed angry and off task behaviors of the student participants in this study as they transitioned to a more restrictive learning environment echoes the Glazard (2010), study which explored the attitudes and experiences of students with dyslexia in public schools. The Glazard study noted the important role that teachers played in creating learning environments that provided students with dyslexia opportunities to thrive within the general education setting. In the current study, the researcher noted that the segregation of student participants from their peers in the general education classroom emerged as a cause of resentment which led to frequent inappropriate behaviors when transitioning to class. Inappropriate behaviors like stomping feet, yelling, and throwing books, and pencils. For other students the transition to a new setting necessitated a period of readjustment so that they could find focus on learning. The comic book curriculum had no observable effect on easing the transition into the intervention classroom.

Regarding the ability of student-participants to maintain focus throughout the lesson, it was noted in the researcher's field log that the student participants were regularly able to complete the three required activities of each day's lesson. The student participants displayed curiosity and interest in the comics and found ways to engage with the curriculum components that were game-like and fun.   As in the McGrail (2018) study, the researcher observed that student participants read the comic curriculum with more feeling by "acting out" the dialogue and increased their reading fluency rates over time. Like the Boerman-Cornell (2016) study, the researcher observed several instances of students applying critical thinking skills in their discussions of new vocabulary words and when answering comprehension questions. Like the Kara (2020) study, the researcher noted that the multi-modal nature of the comic-curriculum provided students with opportunities to think critically about new ideas and apply new skills within the virtual zone of proximal development that the comic curriculum provided. Student participants were observed relating the content of the comics to their own lives, making inferences about the motivations of characters in the stories, and creating original drawings related to the target vocabulary words.   The researcher observed that the student-participants were regularly able to maintain focus on the comic-curriculum throughout daily lessons.

Despite the frequent rough transitions into the intervention classroom, it was regularly noted in the field log that students left intervention sessions "with a big smile" or talking about the material covered in that day's lesson. None of the intervention sessions ended in office referrals for inappropriate behaviors and student-participants regularly received success cards in the classroom token economy system for completing their three-required tasks. The generally positive atmosphere of intervention sessions noted in this study recalls the Smetana & Grisham (2011-2012) study which concluded that comics could provide an authentic and highly

motivating reading experience for students with learning differences.   Student participants in this study regularly completed lessons and generally contributed to a positive classroom environment.

On completing the nine-week intervention with the researcher created comic-curriculum, student participants in this mixed methods case study showed a statistically significant improvement in their knowledge of the targeted Tier Two academic vocabulary words. Although only one of the four student participants showed a statistically significant improvement in his oral reading fluency rate, all students had a generally positive trend in reading rates over the nine-week intervention period using the comic-curriculum. Despite frequent rough transitions to the intervention setting, student-participants engaged with the comic-curriculum in a generally positive and game-like manner, regularly demonstrating critical thinking skills and creativity.

The lesson structure for the researcher created comic curriculum employed in this study was based on the research of Fenty (2020), that provided several suggestions for an effective comic reading intervention. Fenty's suggestions that were implemented for this study included:

- Pre-teaching of Tier Two Vocabulary Words.

- Providing regular stopping points within the reading to check student comprehension.

- Asking students to make predictions about the story.

- Repeated readings of sections of the text with one-minute timed oral reading fluency measures.

- Comprehension questions and summarization activities.

- Opportunities for students to apply their knowledge by creating their own

  drawings.

This researcher utilized Fenty's (2020) suggested lesson components with the intention of creating a comic reading intervention curriculum that utilized current best practices.   When designing the comic curriculum used for this study, the researcher also applied Warwick Elley's (1989) suggestions that new vocabulary words should be taught through regular discussion using student friendly language. The researcher's decision to center the comic-curriculum on the acquisition of Tier Two vocabulary words is rooted in Elley's assertions that the knowledge of academic vocabulary is a leading indicator of academic success for all students and that students with learning differences could acquire this knowledge.

Summary

In chapter four, the researcher has provided a detailed explanation of the findings of this mixed methods action research case study. The researcher has provided an explanation of the statistical significance of the two quantitative research questions and an explanation of the data that emerged for the qualitative research question. In chapter five, the researcher will provide an overall summary of the study, restate the findings, discuss the implications of the findings for future practice and research, and offer final thoughts and conclusions on the significance of this mixed methods action research case study.

Chapter 5

Conclusions and Recommendations

Summary

In this mixed methods action research case study, the researcher has presented an overview of the history of comics and provided a comprehensive sampling of current research on the potential uses of comics and graphic novels for teaching complex skills and concepts in a classroom setting. Of relevance to this study, the researcher has presented a review of current research and best practices in the use of comics to teach fundamental reading skills to students receiving special education services in intervention settings.

Using this knowledge base, the researcher devised an intervention curriculum that uses a comic book format. The primary goals of the curriculum were to teach Tier Two academic vocabulary and increase oral reading fluency rates for special education students utilizing a highly engaging multi-modal format. The curriculum employed principles of phonics instruction, student discussion, guided close reading, regular comprehension checkpoints, repeated reading, and drawing to develop skills and foster understanding of Tier Two academic vocabulary.

Over the course of nine weeks, the researcher put this comic curriculum to use in an intervention setting with four student participants that received special education services in reading. Using a mixed methods action research case study methodology, the researcher triangulated data collected from student participants in the form of a pre and posttest of academic vocabulary, weekly timed oral reading fluency measures, and daily written observations collected in a field log.   On the quantitative side, the research questions for this study were:

what effect, if any did this comic curriculum have on the acquisition of Tier Two academic vocabulary for the student participants and whether the curriculum had a positive effect on their oral reading fluency rates. On the qualitative side, the researcher was concerned with what effect the comic curriculum may have had on student engagement operationally defined as their abilities to transition to the classroom smoothly, complete three tasks in a session, and contribute to a positive classroom environment.

Results

Results of the pre- and posttest showed that over the course of nine weeks all students showed a statistically significant increase in their knowledge of the targeted Tier Two academic vocabulary words. Although not of statistical significance, all students did show generally positive trends in their oral reading rates on weekly fluency measures taken over the course of the study. Regarding student engagement, the researcher observed that students were regularly able to complete three tasks in a session. The researcher coded many examples of students contributing to a positive classroom experience by acting out dialogue, having animated discussions, sharing their drawings and fluency scores with classmates, and leaving sessions with smiles on their faces. The researcher observed no improvement in the student's abilities to smoothly transition to the classroom over the course of the study. Students expressed an interest in the drawings and characters of the comic stories. Students were critical of elements of the comics including lettering and plot details. The student participants laughed at the stories, had favorite characters, and were excited to share their new vocabulary and improved reading scores with classmates and teachers.

The findings for this mixed methods action research case study have shown that the researcher created comic curriculum had a positive effect on the acquisition of Tier Two vocabulary words for all participants. By the end of the nine-week period, all student participants demonstrated that they knew at least 80% of the targeted vocabulary words. This result echoes the Rothenberger (2019) case study in which special education students showed an increase in their knowledge of vocabulary words after reading the Neil Gaiman (2003) graphic novel *Coraline*. It is the belief of the researcher that graphic novels have a way of drawing in all types of learners and improving their base of vocabulary knowledge. As stated at the start of this study, according to reading researcher Warwick Elley (1988), knowledge of academic vocabulary is the single greatest indicator of future academic success for young people.

Due to the relatively short duration of the study, it could not be determined if the gains in reading fluency that all the student participants made were of statistical significance. It is the belief of the researcher that by incorporating Fenty's (2020) suggestions of including repeated readings of the text of comic stories in timed oral reading fluency measures, the comic curriculum could have the effect of improving oral reading fluency rates for special education students in a significant way. Researchers Smetana and Grisham (2011-2012) concluded that comics provide an authentic and highly motivating experience for special education students to practice decoding skills. The researcher in this study used the suggested techniques of current experts in the field to devise a curriculum that could be put to the test. Future research that uses the curriculum devised for this study could show increases in student oral reading fluency rates that are statistically significant given a longer duration and larger sample size.

Student participants in this study demonstrated engagement with the curriculum by completing three tasks per lesson and contributing to an overall positive classroom experience.

It is the belief of the researcher that the comic format of the intervention was highly engaging for student participants.   Student participants demonstrated the ability to analyze the pictures that served as visual representations of the targeted Tier Two vocabulary words by discussing the meanings of the words in student friendly language. This researcher feels that the student's significantly improved scores on the post-test of vocabulary knowledge is an example of Pavio's (1986) dual coding theory at work. The dual coding theory of learning holds that by presenting new information in multiple forms of stimuli the learner will more effectively commit it to memory.

The student participants were excited to read the comic stories created for this study. They expressed a great interest in the fact that the researcher had drawn the comics and delighted in criticizing the researcher's drawing and lettering skills.   The students offered suggestions for future comics, discussed possible character motivations, drew comparisons to their own lives, and practiced drawing their own versions of some of the comic characters. The student participants were motivated to show off their skills in drawing, reading, and knowledge of new vocabulary words. Like the Smetana-Grisham (2011-2012) study, the researcher feels that the comic curriculum used in this study provided an authentic and highly motivating experience for students.

Other factors that contributed to student engagement were instructional pacing and the inclusion of a token economy system embedded within the curriculum.   Each activity lasted no longer than ten minutes. Activities that were mentally fatiguing, such as timed readings, were followed by activities that students considered fun, like drawing.   Students were rewarded for completing three activities in a lesson with a success card that could be used to by tangible prizes

every Friday. These evidence-based techniques for improving student behaviors of learning were intentionally incorporated into the comic curriculum to maximize student engagement.

The researcher asserts that the comic curriculum used in this study is effective for improving student knowledge of academic vocabulary and providing the identified students with an authentic and motivating format to practice skills of decoding and reading comprehension. This study contributes to the existing knowledge base in the use of comics in an intervention setting, by demonstrating the effectiveness of a curriculum rooted in Paivio's (1986) Dual Coding Theory of Learning that incorporates Fenty's (2020) suggested lesson components.

Implications for Practice

This study has shown that the use of a comic book curriculum in a reading intervention setting can provide an authentic experience for students to develop new vocabulary, practice reading fluency, and engage in higher order thinking skills. A comic intervention curriculum should follow a regular routine of short engaging activities. This regular routine will help maintain positive behaviors for students who have a hard time transitioning to a separate setting, can't easily maintain focus, or can't sit still. The activities that are focused on vocabulary acquisition should include discussions that give students a chance to develop student-friendly definitions by relating new words to their own lives. The comic curriculum used in this study pre-taught new vocabulary words using a combination of drawings and sentences that used the Tier Two vocabulary words in context. This picture/word component was a good prompt for student discussion. By talking about the pictures and sentences, students could begin to make meaning of new vocabulary words that would come up later in the comic reading activity. Pre-teaching Tier Two vocabulary in a multi-modal format that combines words, pictures, and

sentences, can provide students with multiple paths to develop their understanding of new ideas

and concepts.

By including a drawing component, like the one used in this study, practitioners can

provide students with a creative and fun way to further develop their understanding of new

vocabulary words. A drawing activity should be placed after an activity that is mentally taxing

for a student with dyslexia such as oral reading fluency measures or repeated readings of a text-

only passage. The drawing activity used in this study provided student participants a break from

text reading and helped to maintain a positive overall mood in intervention sessions.

While observing the comic reading component of the curriculum used in this study, the

researcher found that it should not be taken for granted that students will automatically know

how to read comics. Comics provide information through a combination of text and imagery.

When first introducing a comic text, particularly for an intervention setting, students should be

explicitly taught how the story moves from frame to frame. Comic stories usually move from

left to right, but some authors are more creative in their layouts, setting up frames in a way that

requires readers to pay attention to the action of the story in order to understand which frame

should be read next. Also, comics sometimes provide plot details and other information

primarily through visual imagery. Students must be taught how to study each frame of the story

to gather all the information that the drawings provide.

The comic reading activity used in this study had stopping points built in every two pages

to check the student participants' comprehension of plot details and vocabulary words. These

comprehension questions were intended to provide student participants a chance to practice

metacognitive skills and critical thinking while reading. The comprehension questions provided

hints for students who were struggling. Each comprehension question included a frame number

which directed students back to numbered frames within the comic story. In the data collection phase of this study, it emerged that none of the student participants automatically knew how to refer to a text to gather information that they'd missed on the first read. Student participants in this study groaned in dismay when first asked to do this. Through modeling, guided practice, and weekly repetition of the comprehension checkpoints, student participants gradually developed the ability to refer to the text to find answers independently. Some of the comprehension checkpoint questions required students to study the pictorial elements of the story. This activity was intended to provide student participants with a chance to practice metacognitive skills while "reading" the aesthetic information of the comic.

For practitioners using comics as a curriculum with students who have learning differences, it will be necessary to take time to teach students how to read comics. Comic reading requires students to decode words and analyze pictorial information simultaneously. This requires students to develop a new set of multi-modal reading skills. When teaching with comics, students need to be explicitly taught metacognition while looking at the pictorial information by self-questioning to check understanding. Teachers can help students to develop these skills in the same way as they would teach other reading skills, through repetition and practice.   By initially providing comprehension checkpoints, practitioners can model metacognition and provide opportunities for practice of the skills necessary for students with learning differences as they learn to make meaning from comics.

The comprehension stopping points used in this study provided were initially frustrating for the student participants who just wanted to answer the questions and be done with it. For this reason, this activity and all other activities of the comic curriculum were completed in ten minutes or less. This focus on instructional pacing helped student participants to develop a

routine, reduced frustration, and contributed to an overall positive experience during intervention

sessions.

This study has shown that intervention teachers could benefit from turning repetitive

tasks into game-like activities to help boost student engagement. The curriculum used in this

study included multi-syllable wordlist reading activities and repeated readings of the text of the

comic stories to help student participants develop their reading fluency. Participants timed

themselves on repeated readings and tried to beat their scores from previous reads. Some

participants even invited their friends to watch as they engaged in speed-reading activities. By

creating a game-like atmosphere for skill building tasks, teachers can boost engagement for

students with learning differences.

This study has further shown that intervention teachers could benefit from providing

specific feedback and encouragement when students successfully complete tasks. The researcher

in this study provided students with a clear set of expectations at the start of each lesson. The

researcher let participants know that they were expected to complete three lesson components

during each thirty-minute session. At the end of each session students who successfully

completed all three components were given a success card. These success cards were traded for

tangible prizes at the end of the week on "Fun Friday".   Specific feedback and rewarding

positive classroom behaviors contribute to a positive learning environment for students with

learning differences.

I embarked on this study out of a personal interest in comics. It is this researcher's

opinion that comics are inherently fun to look at.   I have spent years in intervention settings

providing phonics instruction to students with learning differences. It was my intent to develop a

reading curriculum that employed evidence-based practices for teaching vocabulary acquisition,

reading comprehension, and reading fluency in a format that was engaging for students who are easily fatigued by reading text.   It is my opinion that comics can be entertaining and informative for all students regardless of their reading abilities. It was the intent of this study to explore some practical applications for the potential use of comics to teach reading skills in an intervention setting.   Overall, the comic curriculum used in this study was engaging for all participants, even for students with particularly challenging behaviors.   I would encourage practitioners to continue to explore the use of comics in their intervention classrooms using the activities suggested in this study. Practitioners could expand on this study by applying other evidence-based reading strategies to comics and graphic novels.

Recommendations for Future Research

The researcher acknowledges the limitations presented by the small sample size used for this mixed methods action research case study. The researcher conducted this study in an authentic setting, an intervention classroom for special education students with IEP determinations of mild to moderate learning disabilities, with a small population of student participants. It is the researcher's opinion that the qualitative data collected for this study has provided valuable insight into the experience of students with learning differences in an intervention classroom setting. The researcher recommends that a future study of the comic curriculum used in this study should have a sample size of at least thirty participants to collect quantitative data of vocabulary acquisition and reading fluency rates of a population sample size that is large enough to be considered statistically relevant.

When seeking consent to conduct research for this study from the Institutional Review Board (IRB) at Slippery Rock University, the researcher discovered the limitations that are

placed upon social scientists looking to conduct research on human subjects in an educational

setting. The board would not accept the researcher's initial proposal to conduct a study of

student participants that included an experimental group and a control group. The IRB approved

this study only after the methodology was reframed as a case study of the curriculum with the

researcher as primary instrument.   Furthermore, the researcher found that the laws protecting the

confidentiality of special education students adds another layer of complication to the ability of

social scientists looking to conduct research with this population.   For these reasons, the

researcher believes that the setting for future research of the comic curriculum used in this study

should be broadened to include Tier II reading intervention classrooms that support students who

are struggling to learn to read but have not yet been identified as having learning disabilities.   In

a multi-tiered systems of support model, Tier I is the general education classroom, Tiers II and

and III are intensive settings that provide evidence-based interventions for students that perform

below benchmark, (Fuchs, Fuchs, & Vaughn, 2008). The researcher recommends that a future

case study of the comic curriculum used in this study should be of a longer duration to more

thoroughly analyze trends in oral reading fluency and include Tier Two intervention classrooms.

Future research could also focus on the use of a comic curriculum for vocabulary

acquisition like the one used in this study in Sheltered English Immersion classrooms.

Massachusetts and many other states have adopted a Sheltered English Immersion (SEI)

approach to teaching emergent bi-lingual English language learners in the general education

classroom. Massachusetts law mandates that all children, with few exceptions, should be taught

to speak English by being placed in English language classrooms that teach all academic subjects

in English. Teachers in SEI classrooms are trained to provide specialized or "sheltered"

instructional techniques to emergent English Language Learners, (Chang-Bacon, C. K., 2022).

According to Hansen-Thomas (2008), techniques for sheltering language instruction in SEI classrooms include the explicit instruction of academic vocabulary using evidence-based practices, the use of visual aids to boost comprehension, heterogeneous peer group discussion, higher order questioning that incorporates critical thinking skills, and by providing highly engaging content.   The comic curriculum used in this case study provided explicit instruction in academic vocabulary using many of the same instructional practices suggested for SEI classrooms.   For this reason, the researcher believes that a future study should be done to examine the effectiveness of a comic curriculum for vocabulary acquisition and student engagement in an SEI classroom.

The researcher also recommends that future research could explore the use of comics to teach early literacy skills like phonemic awareness, (the ability to hear and manipulate sounds in words) and phonics (the ability to associate sounds with letter symbols). The comic curriculum used for this study, was designed to be used with older elementary students that can already read single syllable words and multi-syllable words that are broken up for them using Elkonin Boxes. In the future, this researcher is interested in broadening the scope of the comic curriculum used in this study to include a focus on early reading skills that are crucial for emergent readers.

Conclusions

Educators tasked with teaching students with learning differences face a unique set of challenges. In my experience, these are the students most likely to lose focus during whole group instruction in the general education classroom. They are often reluctant or unwilling to initiate tasks and are the ones most likely to be found at the "take a break" table in the back of classrooms or wandering the halls on extended bathroom breaks. Special Education teachers and

Tier II reading and math specialists are usually given thirty minutes a day to provide meaningful instruction that can be shown to have improved student outcomes on easy to interpret measures of student achievement. It can be particularly challenging for interventionists to get their students into the room for sessions much less to engage with intensive instructional activities.

This researcher does not claim to be the first to attempt to devise a strategy for intensive intervention that is highly engaging for students but feels that the comic curriculum used in this study is unique in many ways.   It is this researcher's opinion that learning should be fun and playful. It was the researcher's intent to create an intervention that was fun to look at, provided different ways for students to learn how to discuss their ideas, put pencils in their hands creating pictures and words, gave them regular practice reading challenging text, and produced long-term outcomes in the form of academic vocabulary acquisition.

In the design of the comic curriculum used for this study, care was given to instructional pacing.   Daily lessons included three short components that were sequenced in a way to account for student fatigue and to maximize engagement. A token economy system was built into the lessons to reward students for successfully completing lessons.

The comic curriculum had a focus on the multi-modal nature of intelligence and provided students with the opportunity to showcase their abilities in reading, speaking, writing, and drawing. The comic curriculum was intended to be aesthetically pleasing, funny, and easy to read and comprehend even while presenting unknown vocabulary words that explored new concepts. From an instructional standpoint, the researcher found that the curriculum was fun to teach. Students engaged with the activities in unexpected ways like acting out the text of the comic stories and producing drawings that were very funny.   The discussion components of

lessons were at first quite challenging, but it was interesting to see students gradually become more confident in their abilities to discuss new concepts.

It is my opinion that despite the monolithic laws put in place to protect the rights of students with learning differences, they remain a population whose experience in school is criminally neglected. It is my opinion that comics are a great way to engage students with learning differences that affect reading, and that further research should be done to devise evidence-based practices that use comics for skill development. Extra care must be given in the design of this specialized instruction to include the thoughts and feelings of students with learning differences. The laws that protect them can also make them invisible to researchers in educational settings. It is my opinion that future research of comic interventions could produce teaching techniques that help students with learning differences feel successful in school.

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Appendix A
Signatory Page of Dissertation Topic Approval
Name of Doctoral Candidate:

_____
We, the dissertation committee, authorize the student above to proceed with
the proposal topic of _____.
Signatures:

_____ _____
Candidate Date

_____ _____
Committee Chair Date

_____ _____
Committee Member Date

_____ _____
Committee Member Date

Appendix B
Approval of Written and Oral Comprehensive Examination
Date of completion of my written/oral comprehensive examination:

_____

I successfully passed my written/oral comprehensive examination during (check one)
_____SPRING _____ FALL Semester 202____.
The proposed title of my dissertation study is:

_____

Below are my signature and the names and signatures of my committee members reflected
the date(s) specified above as the date my dissertation proposal was approved by my
committee through written and oral presentation.

_____ _____
Student Name Student Signature

_____
Committee Chair Name Chair Signature

_____
Committee Member Name Member Signature

_____
Committee Member Name Member Signature

Appendix C
Signatory Page for Dissertation
(should be embedded into the beginning of the dissertation with all committee members and the Dean of
the College of Education signatures following a successful dissertation defense)
Slippery Rock University of Pennsylvania
Department of Special Education
A Dissertation Written By

_____
Bachelor of _____ in _____, Name of Institution, Date
Master of Science in _____, Name of Institution, Date
Doctorate of Education in Special Education, Slippery Rock University of
Pennsylvania, Date
Approved by

_____
Dr. _____, Dissertation Committee Chair
Date

_____
Dr. _____, Committee Member
Date

_____
Dr. _____, Committee Member
Date
Accepted by

_____
Dr. Keith Dils, Dean, College of Education, Slippery Rock University of
Pennsylvania
Date
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Appendix D
Course Descriptions

Research Core (12 Credits):
*All credits are required for this core of courses. Students cannot transfer in any credits to replace
coursework in this core of classes.
SEFE 802: Univariate Statistics (3 Credits). Descriptive and inferential univariate statistics commonly used in education research are studied with emphasis on deciding which statistical analyses to use in practical situations and emphasis on interpreting the results of statistical analyses. Both parametric and nonparametric methods are included. Calculator and computer usage are required.
SEFE 896: Elements of Qualitative Research (3 Credits). This course has a concentration on the theoretical and practical applications of qualitative research within the broad framework of formal education.
SEFE 899: Elements of Quantitative Research (3 credits). This course has a concentration on the theoretical and practical applications of quantitative research within the broad framework of formal education.
SPED 865: Research in Applied Behavior Analysis
Single subject design methodology has developed primarily within the field of behavior analysis but has wider application beyond that theoretical orientation. It represents an intervention-oriented
methodology that is idiographic in nature, requires frequent measurement of the dependent variable, and employs replications within and across participants. In addition, single subject design studies frequently use direct observational methodology as the dependent variable. In this course, we will begin with an overview of single subject design research methods and their application within special education. We will next examine methods of behavioral assessment and
techniques for conducting observational research. A variety of single subject research designs will
be examined, with the strengths and weaknesses of each identified. Issues related to treatment fidelity, social validity, and ethical use of single subject research methodology will be discussed.
SPED 841: Applied Behavior Analysis/Single-Subject Experimental Design I (3 Credits). In this course students will be provided an in-depth review of applied behavior analytic techniques including conducting behavioral assessments, designing effective behavior change programs, and applying behavioral procedures consonant with ethical standards. Students will learn to apply behavior analytic principles toward the improvement of socially significant behaviors in a wide range of settings as well as to evaluate the effects of behavioral procedures. In addition, students will learn how to use single-subject research designs to make data-based decisions about program effectiveness and student outcomes. Students will also learn how to integrate applied research into classroom instruction as part of the move toward evidence-based professional practice in educating students with special educational needs.
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Content and Leadership Core (18 Credits):
SPED 805: Legal Issues and Special Populations (3 Credits). This online course focuses on laws and policies that apply to the education of students with disabilities. The legal system,

constitutional and statutory provisions of federal and state law, and the judicial decisions relating to the education of students with disabilities are reviewed. Students will examine the foundational

concepts of equal protection, procedural and substantive due process in general and as they relate to special education specifically. Students will examine IDEA legislation and its six principles, The Rehabilitation Act of 1973 (Section 504) and the Family Education Rights and Privacy Act (FERPA). In addition, students will examine similar principles in Pennsylvania state legislation with particular emphasis on school practices in special education.

SPED 820: Contemporary Issues in Special Education (3 Credits). A study of basic conditions operating in the educational and psychological development of children with disabilities and the general problems these create in education. Methods, materials, personnel, and techniques are critically analyzed.

SPED 845: Instructional Technology for Exceptional Learners (3 Credits). Candidates will develop the use of technologies to assist in the teaching, remediation, assessment, and enrichment of students with special needs in inclusive traditional and/or cyber classrooms. The goal is to help future special education administrators become familiar with instructional and assistive technology. This course will also provide a framework for utilizing educational technology

to meet the individualized needs of students.

SPED 850: Political and Community Leadership (3 Credits). This course addresses the knowledge, skills, and attributes to: act in accordance with legal provisions and statutory requirements; apply regulatory standards; develop and apply appropriate policies; be conscious of

ethical implications of policy initiatives and political actions; relate public policy initiatives to student welfare; understand schools as political systems; involve citizens and service agencies; and develop effective staff communications and public relations programs.

SPED 852: Instructional Leadership (3 Credits). This course focuses on the knowledge, skills, and attributes to: design with others appropriate curricula and instructional programs; develop learner-centered school cultures; assess learning outcomes; and plan with faculty professional development activities aimed at improving instruction.

SEFE 844: Instructional Design: Principles and Practices (3 Credits). This course includes the knowledge base, principles and procedures utilized in designing instructional strategies and materials. In addition, an in-depth analysis of the various components of instructional design, as well as, case studies from the basis for discussion are included. Students will be able to design and develop effective classroom instructional strategies.

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ELEC 813: Advocacy and Family, School, and Community Engagement (3 Credits). This course examines the role of school, family, and community engagements as a component of educational reform. The focus is to analyze the research reflecting the impact of home/school and

community/school partnerships on student learning. Furthermore, this course will seek to explore the various theoretical frameworks that focus on family types, cultures, economic conditions, school systems, community services, political forces, advocacy groups, and other additional factors that impact all young children and their families. A framework for conceptualizing child/family policy, roles professionals can play in building advocacy/policy, and approaches professionals can use in implementing these roles will also be investigated.

Special Education Core (15 credits):

SPED 802: Special Education Foundations (3 Credits). This course introduces the student to the physical, social, emotional and educational characteristics, incidence, prevalence, and educational intervention for the major categories of exceptionality enrolled in public and private educational facilities in the PK-12 grade range. In addition, the course will identify ancillary services and agencies frequently impacting special populations including the major professional organizations and those concerned with residential programming and vocational training. The course will also identify the major litigation and legislation that have significantly influenced the nature of service to exceptional populations.

SPED 844: Neuropsychiatric Disorders of Childhood (3 Credits). This course will present students an opportunity to examine neuropsychiatric disorders of childhood found in the DSM-V.

Specifically students will examine psychopathology associated with disruptive behavior disorders

such as ADHD, Oppositional Defiant Disorder, Pediatric Bipolar Disorder, Conduct Disorder, etc.

as well as internalizing behavior disorders such as subtypes of Anxiety Disorder, Eating Disorders, Depression, Elimination Disorders, etc. Students will research a group of disorders known as PANDAS (Pediatric Autoimmune Neuropsychiatric Disorders Associated with Strep Virus) and look at current brain research to determine possible causation of these disorders. An emphasis on psychopharmacology as one form of treatment will be explored as well as the role of

the professional educator as part of a multi-modal treatment approach for children with mental health disorders.

SPED: 801: Advanced Studies in Learning Disabilities (3 Credits). This course is designed to offer the student an introduction to the field of learning disabilities and behavioral disorders. This

introduction will familiarize the student with the types of learning disabilities, as well as with educational strategies for coping with them.

SPED 807: Positive Classroom Interventions (3 Credits). This course addresses symptoms and behavior patterns that signal disturbances in the psychological functioning of the individual. It

will also deal with the meaning of this behavior in a school setting, at home, and with peers.

SPED 842: Program Development for Students with ASD (3 Credits). Children with autism are among the most difficult students to teach. They require carefully planned, meticulously delivered,

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and continually evaluated and analyzed instruction. This course provides an overview of researched-based instructional strategies used to teach students with autism spectrum disorders. The course discusses intervention strategies for both the general and special education classroom.

SPED 809: Transition from School to Adult Life (3 Credits). This course is designed to provide students with knowledge, strategies and resources necessary to prepare adolescents and young adults with disabilities for the transition from school to future careers, continuing education, and independent living. Students will develop knowledge and skills about the context within which adolescence occurs, transition assessment/planning strategies, transition-related

content/instruction strategies (including student-focused skill development strategies), and strategies for interacting and collaborating with families and community-based agencies in the transition process.

SPED 808: Applied Behavior Analysis/Single-Subject Experimental Design II (3 Credits). This course will present the student with information on the applications of behavior analytic principles in changing behavior. Specifically, students will learn to select behavior targets for change, to establish and strengthen behavior, and to weaken behavior.

SPED 843: Communication and Social Competency for Students with ASD (3 Credits). This course is designed to provide students with an in depth look at the many facets of social competence for students with ASD and how the lack of or impaired communication skills leads to
social incompetence. Special emphasis will be given to selecting evidence-based practices related to social skill development as well as communication problems related directly to students
with ASD. Twenty hours of observation and field experience are part of the course requirements.

Dissertation Core (15 Credits):

SPED 881: Dissertation Seminar (3 Credits). Dissertation Seminar is intended to assist doctoral students in the preparation of a dissertation proposal and to facilitate the transition from course work to dissertation. The purpose of this course is to take students from a point at which they have general ideas about their dissertation topic through the development of a solid structure, research strategy and drafting of framing chapters. Emphasis is placed on understanding and defining the logical relations between elements in a proposal including the problem statement, conceptual/theoretical framework, literature review, research design and methodology. The chief task is to draft complete framing chapters, giving a full description of the motivation for the project
and the research strategy.

SPED 899: Dissertation (12 Credits). The doctoral dissertation signifies the culminating point in the doctoral program and demonstrates the candidates' knowledge of the program competencies in the areas of research, special education, and educational leadership. Doctoral candidates, under the direction of the chairperson of their dissertation committee, will develop, implement, analyze, report, and defend a structured research project, either qualitative or quantitative in nature in the area of special education. Additionally, the doctoral candidate will present an oral
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defense of the written dissertation upon approval of the five-chapter manuscript by the dissertation committee.
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SlipperyRock
University
of Pennsylvania

Appendix E

PARENT/GUARDIAN INFORMATION FORM FOR ACTION RESEARCH STUDY:

Effectiveness of a Comic Book Curriculum for Vocabulary Acquisition and Reading Fluency for Students in an Intervention Setting

Pete Nolan, 978-544-6926, nolan@swiftriverschool.org

_____

Dear Parent or Guardian,

As a part of my doctoral dissertation at Slippery Rock University and with the consent of Principal Sullivan, for the next nine weeks I will be engaging in an action research project in my classroom. I will be using a new strategy to teach vocabulary words that combines text and images in a comic workbook format. This strategy is based on current research for effective vocabulary instruction in reading intervention settings. The workbook will also provide practice in reading and spelling. There will be a vocabulary assessment at the beginning and end of the nine-week period so that I can see how well the strategy works to teach new words. I will also continue to measure the rate of your student's reading in weekly one-minute timed readings known as oral reading fluency measures.

The focus of this study is on me, the teacher, and this new strategy for teaching academic vocabulary words, not your student. I will use the anonymous results of your student's vocabulary assessments to measure how well the strategy works to teach new academic words. I will also use the anonymous results of your student's oral reading fluency measures. Your student's names will not be associated with this study at any point, nor will I include any potentially identifying information about your student.

Apart from the test scores, I'm also interested in studying if this new strategy is engaging and fun for students. For this reason, I will be keeping a written log, reflecting on each day's intervention sessions. If your student says anything in class that day that I think is relevant to the question of student engagement with the comic curriculum, I will record a quotation of what they said in a field notebook. I will not use your student's name at any point in my notes, and my field notebook will be kept in a locked cabinet in my office. If I use one of your student's quotations in the final document of my dissertation, your student's name will not be used, and I will attribute the quotation to a pseudonym.

Your student may benefit from this research study by taking part in a curriculum that has been designed in accordance with current evidence-based practices for the purpose of increasing engagement, improving vocabulary knowledge, and improving reading speed. I hope that this study may help teachers and future researchers to develop a better understanding of how to best teach vocabulary and reading fluency with the aid of a comic or graphic novel curriculum.

If you have any questions about this project please contact me, Pete Nolan at 978-544-6926 or by email: nolan@swiftriverschool.org. **Since I, Pete Nolan, am the subject of this study, there is no for you to sign a permission form.**

If you **do not** want your student's data used for this study, please sign, date, and return the form below.
I do not wish to have my student's vocabulary assessment scores, oral reading fluency measures, or observational

data included in this study.

_____ Name of Child (Printed)

_____ _____ _____ Printed
Parent/Guardian Name Signature of Parent/Guardian Date

Important Information about the Research Study

Things you should know:

- The purpose of this research study is to determine effectiveness of using a graphic novel or comic-based curriculum to improve vocabulary knowledge and reading speed in an intervention setting. Previous studies have shown that graphic novels and comics can be effective for improving comprehension, vocabulary acquisition, and for teaching new skills. The data collected in this study will further existing research on the topic of the potential uses of a graphic novel curriculum in school settings.
- This researcher believes that there are no known risks associated with this research study. The curriculum is aligned with current instructional practice and classroom curriculum has been designed with the cooperation and support of your student's classroom teachers and the consent of Principal Sullivan.
- Students may benefit from this research by taking part in a curriculum that has been designed in accordance with current evidence-based practices for the purpose of increasing engagement, improving vocabulary knowledge, and improving reading fluency. The researcher hopes that this study may help teachers and future researchers to develop a better understanding of how to best use comics and graphic novels in an intervention setting.

What is the Study About and Why am I Doing it?

The purpose of the study is to aid in the development of a reading curriculum for students in an intervention setting that will improve student engagement while teaching new vocabulary words and improving reading fluency. The results of this study will contribute to what is currently known about the use of comics and graphic novels as a teaching tool. It will also provide a basis for future research on the subject.

Appendix F

Tier Two Vocabulary Pretest/Posttest

Instructions: Choose the best answer for each question.

1. abolish

    a) a statement or story about something that has happened.
    b) to get rid of or do away with; end.
    c) in control; self-possessed; calm.
    d) facts, figures, or other pieces of information that can be used in different ways.

2. reference

    a) to change the form, look, or shape of.
    b) a statement or story about something that has happened.
    c) a source of information.
    d) a hollow place or hole.

3. transform

    a) to change the form, look, or shape of.
    b) an individual piece of information that is used to draw a conclusion.
    c) facts, figures, or other pieces of information that can be used in different ways.
    d) a source of information.

4. negative

    a) a source of information.
    b) to build; put together.
    c) saying or meaning "no."
    d) to gather together.

5. datum

    a) a hollow place or hole.
    b) in control; self-possessed; calm.
    c) to get rid of or do away with; end.
    d) an individual piece of information that is used to draw a conclusion.

6. cavity

    a) a source of information.
    b) a hollow place or hole.
    c) a statement or story about something that has happened.
    d) having a regular style or pattern; not changing.

7. positive

a) to get rid of or do away with; end.
b) to change the form, look, or shape of.
c) sure.
d) a source of information.

8. construct

a) to build; put together.
b) a hollow place or hole.
c) a source of information.
d) to gather together.

9. consistent

a) having a regular style or pattern; not changing.
b) an individual piece of information that is used to draw a conclusion.
c) facts, figures, or other pieces of information that can be used in different ways.
d) a statement or story about something that has happened.

10. data

a) having a regular style or pattern; not changing.
b) a source of information.
c) a statement or story about something that has happened.
d) facts, figures, or other pieces of information that can be used in different ways.

11. collect

a) a statement or story about something that has happened.
b) to gather together.
c) a hollow place or hole.
d) in control; self-possessed; calm.

12. report

a) in control; self-possessed; calm.
b) a statement or story about something that has happened.
c) to gather together.
d) facts, figures, or other pieces of information that can be used in different ways.

14. realistic

a) tending to see things as they really are; practical.
b) to change the form, look, or shape of.
c) sure.
d) an individual piece of information that is used to draw a conclusion.

15. prefer

    a) entertaining; funny.
    b) very large in size or amount; huge.
    c) to choose above others as the best liked or most wanted.
    d) likely or willing to obey rules or orders.

16. source

    a) likely or willing to obey rules or orders.
    b) entertaining; funny.
    c) the start or cause of something.
    d) to choose above others as the best liked or most wanted.

17. amuse

    a) an ending or result.
    b) likely or willing to obey rules or orders.
    c) to cause to smile or laugh.
    d) the start or cause of something.

18. enormous

    a) likely or willing to obey rules or orders.
    b) the start or cause of something.
    c) entertaining; funny.
    d) very large in size or amount; huge.

19. obedient

    a) very large in size or amount; huge.
    b) an ending or result.
    c) to cause to smile or laugh.
    d) likely or willing to obey rules or orders.

20. amusing

    a) very large in size or amount; huge.
    b) the start or cause of something.
    c) an ending or result.
    d) entertaining; funny.

21. conclusion

    a)   an ending or result.
    b)   to choose above others as the best liked or most wanted.
    c)   very large in size or amount; huge.
    d)   the start or cause of something.

22. approximate

    a)   to choose above others as the best liked or most wanted.
    b)   close in amount to the actual amount, but not exact.
    c)   the start or cause of something.
    d)   the same as or equal to another in force, value, measure, or meaning.

23. odor

    a)   close in amount to the actual amount, but not exact.
    b)   to cause someone to do something through reasoning or arguing.
    c)   tending to see things as they really are; practical.
    d)   a smell, often a bad one.

24. persuade

    a)   tending to see things as they really are; practical.
    b)   to cause someone to do something through reasoning or arguing.
    c)   close in amount to the actual amount, but not exact.
    d)   to gather in a small, close group.

25. amusing

    a)   to gather in a small, close group.
    b)   the same as or equal to another in force, value, measure, or meaning.
    c)   to choose above others as the best liked or most wanted.
    d)   entertaining; funny.

26. enormous

    a)   to throw around in different directions.
    b)   to choose above others as the best liked or most wanted.
    c)   very large in size or amount; huge.
    d)   entertaining; funny.

27. source

    a)   to gather in a small, close group.
    b)   very large in size or amount; huge.
    c)   the start or cause of something.
    d)   entertaining; funny.

28. scatter

    a)   tending to see things as they really are; practical.
    b)   close in amount to the actual amount, but not exact.
    c)   to throw around in different directions.
    d)   to gather in a small, close group.

29. equivalent

    a)   to cause to smile or laugh.
    b)   to gather in a small, close group.
    c)   the same as or equal to another in force, value, measure, or meaning.
    d)   close in amount to the actual amount, but not exact.

30. prefer

    a)   to throw around in different directions.
    b)   to choose above others as the best liked or most wanted.
    c)   to handle or operate skillfully with the hands.
    d)   to cause someone to do something through reasoning or arguing.

31. manipulate

    a)   to cause someone to do something through reasoning or arguing.
    b)   to handle or operate skillfully with the hands.
    c)   entertaining; funny.
    d)   to choose above others as the best liked or most wanted.

32. realistic

    a)   tending to see things as they really are; practical.
    b)   very large in size or amount; huge.
    c)   to choose above others as the best liked or most wanted.
    d)   to throw around in different directions.

33. amuse

    a)   to choose above others as the best liked or most wanted.
    b)   tending to see things as they really are; practical.
    c)   to cause to smile or laugh.
    d)   entertaining; funny.

34. huddle

    a)   tending to see things as they really are; practical.
    b)   close in amount to the actual amount, but not exact.
    c)   to gather in a small, close group.
    d)   to throw around in different directions.

35. approximate

    a)   to choose above others as the best liked or most wanted.
    b)   close in amount to the actual amount, but not exact.
    c)   the start or cause of something.
    d)   the same as or equal to another in force, value, measure, or meaning.

36. odor

    a)   close in amount to the actual amount, but not exact.
    b)   to cause someone to do something through reasoning or arguing.
    c)   tending to see things as they really are; practical.
    d)   a smell, often a bad one.

37. persuade

    a)   tending to see things as they really are; practical.
    b)   to cause someone to do something through reasoning or arguing.
    c)   close in amount to the actual amount, but not exact.
    d)   to gather in a small, close group.

38. scatter

    a)   tending to see things as they really are; practical.
    b)   close in amount to the actual amount, but not exact.
    c)   to throw around in different directions.
    d)   to gather in a small, close group.

39. equivalent

        a)   to cause to smile or laugh.
        b)   to gather in a small, close group.
        c)   the same as or equal to another in force, value, measure, or meaning. close in amount to
        d)   the actual amount, but not exact.

40. manipulate

   a)   to cause someone to do something through reasoning or arguing.
   b)   to handle or operate skillfully with the hands.
   c)   entertaining; funny.
   d)   to choose above others as the best liked or most wanted.

41. realistic

   a)   tending to see things as they really are; practical.
   b)   very large in size or amount; huge.
   c)   to choose above others as the best liked or most wanted.
   d)   to throw around in different directions.

42. diagram

   a)   an event that brings great harm, suffering, or loss to a large area or many people; terrible disaster.
   b)   the state or condition of being entirely forgotten.
   c)   a person who has the same job or employer as another.
   d)   a drawing or plan that shows the parts of something or how the parts work together.

43. viable

   a)   to disagree; quarrel.
   b)   a person who has the same job or employer as another.
   c)   an event that brings great harm, suffering, or loss to a large area or many people; terrible disaster.
   d)   capable of germinating, growing, or developing, as a living organism or social organization.

44. origin

   a)   a person who has the same job or employer as another.
   b)   a drawing or plan that shows the parts of something or how the parts work together.
   c)   the state or condition of being entirely forgotten.
   d)   the point or place from which something comes; source.

45. argue

    a)   the point or place from which something comes; source.
    b)   a drawing or plan that shows the parts of something or how the parts work together.
    c)   the state or condition of being entirely forgotten.
    d)   to disagree; quarrel.

46. critical

    a)   likely to find fault.
    b)   the state or condition of being entirely forgotten.
    c)   the point or place from which something comes; source.
    d)   to twist the body about; wriggle.

47. portal

    a)   the act or an instance of perceiving the environment through one of the senses.
    b)   to twist the body about; wriggle.
    c)   a doorway or entrance, especially a large and imposing one.
    d)   a person who has the same job or employer as another.

48. observation

    a)   a drawing or plan that shows the parts of something or how the parts work together.
    b)   the act or an instance of perceiving the environment through one of the senses.
    c)   to twist the body about; wriggle.
    d)   likely to find fault.

49. catastrophe

    a)   a drawing or plan that shows the parts of something or how the parts work together.
    b)   an event that brings great harm, suffering, or loss to a large area or many people; terrible disaster.
    c)   to give hope or courage to someone; give confidence or support.
    d)   the state or condition of being entirely forgotten.

50. squirm

    a)   to disagree; quarrel.
    b)   capable of germinating, growing, or developing, as a living organism or social organization.
    c)   an event that brings great harm, suffering, or loss to a large area or many people; terrible disaster.
    d)   to twist the body about; wriggle.

51. encourage
    a) to give hope or courage to someone; give confidence or support.
    b) the act or an instance of perceiving the environment through one of the senses.
    c) the point or place from which something comes; source.
    d) to twist the body about; wriggle.

52. oblivion

    a) a person who has the same job or employer as another.
    b) the state or condition of being entirely forgotten.
    c) a doorway or entrance, especially a large and imposing one.
    d) the act or an instance of perceiving the environment through one of the senses.

53. colleague

    a) an event that brings great harm, suffering, or loss to a large area or many people; terrible disaster.
    b) to disagree; quarrel.
    c) the act or an instance of perceiving the environment through one of the senses.
    d) a person who has the same job or employer as another.

54. alternative

    a) an advanced state of development of a society as judged by such things as having a system of government and laws, using a written language, and keeping written records.
    b) to change for a particular use. saying or meaning "no."
    c) one of two or more choices.

54. prediction

    a) the act of telling or trying to tell what will happen in the future.
    b) fierce; savage.
    c) to change for a particular use.
    d) an advanced state of development of a society as judged by such things as having a system of government and laws, using a written language, and keeping written records.

55. negative

    a) eager to learn or know.
    b) saying or meaning "no."
    c) to enter as an enemy, by force, in order to conquer or plunder.
    d) one who enters as an enemy, by force, in order to conquer or plunder.

56. adapt

    a) a living person or animal.
    b) the act of telling or trying to tell what will happen in the future.
    c) fierce; savage.
    d) to change for a particular use.

57. invader

    a) one of two or more choices.
    b) one who enters as an enemy, by force, in order to conquer or plunder.
    c) able to be eaten.
    d) a feeling or action that occurs as a response to something else.

58. reaction

    a) to enter as an enemy, by force, in order to conquer or plunder.
    b) a feeling or action that occurs as a response to something else. T
    c) he act of telling or trying to tell what will happen in the future.
    d) able to be eaten.

59. creature

    a) one of two or more choices.
    b) saying or meaning "no."
    c) able to be eaten.
    d) a living person or animal.

60. nibble

    a) saying or meaning "no."
    b) an advanced state of development of a society as judged by such things as having a system of government and laws, using a written language, and keeping written records.
    c) to eat in small bites.
    d) eager to learn or know.

61. edible

    a) able to be eaten.
    b) one who enters as an enemy, by force, in order to conquer or plunder.
    c) one of two or more choices.
    d) to eat in small bites.

62. curious

    a) eager to learn or know.
    b) saying or meaning "no."
    c) to change for a particular use.
    d) to enter as an enemy, by force, in order to conquer or plunder.

63. ferocious

    a) to enter as an enemy, by force, in order to conquer or plunder.
    b) fierce; savage.
    c) eager to learn or know.
    d) one of two or more choices.

64. civilization

    a) one who enters as an enemy, by force, in order to conquer or plunder.
    b) to eat in small bites.
    c) an advanced state of development of a society as judged by such things as having a system of government and laws, using a written language, and keeping written records.
    d) fierce; savage.

65. invade

    a) saying or meaning "no."
    b) one who enters as an enemy, by force, in order to conquer or plunder.
    c) to eat in small bites.

66. hostile

    a) feeling or showing dislike; unfriendly.
    b) to allow or accept; not oppose or attack.
    c) like a giant; huge.
    d) the act of telling or trying to tell what will happen in the future.

67. government

    a) to cause someone to do something through reasoning or arguing.
    b) the group of people that has power to make laws and important decisions for a community, state, or nation.
    c) like a giant; huge.
    d) to look at closely so as to get information and learn the facts.

68. vegetation

    a) plants or plant life in a particular place.
    b) to look at closely so as to get information and learn the facts.
    c) like a giant; huge.
    d) a test used to discover something not known, such as the cause of something.

69. solution

    a) a test used to discover something not known, such as the cause of something.
    b) like a giant; huge.
    c) an answer to a problem or a way to fix it.
    d) to cause someone to do something through reasoning or arguing.

70. dimension

    a) to look at closely so as to get information and learn the facts.
    b) size as measured in length, width, or depth.
    c) plants or plant life in a particular place.
    d) like a giant; huge.

71. gigantic

    a) to look at closely so as to get information and learn the facts. size as measured in length, width, or depth.
    b) like a giant; huge.
    c) plants or plant
    d) life in a particular place.

72. tolerate

    a) plants or plant life in a particular place.
    b) to allow or accept; not oppose or attack.
    c) size as measured in length, width, or depth.
    d) to cause someone to do something through reasoning or arguing.

73. experiment

    a) an answer to a problem or a way to fix it.
    b) to look at closely so as to get information and learn the facts.
    c) a test used to discover something not known, such as the cause of something.
    d) plants or plant life in a particular place.

74. persuade

   a) To cause someone to do something through reasoning or arguing.
   b) a test used to discover something not known, such as the cause of something.
   c) size as measured in length, width, or depth.
   d) to allow or accept; not oppose or attack.

75. investigate

   a) feeling or showing dislike; unfriendly.

   b) like a giant; huge.

   c) plants or plant life in a particular place.

   d) to look at closely so as to get information and learn the facts.

76. experience

   a) plants or plant life in a particular place.
   b) feeling or showing dislike; unfriendly.
   c) something that a person has done or lived through.
   d) to look at closely so as to get information and learn the facts.

77. prediction
   a) the group of people that has power to make laws and important decisions for a community, state, or nation.
   b) the act of telling or trying to tell what will happen in the future.
   c) like a giant; huge.
   d) plants or plant life in a particular place.