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Augmented reality (AR) : a school library app to engage high school reluctant readers to read for pleasure

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ABSTRACT

AUGMENTED REALITY (AR): A SCHOOL LIBRARY APP TO ENGAGE HIGH SCHOOL
RELUCTANT READERS TO READ FOR PLEASURE

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If a student does not read for pleasure, studies have shown it can be detrimental to a student's academic success. Augmented Reality (AR) has shown positive results in schools, classrooms and public libraries, but could be beneficial as a school library tool to help reluctant readers select books to read for pleasure. In this qualitative case study, seven high school level reluctant readers were given the opportunity, through augmented reality apps, to explore books that could help them read for pleasure. Over a school's quarter semester (9 weeks), seven high school level reluctant readers used Aurasma and LayAR to watch book trailers or click links for 55 books of different genres to guide them in finding a book to read for pleasure. The seven high school level reluctant readers were studied through nine interviews and three observations periods to understand the relevance of the AR app recommendations, their engagement with the AR apps, and the reading materials chosen after usage of the AR apps. The seven high school level reluctant readers were given reading recommendations by teachers, the school librarian or other recommenders, but reported they could not independently pick books they enjoyed. Each high school reluctant reader was independently studied and cross-analyzed to find themes that helped

or hampered their reading for pleasure. Sustained silent reading, class libraries, and academic issues played into this study, as major factors for success or failures. Augmented Reality cannot replace human influence, factors or recommenders, but could be a beneficial tool for reluctant readers to read for pleasure.

NORTHERN ILLINOIS UNIVERSITY

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AUGMENTED REALITY (AR): A SCHOOL LIBRARY APP TO ENGAGE HIGH SCHOOL

RELUCTANT READERS TO READ FOR PLEASURE

BY

KAI RUSH

A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL TECHNOLOGY, RESEARCH AND ASSESSMENT

Doctoral Director:
    Rebecca D. Hunt

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Growing up without a father, many men have made sure I stayed on the right track: men like my Uncle Stoney Hamm, Coach Bennerman, Mr. Jones, Andrew Johnson, James Feazell, Jim Waters, Jade Moore, Eric McClendon, Ken Welch, Randy Lightfoot, Tremayne Clardy, Terrell Yarbrough, Chuck Roberts, Scott Meech, Dr. Wei-Chen Hung, Dr. Allen Williams, Calvin Harris, Dr. John Cowan, Dr. Nick Omale, Steve Johnson, and many others who helped guide my life. At the same time, I also had very strong women, who provided the same guidance, like my Aunt Geri Hamm, Mrs. Hanks, Ms. Kirkham, Shannon Shafer, Donna Mack, Michelle Dennard, Kim Black, Wendy Paser, Gladys Morgan, Patti Beck, Shelly Tucson Story, Kathi Garton, Linda Caine, Sara Omi, Dr. Rebecca Hunt, Dr. Pi-Sui Hsu, Dr. Hayley Mayall, Traci O'Neal Ellis, Dr. Beth King, and many other women. Of course, my beautiful wife, Olivia Rogers-Rush. These are my heroes and idols in life. They have mentored, guided and given up their time to help me achieve my dreams.

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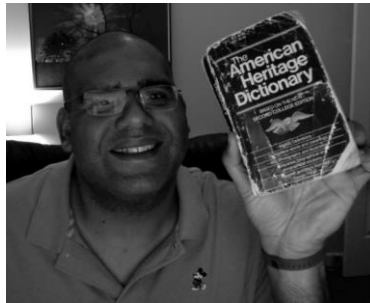
Lastly, I think of all that African Americans have done throughout history for me to be able to achieve this step in my life. This is my honor to their struggle. As I continue to educate young minds, I hope I am able to provide that same guidance to those young people who enter my classroom and my life.

How far you go in life depends on your being tender with the young, compassionate with the aged, sympathetic with the striving, and tolerant of the weak and the strong. Because someday in life you will have been all of these. – George Washington Carver

DEDICATION

       I dedicate this dissertation to my sons, Cason and Grayson Rush, and to every student I have had in my classes. When I die, I hope my teaching and research have helped to propel them as human beings to understand different cultures of the world and to lend a helping hand to others who are struggling to live a life of happiness. My research is an extension of my teaching and my passion for education, technology and library science. It takes a village to raise a child, and I hope I was a great teacher and professor in that village!

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CHAPTER 1

INTRODUCTION

This dissertation outlines how Augmented Reality (AR) can be a useful tool in the educational literacy movement for creating a culture of lifelong reading. Using seven high school level reluctant readers in a high school library setting, this study took 3D virtual objects (also known as augmented reality objects) and attached those virtual objects to book covers. AR tools could then allow the student to explore books outside of viewing the book covers, teachers and/or school librarians' recommendations, or catalog descriptions with a mobile device. Augmented Reality (AR) helped the student investigate books with videos, 3D images, twitter feeds and many 3D items using the mobile device (smartphone or tablet). AR can be used in different ways in a school library, but in the scope of this study, AR was used to connect existing YouTube book trailer videos, Goodreads' book reviews and/or authors' twitter accounts to each book. For example, a Mickey Mouse icon could have an overlay that plays a video advertising Walt Disney World. AR allows an existing real world object to become animated (augmented) in a 3D form. From the research of Krashen (1993, 1995, 2006), Jenkins (2009), Whitmire (2010), and Allyn (2011), this study addresses aiding students in self-selecting books, which can be linked to reading for pleasure.

Background of the Problem

Factors in Engagement of Reading for Pleasure

Over forty years of research has been done to identify the factor of low engagement of reluctant readers to read for pleasure on all levels of education. Krashen (1993, 1995, 2006), Jenkins (2009), Whitmire (2010), Allyn (2011), and Hahn (2012) discovered high engagement and more effective learning when students read for pleasure than rote classroom comprehension assignments or listening to a lecture. Krashen (1993, 1995, 2006, 2013) concluded that a major factor to helping reluctant readers is reading for pleasure. In addition, Miller (2009); Harrison (2012); Whittingham, Huffman, Christensen and Mcallister (2013); Stoller, Anderson, Grabe and Komiyama (2013); Meredith (2014); and Pittman and Honchell (2014) found that reading for pleasure is essential for reading comprehension and future student success in school. Krashen (1993, 2006); Hahn (2012); van Arnham and Spiller (2014); and Kang (2015) expressed in their studies that school libraries are hugely important to engaging students in reading for pleasure in our nation's schools. All four studies concluded that the school library's main purpose is to promote literature to the school community and could be a solution to students reading for pleasure. In this study, the focus was on a high school library, which is the center for reading in a high school.

Krashen (1993, 1995, 2006), Whitmire (2010), Allyn (2011), Hahn (2012), Harrison (2012), Whittingham et al. (2013), and Pittman and Honchell (2014) all agree that reading for pleasure is valuable to students and can help shape a child's academic future. Brinda (2011) discovered that students could have personal experiences, such as being discouraged from reading comic books or graphic novels or being forced to read from a teacher's established

collection, that will not allow them to embrace reading for pleasure. Thompson (2007) and Brinda (2011) stated that teachers find graphic novels and comic books as too easy, although comics and graphic novels vary in degree of reading levels. This discouragement can make those students reluctant readers and can affect a student's academic future. Rodrigo et al. (2007) identified a major factor in adult reluctant readers: that as children, they were not stimulated to read or engaged in reading for pleasure.

Sustained Silent Reading

The engagement of reading for pleasure has been observed in schools during sustained silent reading (SSR). von Sprecken and Krashen (1998) studied self-selection reading procedures during sustained silent reading in different schools, which is structured free reading time during the school day. During this time, Krashen (1993); von Sprecken and Krashen (1998); Miller (2009); and Stoller et al. (2013) suggest that students should be allowed to read any books, magazines, comic books, or any reading material a child enjoys reading, although many teachers in these studies were found to coerce their students toward traditional fiction and nonfiction books. Krashen (1993, 1995, 2006); Harrison (2012); Whittingham et al. (2013); and Pittman and Honchell (2014) all learned that if students are disengaged from their reading interests, they will not perform well in school.

Technology Tools Success in the School Library

With technology entering American schools and school libraries over the past decade, new tools are being created to help students embrace learning and reading. Kang (2015) examined engaging STEM students with AR in school libraries. Billinghurst (2002), Billinghurst

and Kato (2002), Fellerer (2009), Brill and Park (2008), Walsh (2010), Law and Simon (2011), Whitchurch (2011), Brown and Green (2012) and Hahn (2012) studied new tools being introduced to libraries and schools, such as audiobooks, Playaways, QR codes, virtual reality and augmented reality (AR) tools. Although the tool is not the focus of learning, the tool could be the attractor to drive the interest level of the reluctant reader. Dünser and Hornecker (2007) showed that interest in books is declining among all students and that new methods are being explored to keep all students, in addition to reluctant readers, interested in reading.

Krashen (1993, 1995, 2004, 2006) and Hahn (2012) stated that students can make positive learning gains through reading for pleasure. Krashen (1993, 1995, 2004, 2006, 2013) and Hahn (2012) have concluded that educational technology and school library sectors of education should integrate new tools, such as audiobooks, QR codes, virtual reality and augmented reality (AR), to motivate reluctant readers. With a focus on school libraries, Krashen, Lee and McQuillan (2012) emphasized how school libraries are the main establishment for all the books in a school, which allows for the importance of integration of AR in the school library.

<p style="text-align:center">School Libraries' New Purpose</p>

Ross and Furno (2011) concluded that school libraries can no longer be a place filled with books, but they need to be a place that fits into the larger framework of the school's curriculum. van Arnham and Spiller (2014) also suggested that the library must be the place that is the main support system for collaboration, research, reading and writing. Ross and Furno found that for libraries to stay relevant in today's society, school libraries must incorporate technology. Adams, Cummins and Johnson (2012) reported in the Horizon report that Augmented Reality will be a new area for school libraries to develop. Hahn (2012) showed how

AR in a university library can change the collection immediately, based on a user's needs, and offer a new perspective to an older collection of books.

School libraries can help engage students with reading for pleasure. Through studies and research, Krashen (1993), Gurian and Stevens (2005), and Boltz (2007) all suggested that school libraries need to implement more graphic novels and comic books to engage reluctant readers. Gurian and Stevens (2005), Allyn (2011), and Brinda (2011) found that boys are spatial learners when they studied boys' motivation to read. The researchers discovered that boys prefer science fiction and graphic novels when reading for pleasure. However, Greyson (2007), Griffith (2010), and Moeller (2011) would argue with their research, noting that girls are just as adaptive to comic books and graphic novels. It can be concluded that both boys and girls would enjoy non-traditional written formats. Brinda (2011); Boltz (2007); and von Sprecken, Kim and Krashen (2000) concluded that if students are not allowed to self-select their own reading materials, the effect will cause the students to disengage from reading. Thompson (2007), Griffith (2010), Allyn (2011), and Brinda (2011) learned that teachers are too unfamiliar with comic books, graphic novels and science fiction to make book recommendations, which poses the problem of assisting students with books that peak all students' interest.

Boltz (2007), Brinda (2011), and von Sprecken and Krashen (2000) concluded that the goal is to engage the reluctant reader to self-select a book and read for pleasure. Fellerer (2009), Mulch (2010), Hahn (2012), Whitchurch (2011), Brown and Green (2012), and Whittingham et al. (2013) have shown their studies had positive gains with students using new technology tools, such as audiobooks, QR codes and Playaways. Holum and Gahala (2001) has stated that technology is beneficial when combined with reading. Miller (2009); Harrison (2012); Whittingham et al. (2013); Stoller et al. (2013); Meredith (2014); Pittman and Honchell (2014)

show that AR is an extension tool that could possibly give more students an option to find books, which could lead to self-selected reading for pleasure in the future.

Augmented Reality has proven successful in other sectors of society. Billinghurst (2002), Billinghurst and Kato (2002), and Brill and Park (2008) have shown evidence that when a user moves their tablet or phone camera over an identified object (street sign, painting or almost any object), new 3D AR images pop up and provide more information to the user.

Schmalstieg (2001) stated that AR was developed to increase productivity in the real world. For example, Kipper and Rampolla (2013) explain how the first down line in a televised football game is an AR line. Fighter pilots use AR while flying jet planes to see their ammunition, fuel, and other data about the plane on the cockpit window. Disney Parks (2014) and Aurasma (2015) joined together to offer Disney World guests, during Star Wars' weekend, an experience where many objects in the parks come to life with AR using the Aursma app. Ross and Furno (2011) and Hahn (2012) have used AR in the library to show relevance to the real world. If AR could be used in a school library with books linked to book trailers on YouTube or 3D images, AR could assist students in self-selecting books toward their interests and/or relevant to their lives.

Augmented Reality has been successfully used in the school libraries over the last four years. Chen and Tsai (2012) used AR in a school library in Taiwan. They found that using AR for teaching students the basic library classification system, over a librarian's traditional instruction, was very useful because of student engagement. Actually, AR could help make up for a librarian's weaknesses. Hahn (2012) studied AR use with research as a resource for college undergraduate students to check out books and as a wayfinding (guide) to books in a university school library. Murphy (2012) used AR with library signage and shelving, which helped students

find specialty areas of the library. Meredith (2014) used an AR app that acts as a readers' advisor and suggested books based on a reader's habits. Feltz (2014) recently conducted a mobile learning environment in a library, and the results showed increase checking out of books. All of these studies were quantitative and used various library settings, but a study can help AR research by explaining why reluctant readers engage in using an AR system to find books.

In the K-12 classroom environment, Billinghurst (2002), Brill and Park (2008), and Chang and Liu (2012) have experimented using textbooks with AR. The students were able to see graphs, videos, and animated displays throughout a textbook. Brill and Park (2008) provided a study that showed if a child is in a traditional classroom with a teacher or at home in an online asynchronous environment, a child can make the content come to 3D life. Billinghurst found that students are able to collaborate and learn in an artificial world the same as they would in a traditional classroom.

Dünser (2008) conducted a study using AR tools to engage low ability primary school readers. Although the study did not produce positive results over higher ability primary school readers, the study proved that all students were highly engaged in the AR books. The same results were found in studies by Billinghurst and Kato (2002), Dünser and Hornecker (2007), and Brill and Park (2008) in that learners enjoyed the experience and were engaged longer with AR.

Augmented Reality could be a factor or tool to help reluctant readers to read for pleasure. Krashen (1993), Ujiie and Krashen (1996), Jenkins (2009), and Allyn (2011) showed that a child's selection of reading material is critical to the success of reading for pleasure. With the research and knowledge of free voluntary reading, any tool to engage reluctant readers and promote lifelong reading should be considered. Billinghurst (2002) and Billinghurst and Kato (2002) agree that AR is a great benefit to our educational society, but there must be more

research on the design, development, implementation and evaluation of AR use in the K-12 and postsecondary levels of education.

Wolfson (2008) and Whittingham et al. (2013) focused on audiobooks to help struggling readers increase reading skills and engagement in reading. The pre-study interview and post-study interview revealed that students did not have access to different types of reading materials. Whittingham et al. (2013) found that student growth through using audiobooks went from -1.48 mean in the pre-interview to a 1.29 mean score in the post-interview. The growth showed that students must have different options to find materials within their school libraries. Brill and Park (2008), Wolfson (2008), Law and Simon (2010), Walsh (2010), and Hahn (2012) showed QR codes and audiobooks were a fun and interactive way to peak students' interest in books. Additionally, AR could offer the second step of a visual stimulate to a student's interest in books. Whittingham et al. (2013) and Krashen (2014) stated that if the libraries are not meeting the demand for readers in the future, then they are failing students. As evidenced by the research, AR could possibly help reluctant readers engage with our school libraries in new ways and find books they self-select to read for pleasure.

Statement of the Problem

AR has been proven successful in K-12 classrooms, university libraries, and in many different parts of everyday society. Whittingham et al. (2013) concluded that the public education system has the ability to offer students eBooks, audiobooks, and other great tools to engage students in reading, learning, and the school library. Dünser and Hornecker (2007); Di Serio, Ibanez and Kloos (2013); Mahadzir and Phung (2013); and Wu, Lee, Chang and Liang (2013) identified that many libraries have brought in gaming systems to entice and entertain

students in the library environment. With all the new technology being engrained in today's library system with high success, AR could bring excitement, engagement, and interaction with the real world. The current study examined if AR can be a tool to engage reluctant readers to read for pleasure in a high school library.

Secondly, this study addressed whether AR is able to help reluctant readers self-select books in the school library. von Sprecken and Krashen (1998) discovered that a student could be a lifelong reader, if the student, as a reader, has enough positive experiences with reading. As stated, Thompson (2007) and Brinda (2011) learned that some teachers may not have the expertise to recommend different types of books for reluctant readers'. Ujiie and Krashen (1996), von Sprecken and Krashen (1998), Boltz (2007), and Brinda (2011) identified that there is a need to engage students in reading. The current study sought to determine whether AR can provide a new tool to entice new readers or reluctant readers to read for pleasure.

Hahn (2016) said that Minerva, an app created to help university students find books in an undergraduate university library, could possibly bring in new students that would never use the library. AR has been explored and researched in the K-12 classroom and university libraries for basic library instruction, but it has not been researched with reluctant readers at a high school level in a school library.

Purpose of the Study

The purpose of this study was to investigate the engagement of high school aged reluctant readers with augmented reality apps in a school library setting. Harrison (2012) referenced that learning suffers when literacy declines. With reluctant readers, the possible negative effects of learning are too detrimental to their future. The role of the school library can be essential in

changing the mindset of reluctant high school aged readers. With its visual stimulation, AR could encourage more students to become interested in reading and, possibly, be a beneficial tool for school libraries.

Significance of the Study

This study can help with the selection of books for reluctant readers, while contributing to two major sectors of education: educational technology and library science. The findings from this study will not help every reluctant reader read for pleasure, but the findings have the possibility to help some reluctant readers through encouragement in self-selected reading. School libraries are struggling to find relevance in today's digital world as more books become digital. Educational technology, along with school libraries, can help drive some reluctant readers to use technology to find books on topics of interest.

The high school ages of 14 to18 years have not been studied extensively in conjunction with AR, with reluctant readers, or with school libraries. Billinghurst and Kato (2002), Dünser and Hornecker (2007), and Brill and Park (2008) all studied low socio-economic or primary aged students, but not high school aged students. Other studies focused on highly engaged readers or academically successful students, such as Kang (2015), who investigated AR with STEM students. The current study examined the relevance of AR on high school level reluctant readers in a school library setting.

Chen and Tsai (2012) found success explaining the basic Chinese classification system to students.in a school library in Taiwan. Hahn (2008, 2012) discovered success in a university library. In Mulch's (2014) study, one librarian remarked about the excitement the students felt about their freedom and opportunity for exploration rather than a lecture from him. Ross (2011)

showed that when using a clicker system like a cellphone, faculty received an 83% approval rating and 6% increase in attendance by students. With the success that has been shown in previous school library studies, there has not been a published study about AR being used to engage reluctant readers with self-selected reading to help them read for pleasure in a high school library.

AR has the potential to help every reluctant reader turn a bookshelf into a visual simulation of online book trailers, YouTube reviews, 3D images, and, possibly, 3D animated images. In a face-to-face interview, Krashen (2013) talked about the cost of technology for low socioeconomic populations and found that most students will still read and be engaged by traditional books. Krashen (2013) felt that until the price of eReaders was more affordable, the educational system must find ways to engage readers with traditional books. He continued to express a need for technology to help engage students. With the affordability and mobility of the AR apps and book trailers' availability to be attached to books, AR could be a part of the movement to help students read for pleasure.

<div align="center">Research Questions</div>

Audiobooks, QR codes, and Kindles are new technology tools being introduced into the school library system. AR could be a successful tool, among other successful technology tools, to be implemented into the school library system to help reluctant readers. The research questions were as follows:

1. What are the differences of engagement in finding books to read among reluctant high school level readers before and after using an Augmented Reality tool?

2. How do reluctant high school level readers find books that engage their interest in using an Augmented Reality tool?

Theoretical Framework

Keller (1979, 1987) created the Attention, Relevance, Confidence and Satisfaction (ARCS) model, which is based on the engagement of a learner, that is a person's inputs, outputs and environmental influences. In the current study, relevance was the theoretical framework that was used to study the seven high school level reluctant readers. Keller (2009) stated relevance is a powerful factor in student motivation to learn. The usage of AR did depend on relevance, as the seven high school level reluctant readers did want to know why they should put their effort into using the augmented reality tools. The outcome was dependent on the students finding relevant reading materials that interested them. The same question was answered by the seven high school level reluctant readers over their school's quarter semester (nine weeks) to study if AR could help them find books that matched their interests, as the AR apps and books found were relevant to their lives. During the study, more questions were added interview-by-interview, drawing from the last interview with the seven high school level reluctant readers for clarification, member checking, and gathering of additional data for use in future articles.

Keller (2010) developed three sub categories under relevance: that the learner must have goal orientation, motive matching, and familiarity. All three subcategories were important to this study. In goal orientation, Keller (2010) stated that learners are engaged to learn if the new knowledge will help them achieve their goal. In the current study, the goal was that AR could help these seven reluctant readers find reading materials that interested them. The seven high school level reluctant readers were given time over the nine week quarter semester to engage

with the AR apps and the books they found. With the AR system, the students had the ability to gain new knowledge, as Keller (2010) suggested, to engage through YouTube book reviews, author reviews, and many other 3D items through their cellphone apps. Also, the goal was that reluctant readers would find the genres and sub-genres that most interested them.

The second sub category that Keller (2010) identified is motive matching, which states that some learners are independent and need to set goals for themselves. Rodrigo et al. (2007) stated that reading for pleasure must start at a younger age, as their research on adults showed an inability to read for pleasure as adults. Ujite and Krashen (1996), Sprecken and Krashen (1998), Boltz (2007), and Brinda (2011) concluded that the main focus of reading for pleasure is self-selection of reading material by the student. AR allows a student to be an independent learner and to find relevant material to self-select to read for pleasure. The reluctant readers were given instructions on how to use the AR apps, but they were independent in how they used the app and the types of books they discovered.

Ujiie and Krashen (1996) realized schools must allow students to have a choice of reading materials, and Krashen et al. (2012) discovered more access and a variety of reading materials would make better readers. Sprecken and Krashen (2008) learned that traditional methods of teachers providing teacher-selected books to the students produced only an 80% on-task reading rate during SSR time. Sprecken and Krashen stated that self-selection is the key to helping reluctant readers engage in reading for pleasure.

The last sub-category by Keller (2010) is familiarity, which states that learners want some connection to the material they are using. Ryan and Deci (2000) stated that a person has to be inspired and motivated to do something intrinsically or extrinsically. AR is a new technology and gave the seven high school level reluctant readers a connection of using their cellphones and

3D technology to connect to reading. Billinghurst (2002), Brill and Park (2008), Chang and Liu (2012), Chen and Tsai (2012), and Seifert and Tshuva (2013) agreed that AR must have real world application. Blagg (2009) compared two major AR studies and found that AR allows low socioeconomic populations to have real world experiences outside of their neighborhoods, such as viewing a virtual museum right from their cellphones. There is a difference between VR (Virtual Reality) and AR (Augmented Reality). AR is applied to the real world that surrounds the reluctant readers. VR creates a virtual book, whereas AR allows existing books to be filled with many virtual objects to engage them into reading for pleasure. The books are the real reading materials and, hopefully, engage the reluctant readers to read for pleasure.

Yuen, Yaoyueneyong, and Johnson (2011) and Branson and Thomson (2013) found that the U.S. military has used AR technologies in its school programs to connect learners to the real world, just like as Brill and Park (2008) and Dunleavy and Mitchell (2009) provided similar research with public school students. AR gives reluctant readers the ability to find books and other materials that might peak their interests and to reward them intrinsically to continue to find other books they might enjoy. The goal was that reluctant readers could identify relevance in the AR apps to find books that might be interesting for reading for pleasure.

<div align="center">Definition of Terms</div>

Augmented Reality (AR) **-** AR takes 3D virtual objects and combines them in a real world environment (Azuma, 1997; Hahn, 2012). Azuma (1997) wrote that augmented reality systems "have the following three characteristics: 1) Combines real and virtual, 2) Interactive in real time, 3) Registered in 3-D" (p. 2). For example, a coloring book with a mobile device can be

brought to life, so the image is now 3D (Color Alive). Yuen et al. (2011) described AR as digital overlays in the real world in which VR (Virtual Reality) is a total digital world.

Reluctant readers - As defined many times by Krashen (2003; 2005; 2009; 2013), a reluctant reader is a person who does not conform to traditional teaching methods or rote learning. During silent reading time, these readers are not challenged to read anything, which hurts their academic growth (Boltz, 2007; Brinda, 2011; Sprecken & Krashen, 2000).

Self-selected Reading **-** Students are allowed to choose the reading material without required direction from the teacher or school librarian. Students are allowed to pick their own genre without influence from teachers or parents (Allyn, 2011; Krashen, 1993, 1995, 2006; Jenkins, 2009; Whitmire, 2010).

Sustained silent reading (SSR) **-** Students are allowed to read whatever they enjoy reading and there is no accountability (tests, debriefing, blogging or assignments) (Allyn, 2011; Krashen, 1993, 1995, 2006; Jenkins, 2009; Whitmire, 2010).

<div align="center">Summary</div>

Self-selected reading is an issue for students and teachers, as both are uninformed of what reluctant readers need to be successful. Krashen (1993, 1995, 2006, 2013) as did Daniels and Steres (2011), Harrison (2012), and Krashen et al. (2012) studied sustained silent reading and found that students must have self-selected books to read for pleasure. However, Thompson (2007), Griffith (2010), Allyn (2011), and Brinda (2011) expressed their concerns that teachers cannot make recommendations of certain genres of books because of their limited background in fiction and nonfiction books.

To address this problem of self-selection of books to help students read for pleasure, AR could be a tool to help students self-select books, especially books that teachers cannot recommend. Dunleavy and Mitchell (2009), Walsh (2010), Hahn (2012), and Whittingham et al. (2013) emphasized the success of audiobooks and other tools to help peak students' interest in learning and/or reading. Billinghurst (2002), Brill and Park (2008), Walsh (2010), Hahn (2012), and Billinghurst and Kato (2002) identified the benefits of Augmented Reality on learning. AR's engagement of reluctant readers was the goal of this study, as AR could be the tool to help reluctant readers find relevance in reading for pleasure.

CHAPTER 2

REVIEW OF THE LITERATURE

Augmented Reality (AR) is new to the education field, and researchers such as Chang

and Liu (2012) and Mahadzir and Phung (2012) admitted immediately that this area has not been

extensively explored. With technology entering the education field within the last 20 years

(Johnson, Smith, Willis, Levine, & Haywood, 201; 1Li, 2010) as a main or a supplemental tool

for learning, AR is one of the newest unexplored tools, especially on the effects to learning

(Dunleavy & Dede, 2004). With the exceptions of Chang and Liu (2012) and Hahn (2012), the

effects of using AR in a library setting have been not been academically researched. In this

literature review, researchers such as Dunleavy and Mitchell (2009), Law and Simon (2010),

Walsh (2010), Whitchurch (2011), Brown and Green (2012), Hahn (2012), and Whittingham et

al. (2013) explain how QR codes and audiobooks have engaged library patrons with new

technology. Brill and Park (2008) and Wu et al. (2013) discovered that students love new

technology because it simulates real-life video games and opens new possibilities for teaching

and learning. Chen and Tsai (2012) stated that budget cuts could push education to find new

ways to educate students but, at the same time, engage them in learning in a way that will

enhance their learning over traditional methods.

Whittingham et al. (2013) researched student engagement using audiobooks to increase reading among students. Wu et al.'s (2013) qualitative study discovered that students were so immersed in their AR tool that it was hard to bring students back to the reality of the classroom. Dunleavy and Dede (2014) found over 10 years ago that AR could be a transformative tool for changing teaching and learning.

With school libraries supporting teaching and learning, AR has been studied in different ways to find its relevance in the library. Chen and Tsai (2012) analyzed certain areas of basic library instruction for their students in Taiwan. They wanted to see if students would learn the same basic library skills as traditional methods of a live librarian as they introduced students to the library classification system. Chen and observed that students excelled with AR in memory and application of the Chinese library classification system, but they needed reinforcement for comprehension. Whittingham et al. (2013) discovered that audiobooks in the library increased comprehension, vocabulary, skills, and students' attitudes toward reading. Two different tools for two different purposes, but both showed very positive engagement for students.

Billinghurst and Kato (2002), Dünser and Hornecker (2007), and Brill and Park (2008) studied primary aged students' usage of AR and found high engagement. All three studies discovered that almost of the all students found AR fun and interesting, which allowed them to be engaged in the AR application longer. Hahn (2016) explained that at the university level, AR could bring in students to the library who may have felt the library was relevant to them. For example, Hahn (2016) stated, a computer science student can do everything online, but with AR, they can discover new items in the university's library.

Technology Tools

Krashen (2013) explained that educational technology has changed the face of technology, education, and the library. Reading has been transformed with iPads, Kindles, iPhones, and many other devices and applications. The problem we are seeing as a nation is getting reluctant readers interested in reading for pleasure. Krashen (1993, 1996, 2003), Ujiie and Krashen (1996), Rodrigo et al. (2007), Brinda (2011), Pittman and Honchell (2013), and Whittingham et al. (2013) found that if students read for pleasure, it does increase comprehension so students understand higher level vocabulary and harder concepts in their learning. With the goal of motivating readers, Krashen (1993, 1996, 2003), Ujiie and Krashen (1996), Rodrigo et al. (2007), Brinda (2011), Pittman and Honchell (2013), and Whittingham et al. (2013) confirmed electronic reading tools, such as audiobooks, can engage students in reading. Whittingham et al. (2013) used audiobooks with students and achieved great success with struggling readers increasing their reading skills and engagement in reading.

Wu et al. (2013) discovered negative effects on learning, such as low student engagement. The reason for the negative effects was attributed to the teachers' use of the new tools, which in turn could not teach the AR skills to the students. Clarke-Midura, Dede, and Norton (2011) added that a designer's perspective of AR can be much different than a teacher's perspective of usage in the classroom. Dunleavy and Dede (2014) cited that using AR in the classroom can be almost as difficult as a teacher arranging a field trip. Perry, Kloper, Norton, Sutch, Sanford and Facer (2008) examined AR at a zoo with students, in that the students loved the movement and interaction AR had to offer. But if not designed correctly, AR can cause confusion for the teacher and the students. Also, if instructions are missed or misunderstood, the students' learning will not excel. In addition, Dunleavy and Dede (2014) stated that the biggest

negative factor to AR in education is that students, even academically high achieving students, cannot apply what they have learned outside of the AR simulation. Dunleavy and Dede (2014) later mentioned that with the educational environment moving to a one-to-one environment, the education field is looking for more technology teaching tools. Dunleavy and Dede stated that technology should be a supporting tool for teacher instruction. There were limited studies outside of classroom usage of AR, but the school library is an extension of the classroom. The school librarian has more flexibility with the use and relevance of AR and its application in the school library.

Ross and Furno (2011), van Arnham and Spiller (2014), and Kang (2015) stressed that school libraries must have technology to stay relevant in today's society. Rodgers (2014) achieved success with boys and their reading when applying the latest technologies, such as blogs, websites, avatars, podcasts, social networking and other tools, to help drive students toward reading for enjoyment. Martens (2012) and Meredith (2014) explained that books selected for students are based on browsing habits and not search strategies used by most libraries today. Meredith (2014) discovered that most school libraries are set up for a text-heavy and high vocabulary environment.

In Dunleavy and Mitchell's (2009) study, they used a federal grant and the help of the University of Wisconsin to create their study. Slowly, some companies, such as Aurasma, have begun to make free user-friendly AR technology for everyone to use with a regular cellphone. Krashen (2013) stated that once technology is affordable for low socioeconomic schools, more schools will be able to engage reluctant readers in school libraries.

Walsh (2010) and Kroeber (2010), Whitchurch (2011,) and Brown and Green (2012) found that most students have phones with an integrated camera that can help them scan a QR

code. Bromley (2012) and Larson (2012) found that technology could assist educators with reading instruction. With reading being the main focus of a library system, AR could be very beneficial to a school library. Hahn (2012) and Renner (2014) found that AR applications can deliver an engaging and interactive information experience.

<center>Sustained Silent Reading</center>

Daniels and Steres (2011), Harrison (2012), and Krashen et al. (2012) clarified that Sustained Silent Reading (SSR) has been built from research that students need to read for pleasure during the school day. With SSR, during the school day or during the week, students are given time to read for pleasure at school. von Sprecken and Krashen (1998) explained that the one problem that has risen during SSR is with reluctant readers. Students are not allowed to self-select their reading materials. von Sprecken and Krashen's (1998) results revealed that even if the teacher did not model reading, students were not allowed to bring their own book and/or students were given a limited selection of reading materials. Ujite and Krashen (1996), von Sprecken and Krashen (1998), Boltz (2007) and Brinda (2011) found SSR is highly successful with most students, but they concluded that students should be allowed to self-select their books rather than being given reading materials.

Daniels and Steres (2011), Harrison (2012), and Krashen et al. (2012) concluded that given SSR and the need for students to self-select their reading materials, schools must be dedicated to the enjoyment of reading. Whittingham et al. (2013) identified that students are different types of learners and some may enjoy audiobooks, but Ujite and Krashen (1996), von Sprecken and Krashen (1998), Boltz (2007), and Brinda (2011) found that others may be interested in a visual simulation to engage them in a book.

Augmented Reality

AR could be used to encourage engagement of reading in school libraries, as Franklin (2011) noted, we are at the tipping point with mobile technology. Franklin found that students' lives will be immersed in virtual worlds and augmented reality in the future. Yuenet al. (2011), Whittingham et al. (2013), and Mahadzir and Phung (2013) found that audiobooks and AR pop-up books for students have shown positive results on their populations. Dunleavy and Mitchell (2012) and Kang (2015) studied AR technologies of students' high interest in mobile devices. Brill and Park (2008), Blagg (2009), Annetta et al. (2012), and Burton et al. (2012) discovered that cellphones are being implemented in classrooms, have helped with differentiated instruction, and have created new learning opportunities. Chen and Tsai (2012) suggested that some students may still prefer traditional methods, but new tools can encourage unmotivated students.

Dunleavy and Mitchell (2012) created an application called *Alien Contact* in which students used GPS and a reality world to solve real-life educational problems. *Alien Contact* showed high student engagement in an urban, elementary classroom. The students became so engaged they lost sense of the real world. In Dunleavy and Mitchell (2012)'s qualitative study, *Alien Contact* displayed the highest engagement for students and teachers. Brill and Park (2008), Yuen et al. (2011) and Chang and Liu (2012) discovered the same high engagement with audiobooks, textbooks with AR technology, and pop-up AR books.

Brill and Park (2008) and Chang and Liu (2012) agreed that AR could bring textbooks to 3D life. Students are able to see graphs, videos and animated displays throughout a textbook. If a child is in a traditional classroom with a teacher or at home in an online asynchronous environment, a child can make the content come to 3D life. Students can communicate in a 3D augmented reality world just as they would in a traditional classroom.

Face-to-face communication and collaboration is a vital part of the traditional classroom, but can it be accomplished in the 3D augmented reality world? Brill and Park (2008), Dunleavy and Mitchell (2009), and Wu et al. (2013) discovered that students could be successful with communication, when using AR technologies. Dunleavy and Mitchell (2009) stated that students could communicate in real and virtual worlds, increasing every students' opportunities and options for learning.

Dunleavy and Mitchell (2009) noted that the unmotivated students in their AR study seem to have a new spark of interest. Most studies do not show the socio-economic status, racial makeup, or achievement level of their students, but in Dunleavy and Mitchell's study, it was highly noted that lower socioeconomic students showed a high engagement with their AR tool. Dunleavy and Mitchell found that the affordability of AR technology was too expensive for lower socioeconomic districts, although AR technology showed high success in an urban setting.

Billinghurst and Kato (2002), Dünser and Hornecker (2007), Brill and Park (2008), and Seifert and Tshuva (2013) endorsed AR technologies by supporting the student interaction between reality and augmented reality. They agreed that AR should be equal to or exceed classroom instruction to be implemented as a tool in the classroom. Billinghurst and Kato (2002), Blagg (2009), Annetta et al. (2012), Burton et al. (2012), Piovesan et al. (2012), and Seifert and Tshuva (2013) suggested that AR can enhance reality, permit the user to communicate with other students in real time, and provide a relevant, meaningful, challenging, engaging tool for students. In no way, did the researchers suggest replacing teachers, but they did urge adding tools to assist the students with learning.

Blagg (2009), Annetta et al. (2012), Burton et al. (2012), and Latif (2012) discovered cellphone use showed great results when used with students and teachers and changed the

mindset of how cellphones can be used. Cellphones have been the main tool used to engage students with AR. Brill and Park (2009) used *Alien Contact* with students and found that the students were so engaged in the application, it was hard to bring them back to reality. Clemens, Purcell and Slkhuis (2013) learned that pre-service teachers were being taught augmented reality, as an affordable tool, in their pre-service programs.

Krashen's (1993, 1996, 2013) and Ramos and Krashen's (1998) studies have shown that students cannot learn as much from rote learning and worksheets as they can from reading any book for pleasure. Krashen (1993) discovered that language acquisition for English language learners could be captured faster through reading for pleasure. Krashen (2013) has spent much of his career proving that free voluntary reading is equally or more effective than direct instruction or assigned reading. With technology being a main factor with the new national Common Core Standards and the suggestions for visual reading, AR could be a way to help reluctant readers find interest in books. Dunleavy and Mitchell (2009) use of QR codes in the school library has already begun to be heavily researched, but AR offers a visual environment, such as a comic books or graphic novels compared to traditional books.

In a personal interview with Krashen (2013), he expressed a need for technology to help motivate students. Although the end result is the book the student has chosen, it is important to find the vehicle that gets him/her there. Other contributors to the voluntary reading movement are Pilgreen and Sprecken (1993), Boltz (2007), and Brinda (2011) have contributed to the research of reading for pleasure. von Sprecken et al. (2000), Boltz (2007), and Brinda (2011) have stated three main ideas backed with research. One main idea is that students should be allowed to self-select their own materials for reading for pleasure.

Augmented Reality is new to the education field, and researchers admit immediately that this area has not been explored deeply (Chang & Liu, 2012). Billinghurst (2002), and Brill and Park (2008) have extensive studies in AR being used in the educational setting. Although many others have started to explore and expand research in this area, Billinghurst (2002) and Brill and Park (2008) are pioneers in AR technology being used in the educational setting. Science classrooms were mainly studied with this technology, but it has now branched out to other educational settings and subject areas. Billinghurst (2002), Brill and Park (2008), Chang and Liu (2012), and Seifert and Tshuva (2013) have all studied AR and its use in the educational setting. Recently, it has been studied with elementary students, adults, and reading. Mahadzir and Phung (2013) started to study using AR with children's books for elementary students, and Chen and Tsai (2012) examined giving elementary students basic library instruction through AR technologies. Both of these studies showed success. None of the researchers suggested replacing a teacher with AR technologies, but most researchers felt AR technology could be a successful tool to motivate reluctant readers.

Billinghurst (2002) has led the way since the early 1990s, when AR in education was in its infancy. Many other AR experts have started to explore research based on Billinghurst's (2002) and Brill and Park's (2008) findings. Seifert and Tshuva (2013) started to bridge the gap of motivation of students and AR technologies, which is uniting the subject of education and AR.

Di Serio et al. (2013) and Mahadzir and Phung (2013) had studied AR in the classroom but never a school library. Based on the research using AR in the classroom, it has shown to be a positive and motivating tool for learning. Dunleavy and Mitchell (2009) found that AR mirrors many other 21st century tools being used to introduce students to the world of reading for pleasure.

Research is limited on AR technology in general and almost non-existent when looking at AR in a school library setting. AR has been studied in recent years, but at the classroom level. Sansone (2014) published a dissertation two years ago, entitled *Evaluating Educators' Perceived Value of Augmented Reality in the Classroom*, and many new studies are currently being conducted. Most of the research is based on classroom studies: Billinghurst (2002), Brill and Park (2008), Chang and Liu (2012), Chen and Tsai (2012), Seifert and Tshuva (2013) and Sansone (2014).

With the problem of reading for enjoyment, Krashen (1993, 1995, 2006), Whitmire (2010), Allyn (2011), Hahn (2012), Harrison (2012), Whittingham et al. (2013), and Pittman and Honchell (2014) explained that students must be allowed to self-select their books. With AR, they are allowed to self-select books through visual stimulants. School libraries and AR can help students with self-select books for reading success.

Conclusion

In conclusion, AR could be a tool to help reluctant readers self-select materials. None of the researchers suggested that a classroom teacher can be replaced, but Chen and Tsai (2012) and Hahn (2014) found that basic library instructions or guides might be more effective than instruction from an actual librarian. Kaufmann (2003) agreed that no tool will ever substitute a teacher or classroom instruction, but AR offers a new opportunities and possibilities for students.

With the issues that Daniels and Steres (2011), Harrison (2012), and Krashen et al. (2012) identified in regard to students being able to self-select their own reading materials and the engagement of reluctant readers, AR offers a new technology tool to help students be

successful in self-selecting their own materials. Hahn (2014) has shown success on the university level, which could be a forecast for the K-12 education level.

AR technology joins the two areas of face-to-face communication in a traditional classroom and an asynchronous online classroom environment. For example, students can not only learn about clouds from a textbook and teacher's instruction in a classroom, but they can use a mobile device and AR app to view a real cloud and see 3D labeling of clouds and their formations. Learning can be expanded outside of a classroom, as AR can interact with the real environment around a student.

Billinghurst (2002), Billinghurst and Kato (2002), Dünser and Hornecker (2007), Brill and Park (2008), Dünser (2008), Chang and Liu (2012), Chen and Tsai (2012), and Seifert and Tshuva (2013) found positive results for AR technology being used in the educational setting. AR could help a child self-select a book anywhere and at any time – for example, imagine a child holding up a cellphone or personal digital device to a book and a YouTube book trailer appears to engage a student in the content of that book. With AR technology, no longer does a student have to search through textbooks or search for information online, students can now point to the object and expand their knowledge about a book, subject or their learning beyond the sheet of paper in front of the student. AR could help solve a forty-year-old problem of reading for pleasur, by helping students find books that meet their interest level.

CHAPTER 3

STUDYING THE ENGAGEMENT OF AR WITH SEVEN HIGH SCHOOL LEVEL
RELUCTANT READERS

Methodology

The purpose of this study was to investigate if Augmented Reality (AR) apps could be a benefit and engage seven high school level reluctant readers in finding books to read for pleasure. Pilgreen and Krashen (1993), Yoon (2002), and Garan and DeVoogd (2008) have shown positive results of sustained silent reading within schools when students self-select their own books. To further that research while utilizing technology, this study sought to investigate whether AR apps could be a tool to help high school level reluctant readers find the books they would enjoy reading. Hahn and Zitron (2011) and Hahn (2012) found extraordinary success in engagement with augmented reality in a university library setting. In a personal interview, Hahn (2016) stated, "We should try any tool that helps our students be successful in the library" (J. Hahn, personal communication, May 14, 2016). In a personal interview with Krashen (2013), he expressed almost the same view as Hahn, but he felt that technology tools were too expensive to help all students. Augmented Reality is mostly free technology that could benefit children of all grade levels, socioeconomic levels, and educational settings, including school libraries. Both Krashen (2013) and Hahn (2016) felt school libraries could use AR as a tool to engage students in self-selected reading, which could lead to additional interest in reading for pleasure.

Qualitative Case Study

A qualitative case study was chosen as the method to collect data from seven high school level reluctant readers in regard to using AR apps for self-selected reading. Qualitative case study methodology allows the researcher to observe and analyze a small group of a population without limitations. Creswell and Maietta (2002) and Creswell (2013) explained that a qualitative study does not constrain the targeted population's views and allows for more detailed information. Yin (2014) added that qualitative case studies add more in-depth discussion between the participant and the researcher. In this qualitative case study on Augmented Reality apps, the study focused on in-depth discussion of Augmented Reality apps, how the seven high school level reluctant readers were using them, and whether the AR apps did influence their reading for pleasure. Seidman (1998), Patton (2002), and Creswell (2005) stated that qualitative research studies are intended to explore issues, provide a deeper understanding of the topic being studied, and identify main themes from the data that were gathered. Strauss (1987), Strauss and Corbin (1994), Creswell and Plano Clark (2011), and Creswell (2013) established that the data gathered in a qualitative case study can be analyzed for common themes and ideas. Strauss and Corbin (1998) explained that qualitative research will allow a researcher to explore a phenomenon that cannot be obtained through other research methods.

By using a qualitative case study approach, the seven high school level reluctant readers were able to answer freely without parameters to their engagement with the AR apps or the relevance of using the AR apps to read for pleasure. With a qualitative case study, the seven high school level reluctant readers explained how the Augmented Reality apps interested them and were relevant to their reading experiences. They described successes or failures generated when

reading for pleasure and explained how they connected to the reading materials. Creswell (2005) stated that a qualitative case study should find a meaning rather than a result.

A qualitative study allowed the seven high school level reluctant readers to explain if the AR apps helped them find relevant reading materials to read for pleasure. A qualitative study was preferable to a quantitative study method because it allowed for discussion about the data gathered in addition to review of the actual data points. In a qualitative study, the seven high school level reluctant readers were questioned about the AR apps and data points showed successes or failures. Additionally, the seven high school level reluctant readers explained how and why they were using the AR apps, what books had engaged them to read for pleasure, and their opinions of the AR apps. Seidman (1998), Patton (2002), Yin (2003), and Baxter and Jack (2008) stressed that qualitative case study research questions explore the how and why of the topic being studied.

The seven high school level reluctant readers were able to explain why the AR apps were a success or a failure for them over the school's quarter semester (nine weeks). The reluctant readers were asked the same eight questions (see Appendix F) each week. During the school's quarter semester, they or the researcher could expand on the questions to go more in-depth into a discussion on AR, a self-selected reading, and/or the AR tools. Finley and Ballinger (2006) explained that qualitative research allows the researcher to understand the data from the participants' viewpoint, feelings, and experiences.

This research was conducted as a qualitative case study because it contains seven separate cases. Flyvbjerg (2006) warned that a researcher cannot find relevance in one single case, as it could contain bias toward verification and be difficult to summarize research for a population based on a single case study. Yin (1989, 2003) stated that case study research grants

the ability for qualitative research to conduct cross-case analysis and replication to find the common themes of a qualitative case study. Herriott and Firestone (1983), Yin (2003), and Baxter and Jack (2008) explained that a qualitative case study allows confidence and a more robust, rigorous and reliable study. The cross-case analysis was important to this qualitative case study to look at the common themes produced by the seven high school level reluctant readers and whether the successes or challenges were replicated throughout the study. Although each of the readers' viewpoints were important, a set of common themes brought validity to the successes and failures of this study.

Sampling Strategy

The seven readers were chosen through purposive sampling from teachers and/or the school librarian's recommendations. At Sunwater High School, there was an established pool of students enrolled in a reading class or who were deemed reluctant readers by the reading coach and/or school librarian. The teachers and/or school librarian had observed the pool of students during sustained silent reading or their engagement with reading for pleasure over the first seven week of school. In this case study, with a purposive sampling, the teachers and/or school librarian were able to select seven high school level reluctant readers who would not engage in sustained silent reading, who expressed displeasure with the preferred reading material, who were considered a reluctant reader, who were placed in a reading strategies class and/or who refused to read during free reading time. Students within this pool, who were freshmen, were offered an opportunity to be in the study. All seven high school level reluctant readers with parental permission were allowed to be in this study. Northern Illinois University's IRB committee directed the researcher to have no contact with the students before parental

permission was given. The seven reluctant readers, along with many other students within the pool, were given the opportunity to be a part of this study. The researchers selected all students who had signed IRB forms to be a part of the study. The selection of the seven high school level reluctant readers were made by Sunwater High School's school librarian, reading coach, science teacher, and/or principal (see Appendices A and B).

Bernard (2002), Patton (2002), Creswell and Plano Clark (2011), and Etikan, Musa and Alkassim (2016) identified that purposive sampling is mainly used in qualitative studies, while convenience sampling is used mostly in quantitative studies. Bernard (2002) and Patton (2002) contended that researchers need participants who are willing to participate, engage in and communicate during the study. Bernard (2002) stated that in purposive sampling, participants are deliberately picked because they were described as reluctant readers and would provide a deeper understanding of how the AR could assist or hamper their reading for pleasure. The teachers and/or school librarian were certified by this Midwestern state, were considered highly qualified educators, and were capable of determining this purposive selection of the seven high school level reluctant readers in this qualitative case study because of their expertise in literacy as well as their extensive knowledge of the students' reading habits. Patton (2002) expressed that qualitative studies using purposive sampling must identify information-rich cases who are willing to communicate and participate to provide a deeper understanding to a qualitative study.

Maxwell (2005) explained that "particular settings, persons or activities [should be] selected deliberately to provide information that can't be gotten as well from other choices" (p. 88). Lincoln and Guba (1985) and Patton (1990) noted that identical results may not be reproduced, but the process should be repeatable and results analyzed without bias. This purposeful sample of seven high school level reluctant readers was chosen by their teachers

and/or the school librarian and given the chance to engage with the AR apps to self-select books to read for pleasure. The only expectation for these reluctant readers during this qualitative case study was for them to engage with the AR apps and to debrief with the researcher on how relevant AR apps were in helping them find books that interest them.

Site and Participants

The site chosen for this qualitative case study was Sunwater High School, located in the Midwest. The student racial makeup was 12.2% Caucasian American, 72.6% Hispanic American, 5.4% Asian American, and 6.1% African American (IIRC, 2016). The school population was over 2,600 students, and over 70% of the students were on free and reduced lunch and had close to an 80% graduation rate on a four-year plan (IIRC, 2016). According to the IIRC (2016), 73% of the freshmen class were on track to graduate.

The scope of this qualitative case study was limited to seven high school level reluctant readers of any grade level, although the purposeful sampling strategy produced all ninth graders for this study. Teachers and/or the school librarian identified students who would not engage in sustained silent reading, who expressed displeasure with the preferred reading material, who were considered a reluctant reader, who were placed in a reading strategies class and/or who refused to read during free reading time.

During the time of this qualitative case study, the school library was under renovation and the school librarian was unavailable for the beginning of this study. There was a temporary library in an auxiliary room that contained 2,000 books for all of Sunwater High School's student body to check out. The researcher created a library collection of 55 young adult books to sit separately from the student body's collection that were reserved for the seven reluctant readers,

as the more avid readers in the high school could have made the books unavailable for the participants during the study. Creswell (2005) stated that time and place are important for a qualitative case study. The scope of this study did not revolve around the availability of the school librarian or the school library's location, but the availability of the seven high school level reluctant readers for the nine weeks of observations and interviews to determine the successes and failures of the AR apps.

After Northern Illinois University's Institutional Review Board (IRB) finalized all consent forms for students under the age of 18 and students over the age of 18 (see Appendices A, B, C, D, and E), the IRB reviewer mandated that the researcher not have any direct contact with students until after the consent forms are signed. Many identified students were reluctant to bring back signed parental paperwork, as the researcher was unfamiliar to them. The researcher created a YouTube video for recruitment (Rush, 2016), which the selecting teachers showed to a pool of high school reluctant readers. This video was an indirect measure to recruit students and to build relationships with the pool of possible reluctant readers prior to their start in the study.

Initially, the seven high school level reluctant readers individually had an orientation interview with the researcher (see Appendix F). The seven high school level reluctant readers were asked to come to the principal's conference room for their first meeting with the researcher. The questions in Interview 1 were used for demographic data and allowed the researcher to observe if each high school reluctant reader would engage with the AR apps. The seven participants were given a 45 minute orientation, which included Interview 1 and a slideshow presentation about the study (Appendix I). The researcher asked about the students' continued interest in the study. If they agreed, a pseudonym name was selected by the student. Originally, the participants were to be given time to use the AR apps, but the Sunwater High School School

District blocks YouTube, including for staff usage. The students were able to start using the AR apps in Interview 2 due to these restrictions.

AR cannot exist without an app or program to deliver the content to an electronic device (smartphone, iPad, tablet or computing device). This study used two apps: Aurasma and LayAR. Those AR apps delivered the 3D content to the students. The AR apps are important, but the technological content behind the apps was extremely important to make the 3D experience occur.

Kroeker (2010), Mulch (2010), Walsh (2010), Bryne (2012), Hahn (2012), and van Arnham and Spiller (2014) had previously used Aurasma and/or LayAR for their research. The researcher used both apps for this study for this study for three main reasons. The first reason was that LayAR can be used by anyone with the downloaded app, whereas Aurasma requires a user with a downloaded app to follow its channel. This was later seen in the study, when one of the case study participants tried to scan books with the Aurasma app on his personal phone and the books did not produce any results. Unless the case study participant followed the researcher's channel, the AR connected book would not produce any results. The second reason to use two different apps was unfamiliarity with the school's web filtering system. Both apps experienced technical difficulties with the school's web filtering system. LayAR experienced problems with connecting to authors' twitter accounts and YouTube videos. Aurasma experienced the same difficulties with the YouTube videos and had to have each video uploaded to the Aurasma portal independently.

Lastly, LayAR is a fee-based system, whereas Aurasma is a free system. LayAR did allow books to be connected for free for one month (four weeks), but this study was over a nine week period. LayAR was used for six books and Aurasma was used for 49 books in the study.

Books attached with a 3D object were marked with an Aurasma (Figure 1) or LayAR sticker

(Figure 2).
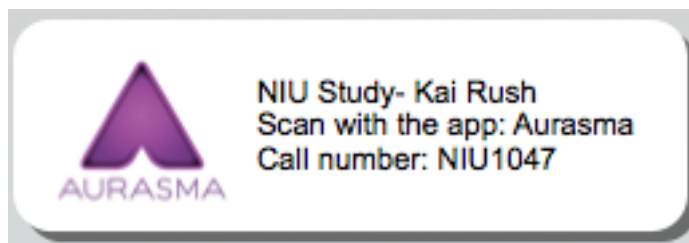
Figure 1. Aurasma control tag.
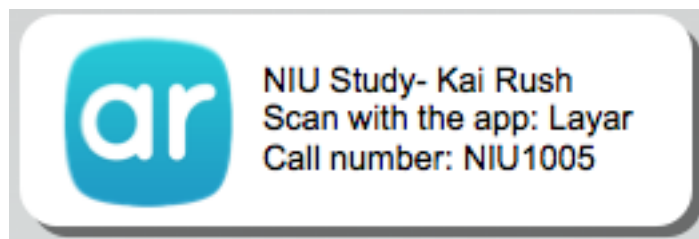
Figure 2. LayAR control number.

The Aurasma and LayAR apps were available in the iPhone Apple store, Google Play

store, and Android store, and were free of charge. LayAR granted permission to the researcher to

use LayAR for his study for two years. These apps allowed the researcher to create AR objects

that were scanned by the seven high school level reluctant readers on designated young adult

books that would appear in the school's library. The AR objects were limited to a 3D pictures

that represented the book (Figure 3), YouTube book trailers created by the authors or teen book

reviewers (Figure 4) and/or a clickable link to a website or book review on the book (Figure 5).

These 3D objects were pre-loaded by the researcher for each book in this study. Approximately

50 young adult books were used for this study, although the researcher had duplicate copies of

certain books. During the first six weeks of the study, the collection of books was brought with

the researcher and laid out in front of the students to scan with a designated iPad. During the last

three weeks of the study, 35 books were set up with a dedicated iPad in Sunwater High School's temporary school library.

Figure 3: 3D Image
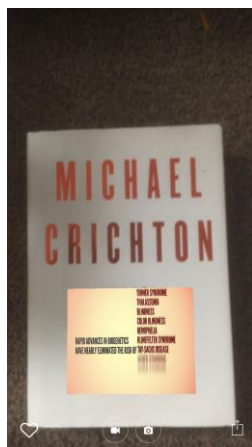
Figure 4: Book Trailer

Figure 5: Book review

During the school's quarter semester, the seven reluctant readers were interviewed every week and were able to provide answers to the same open-ended eight questions (Appendix F). Esterberg (2002) cautioned against using leading questions and closed-ended questions, which led to eight general open-ended questions. The eight questions showed the engagement each student had with the AR apps, the type of book(s) they had checked out, and the engagement they had with the reading material they had chosen or were reading.

The principal's conference room was used for the interviews and the book collection. The reluctant readers met with the researcher for 5 to 25 minute sessions once per week for the quarter semester. The students were asked to sit across the table from the researcher, the only variance is one high school reluctant reader (The Gaming Flaco) chose to sit directly next to the researcher after Interview 3.

The second data collection method came in the form of observations, which were recorded onto field notes. The researcher observed the reluctant readers three times during the quarter semester. The reluctant readers were observed twice directly using the AR apps with the researcher. Observation 3 was in the form of an indirect observation of voluntarily use of the AR apps in the school library during the last three weeks of the study.

The seven reluctant readers were asked to use their cellphones for this qualitative case study, but the researcher brought an iPad for the students to explore before their interview time. Cellphones were the best instrument for this study, as that is the device every student needed to view the AR on each book in a school library. Blagg (2009), Annetta et al. (2012), and Burton et al. (2012) agree that AR could expand the minds of students and teachers on how cellphones could be used and could help to give AR access to students of low socioeconomic status, even after the study has concluded.

<div align="center">Case Studies</div>

<div align="center">Case Study 1</div>

This student was chosen by a teacher who was a past County Teacher of the Year. This student was a freshman at Sunwater High School. The study was started October 7, 2016, and ended on December 9, 2016. He self- identified as The Gaming Flaco from his favorite game, and, at first, he was unable to pick a name and was later identified during the pre-interview and observation, as Student A. The student self-identified as a gamer and picked a name he goes by in games. The student is of Hispanic descent. He had a cellphone, but there were technical difficulties with YouTube and Wi-Fi issues throughout the school. He was asked to use the researcher's iPad.

Case Study 2

The student was chosen by a teacher who was a past County Teacher of the Year. He was a freshman at Sunwater High School. The study was started October 7, 2016 and ended on December 9, 2016. He was identified in the study as 117, the name chosen by the student from his favorite video game. The student is of Hispanic descent. 117 had a cellphone and used it during the study, after downloading Aurasma and LayAR. During the orientation, 117 expressed his joy at being in this study because he likes augmented reality. He immediately downloaded Aurasma and LayAR and wanted to scan the books presented in front of him.

Case Study 3

The student was chosen by a teacher who was a past County Teacher of the Year. This student was a freshman at Sunwater High School. The study was started October 7, 2016 and ended on December 9, 2016. He was identified in the study as Captain Underpants from one of his favorite comic books that he enjoys reading. The student is of Hispanic descent. Captain Underpants did not have a cellphone, so an iPad was provided by the researcher during their meetings.

Case Study 4

The student was chosen by a teacher who was a past County Teacher of the Year. This student was a freshman at Sunwater High School. The study was started October 7, 2016 and ended on December 9, 2016. She was identified in the study as Annabeth Chase from a character

from the Percy Jackson's book series. The student is of Hispanic descent. Annabeth Chase had a cellphone but chose to use the researcher's iPad to scan the books during their meetings.

Case Study 5

The student was chosen by the school's reading coach. This student was a freshman at Sunwater High School. The study was started October 7, 2016 and ended on December 9, 2016. He was identified in the study as Spiderman because that is his favorite comic book character. The student is of Hispanic descent. Spiderman had a cellphone but chose to use the researcher's iPad to scan the books during their meetings. Spiderman would put his cellphone in his locker during the school day and did not use it during the school day.

Case Study 6

The student was chosen by the school's reading coach. This student was a freshman at Sunwater High School. The study was started October 7, 2016, and ended on December 9, 2016. He was identified in the study as Percy Jackson because it is his favorite book series to read. The student is of Hispanic descent. Percy Jackson did not have a cellphone and chose to use the researcher's iPad to scan the books during their meetings. Percy Jackson was reluctant to be in the study, as he felt it would interfere with his academics. The researcher asked him for the most convenient time to call for him once a week, offering multiple days. Percy Jackson chose Fridays but wanted to be called during certain non-academic periods.

Case Study 7

The student The student was chosen by a teacher who was a past County Teacher of the Year. This student was a freshman at Sunwater High School. The study was started October 14, 2016, and ended on December 13, 2016. She was identified in the study as Rupi Kaur, the name of an author of a poetry book. During the pre-interview and orientation, she pulled out one of Rupi Kaur's books. She was unable to attend the first meeting, as the researcher called for her during lunch and she was unable to be located. While interviewing and observing the seven high school level reluctant readers, the researcher was unable to meet with Rupi Kaur and conduct a pre-interview and orientation with her. The researcher could have started the first interview and observation, but felt the protocol should stay in place that the first seven high school level reluctant readers went through.

The student is of Hispanic descent. Rupi Kaur did have a cellphone but was reluctant to use it during this study. Rupi Kaur chose to use the researcher's iPad to scan the books during their meetings. Rupi Kaur was reluctant to be in the study, but after talking to another participant in the study, she felt it was beneficial. Rupi Kaur's addition to this study was important since the original six participants were five males and one female freshman students. She was an essential part to adding a female's opinion to AR usage and to add more balance to the study.

Data Collection Methods

Table 1 illustrates the interview schedule that was followed for the nine weeks of the quarter semester.

Table 1

Sunwater High School Interview Schedule

Interview Schedule
Sunwater High School

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10
Orientation	October 7									
Interviews	October 7	October 14	October 21	October 27	Nov. 4	Nov. 11	Nov. 18	Nov. 22	Nov. 29	
Observations		October 14			Nov. 4		November 18 - December 9			

Orientation

During the orientation, the researcher met with each of the participants for 13-25 minutes. Each was shown the orientation presentation (Appendix H). Then the researcher used his phone and personal iPad to scan *Ready Player One* by Ernest Cline and *Monster* by Walter Dean Myers. Also, the researcher had an example with an orientation presentation (Appendix H). The seven reluctant readers watched the researcher scan the books. The researcher explained the technical difficulties and that the students would have to use the researcher's dedicated iPad unless the district allowed permission of YouTube. As the orientation concluded, the researcher asked background questions (Appendix I) to explore each reluctant readers' history and to check for engagement of the student to be in the study. Bernard (2002) expressed that researchers need participants who are willing to participate, engage, and communicate during the study. The orientation was important as a background study, but also to build rapport and communication with the seven reluctant readers.

LayAR failed numerous times throughout the study, and Aurasma would not have worked without an independent upload of each video. Reaffirming that Augmented Reality cannot work without the full functionality of the AR apps. At this time, the researcher could have used other AR apps, but they could be costly to implement and/or have the same problems these apps experienced. As the weeks progressed, if the AR apps failed during the study, the researcher reset the app and allowed the participants to continue to scan books or work on the AR apps' technical functionality before the next interview.

After the orientation, the cart of 55 AR-linked books were kept with the researcher, until week 7, when they were shelved separately in a room within Sunwater High School's temporary library. With Sunwater High School's limited book collection of 2,000 books, the more avid readers of the school could have possibly checked out the books deemed for the seven reluctant readers. Also, due to the use of a dedicated iPad and the high value of the iPad, the researcher was able to securely lock the iPad to a table within a private room. Each book was given a special tag that was recorded in an Excel sheet by Sunwater High School's librarian during the checkout process (see Figure 1 & Figure 2). The seven reluctant readers were allowed to explore and checkout any of the books during the last three weeks of the study directly through the school's librarian (see Appendix J). During the first six weeks, the reluctant readers were allowed to check out books from the researcher during the interview and observation periods. During the school's quarter semester, the seven participants were interviewed once each week and were allowed to explore any books, as the researcher brought all the books with him during the first six interviews. The participants were sent back to class after the orientation. Rupi Kaur was the only student who was not available during the initial orientation interview day. Her

orientation interview was combined with Observation 1 and Interview 2. Throughout this study, the orientation interview is referred to as Interview 1.

Interviews

Lincoln and Guba (1985); Emerson, Fretz and Shaw (1995); Stake (1995); Patton (1999); and Merriam (2002) stated that in a valid qualitative study, a researcher must use triangulation with two or more data collection methods to increase the credibility of the study. Yin (2014) and Patton (2002) expressed that triangulation (usage of multiple sources of evidence) strengthens a qualitative case study's findings. Yin (2014) noted that in a qualitative case study, "interviews are an essential source of case study evidence because most case studies are about human affairs or actions" (p. 113). In this study, the first triangulation method was in the form of interviews with the seven high school level reluctant readers every Friday (see Table 1). This study's focus was on the AR apps to influence reading for pleasure, which allowed for questions on sustained silent reading, how the students were reading the books they choose through the AR apps, and the progress they made with reading for pleasure.

The seven high school level reluctant readers met with the researcher once per week for 10 to 30 minutes during periods 1-4. The researcher called each student during their English, reading, or non-academic classes. The seven reluctant readers were asked the same questions (see Appendix F) every week during the nine weeks. In addition to the interview questions, the researcher and the participants engaged in a freeform dialogue about the study, the AR apps and/or their reading successes or difficulties. The seven were freshmen, which kept the nine interviews shorter than an adult interview would have been.

The seven high school level reluctant readers provided more detail about their reading experience and how they felt about academic issues, sustained silent reading, and the AR apps when allowed to have a freeform discussion with the researcher. Yin (2014) stated that a researcher should avoid reflexivity, which is where the interviewees would tell the researcher anything to make them happy. A deeper dialogue or conversation with each reluctant reader allowed the researcher to find out background information on each reluctant reader but also to verify their answers to the questions with background details.

Observations

The second triangulation method to establish validity to this study adopted the form of three observations during the nine weeks. Yin (2014) stated that direct observations will allow the researcher to see the action in real time for each case's context. Yin (2014) also noted that indirect observations allow a researcher "insightful into interpersonal behavior and motives" (p. 106). AR has not been heavily researched at the high school level, and the use of AR apps as a school library tool and case study has limited the field more. Lincoln and Guba (1985) asserted that prolonged engagement is important for the researcher to learn the culture of the school and school library, to build rapport with the school staff and most importantly, and to seek the phenomena of interest in using the AR apps in the school library. The observation tool chosen for this study was field notes, which allowed the researcher to document the behaviors and interests the seven high school level reluctant readers had with regard to the AR apps. Yin (2014) suggested that observations will offer the researcher additional information on his subjects, their environment, and the topic studied. Also Yin (2003) explained that through field notes, the researcher will be able to guide his questions for future interviews.

During Observations 1 and 2 (see Table 1), the seven reluctant readers were invited to meet with the researcher privately in a room in the school's temporary school library, in the principal's conference room, or in the guidance conference room. The setting was not securely private, as the researcher left one door open for the safety of the student and researcher. The seven high school level reluctant readers were called to meet with the researcher between 8:30 to 1:00 p.m. An interview preceded Observations 1 and 2 so the researcher could ask questions about what the students observed. The researcher did observe the participants' use of the two apps (LayAR and Aurasma), how long they looked for books, their engagement period with the AR apps of a selected book, and if they found books to check out. The researcher did not interact with the reluctant readers, but he provided assistance and instructions, if requested. If any of the students required assistance with the AR apps, it was noted in the field notes.

Observation 3 was conducted during the last three weeks of the study. The researcher worked with Sunwater High School's school librarian to establish a separate room for the study. Due to the high value of the iPad and the possibility of avid readers outside of the study wanting the books from the study, the 55 book collection was kept in a separate room (see Figure 6).

Figure 6: LayAR app using ready player one

Observation 1

The first observation was conducted during the second week of the study. Originally,

Observation 1 was to take place during the orientation, but technical difficulties, as noted in

Chapter 4, prevented the seven high school level reluctant readers from viewing the books.

During Observation 1, the participants were given the following instructions on the AR system:

> I have placed out all the books on the table. I would like you to take this iPad and view as
> many books as you like with the Aurasma or LayAR app. There are multiple features on
> each book for you to explore [the researcher showed them *Ready Player One* by Clive
> with the LayAR app and three features popped up- a YouTube book trailer, the author's
> website and a linkage to twitter to allow the student to tweet the author (Figure 6).] I am
> going to sit over here and watch you, but do not let me influence you. This is totally up to
> you on what you want to explore and for how long. Please do what you want to do,
> otherwise, it may hurt the research study.

All seven high school level reluctant readers were evaluated in Observation 1 from 7

minutes to 26 minutes. Interview 2 took place after Observation 1.

Figure 7: Penny Chic example

Observation 2

Observation 2 took place during Interview 5. The books were set up in the same manner as Observation 1 and the participants were given the same instructions: "I have placed four books in front of you. You can view any book on the table, but I would like you to view the four books in front of you."

The four books were *Tap Out* (Figure 5), *The Book of the Unknown Americans*, *Penny Chic* (Figure 7) and *Hush, Hush*. 117 enjoyed *Hush, Hush*, which was then replaced by *Next* by Michael Crichton. Each book had a different feature that would guide the researcher's questions in Interviews 3 and 4. *Tap Out* had a book review from Goodreads.com attached by the Aurasma app; *The Book of the Unknown Americans* had three features attached by LayAR, which included a YouTube book trailer, the author's website, and a link to Twitter to allow the student to tweet the author. *Penny Chic*, *Hush, Hush* and *Next* had an uploaded YouTube book trailer attached by Aurasma. Observation 2 was 5 minutes to 19 minutes, depending on how long each reluctant reader wanted to scan books and view the attached AR item.

Observation 3

The third set of observations were conducted over a three week period. An iPad and the books were setup in a private room in the temporary school. The private room was due to the library being a high traffic area, for the security of the iPad and for the privacy of the seven high school level reluctant readers in the study. The following instructions were given to the students, during Interviews 7 and 8:

> I have setup the AR system in the library with the books from the study and an iPad. All you have to do is ask the school librarian to allow you into the room to scan any book

you wish. She has a list of your names and will write down any books you wish to check out.

The researcher indirectly observed the students by asking in Interviews 7, 8 and 9 if they had visited the library (Appendix F). Also, the researcher conferred with the school's librarian about whether the seven high school level reluctant readers had asked to use the AR system and if any books were checked out. The school librarian was provided a record of the times the students visited the collection (Appendix J). The purpose of this independent, indirect observation was to gain information regarding whether the seven high school level reluctant readers engaged with the AR apps system independently. The first two observations were extrinsically motivated by meeting with the researcher, whereas Observation 3 was intrinsically motivated engagement. This observation is considered an indirect observation, as the researcher wanted to observe the results of the independent behavior with the AR apps in a school library. Stake (1975) and Lincoln and Guba (1985) both state that indirect observations can be as beneficial as direct observations.

Data Analysis

Lincoln and Guba (1985), Strauss and Corbin (1994), Patton (1999), Maxwell (2013), and Yin (2014) suggested using different methods for collecting data, known as triangulation, to make a stronger case. Although the interviews and observations are independent sources of evidence, Patton (2002) and Yin (2014) suggested that all sources of evidence in a qualitative case study be analyzed, summarized and evaluated to support a stronger case for the study. More importantly, Creswell (1995) and Maxwell (2005) directed researchers to immediately transcribe interviews at the conclusion of the interview. For this study, interview data were transcribed and analyzed immediately after collection. The observation data followed the same protocol, but had

separate coding categories, based on different information collected. Denzin and Lincoln (2000) expressed that data analysis in a qualitative case study should be a creative process, and Stake (1995) stressed that data analysis can begin at any time during the research process.

During the nine weeks, the researcher used Microsoft Onenote to conduct his interviews and observations with the students. Within Microsoft Onenote, the researcher used the audio recording feature. One of the seven high school level reluctant readers inquired about having a digital recorder on the table while responding to the answers. The researcher found an indirect method of recording the seven high school level reluctant readers, which did not impede the research.

Strauss (1987), Miles and Huberman (1994), Strauss and Corbin (1994), Esterberg (2002), and Maxwell (2013) noted that all data should be taken and coded in categories to find common themes (Appendix L). Creswell (2009) called this process *in vivo*, where a researcher places data into coded categories. In this study, coding categories were developed and common themes emerged, as the phenomena in the research began to be discovered. Miles and Huberman (1994) refer to repeating words and phrases called pattern coding, which reduces the list of codes to a smaller list known as analytical units. In this qualitative case study, 10 major categories were summarized into three major themes. As recommended by Strauss (1987), Strauss and Corbin (1994), and Maxwell (2013), all data were coded into common themes, which in the current study are reported in Chapter 4. Neuman (2003) explained that a researcher should develop findings into coding categories, report those findings and draw conclusions. In the qualitative data analysis chart (Appendix L), the process of the collection of data to common themes is shown throughout the study. Appendix L illustrates the trustworthiness of qualitative research, which will be discussed in the next section.

The computer program that assisted the researcher with organization and analysis of the data was Atlas.ti. Atlas.ti is a computer-based program that coded the recording of the seven high school level reluctant readers' responses and put those responses into common themes. Transcripts from Microsoft Onenote were saved as a PDF and uploaded to Atlas.ti. Yin (2014) recommended Atlas.ti as one of the three computer programs that should be used for a qualitative case study.

Trustworthiness of Qualitative Research

A qualitative case study should have produced the most accurate validity for this dissertation, as the seven high school level reluctant readers explained if the AR apps increased or decreased their relevance for engagement to read for pleasure. Data points from a quantitative study could have shown the self-efficacy for the AR apps but would have not shown the engagement or relevance the seven high school level reluctant readers had from using the AR apps. For example, a quantitative survey would have shown the seven high school level reluctant readers' self-efficacy but not their engagement over time or the relevance of the AR apps in their school lives. Strauss (1987) and Strauss and Corbin (1994) proposed that when using a qualitative study, compiling responses from the seven high school level reluctant readers could allow for common themes to be developed (Appendix L). Merriam (1998) and Bogden and Biklen (2003) explained that a qualitative case study allows for the research to be descriptive of the data and allows for an in-depth understanding of the contents of the research. Justification of using a qualitative case study is shown by Hartley (2004), who stated that a qualitative case study is very common throughout the education and social science fields since it allows tracking and observing human behavior.

In this qualitative case study, the researcher used a pilot study, interviews, observations and member checking to establish the trustworthiness of this study. Lincoln and Guba (1985) created four areas that must be met, when using a quantitative or qualitative study: establishing credibility, transferability, dependability and confirmability. Lincoln and Guba (1985) and Patton (1999) asserted that triangulation (credibility) is important, as stated in the data analysis section and the three forms of data collection sources, for a qualitative study. To meet the criteria of credibility and transferability, as suggested by Lincoln and Guba (1985), the seven high school level reluctant readers were interviewed and observed multiple times, and together we orally reviewed their answers after every interview. This allowed the researcher to gain an understanding of the school and temporary library's culture, allowed for prolonged engagement (credibility), and constructed an in-depth description of the seven high school level reluctant readers (transferability), school and AR apps' usage as well as reported the phenomena and common themes over the school's quarter.

Yin (2013) added that qualitative case studies "retain the holistic and meaningful characteristics of real-life events" (p. 2). Yin (2013) suggested that using case studies for educational research has helped to improve the educational system, such as in the current study that sought to engage reluctant readers in reading for pleasure using methods that are new to the educational system and school libraries. Strauss and Corbin (1993) and Yin (2013) noted the weakness of being able to reproduce the same results when conducting qualitative case study research due to the study of human behavior. To meet the criteria for dependability and confirmability, as suggested by Lincoln and Guba (1985), all field notes, interview records, video recordings and audio recordings are available for transparency and to establish an audit trail.

All field notes, interview records and audio recordings will be stored by the researcher for five years. All forms (Appendices E-H) were reviewed, screened and given clarity when dealing with students on the high school level.

<u>Member Checking</u>

Creswell (2005) and Yin (2014) stressed that researchers should have participants review transcripts after an interview to check that their words and meanings were recorded correctly. In this qualitative case study, the seven high school level reluctant readers received a transcribed copy of their personal interview from the week before to review and check for accuracy of their words, meanings and feelings. After the first transcript copy was given to all the seven high school level reluctant readers, the researcher observed that the students did not read the transcript or the transcript was left behind on the table. Since this qualitative case study was based on seven high school level reluctant readers, the researcher reviewed the seven high school level reluctant readers' answers orally with them at the following week's interview. The researcher used the following statement: "So last time you said you didn't visit the library?"

The seven high school level reluctant readers confirmed the answers or stated that the researcher had misinterpreted their answer, and he wrote the corrected answer on the transcript. When interviewing children (the seven high school level reluctant readers), Guba and Lincoln (1989) suggest that when using alternative methods for member checking.

Limitations

The limitation of using a qualitative case study methodology were minimal, in the practice of qualitative research, as the researcher used two methods of triangulation (interviews

and observations) and allowed the seven high school level reluctant readers to be self-chosen or chosen by Sunwater High School's certified staff. This qualitative case study measured seven high school level reluctant readers out of the 2,600 students within Sunwater High School's pool of students. Also, the school library and school librarian were unavailable for most or all of this study. Different results could have been possible with a traditional school library environment.

The researcher was able to identify seven high school level reluctant readers who had not engaged in reading for pleasure based on teachers' and/or the school librarian's observations or through self-selection. By studying seven separate cases in this qualitative case study, the researcher was able to look for similarities and differences among the seven cases, which would not be possible with a single case study or with quantitative research study. Instead of using a quantitative study to see if the students were engaging with the AR apps, a qualitative case study allowed the researcher to understand why the seven high school level reluctant readers were engaging with the AR apps in a school library. Also, the seven high school level reluctant readers were able to express their opinions of the genres/books they liked, the AR apps (LayAR and Aurasma), and if they discovered reading materials they enjoy reading.

Conclusion

This research, given its small sample of seven high school level reluctant readers, did not prove that AR will work in every school library or with every reluctant reader in the world. This qualitative case study explored the option that AR could enhance a school library or reluctant reader and offer a different option for students to select books to reading for pleasure. Maxwell (2013) noted that even a carefully chosen valid sample may not represent the typical population. The goal of this qualitative case study was to help high school reluctant readers read voluntarily,

which can limit any students' success at the elementary, middle, high school or college levels. Krashen (1993, 1995, 2006), Jenkins (2009), Whitmire (2010), and Allyn (2011) expressed that students must be able to self-select books if students are going to read for pleasure. Many times students find books they like from teachers and/or librarian's recommendations, word of mouth, blog recommendations, advertisements, and/or many other forms of suggestive resources. Augmented Reality adds another resource for high school reluctant readers to be able to find books they might enjoy reading. A qualitative case study helped determine if AR can be a beneficial tool to high school reluctant readers. As Hahn (2016) said in a personal interview, "Augmented Reality brings the students to the library, who may not be the traditional library patron. We should try any tool that helps students in a library" (J. Hahn, personal communication, May 14, 2016). If audiobooks, Playaways, QR codes, blogs and many other technology tools can help gear students toward reading, can AR be another tool to push students toward reading for pleasure? A student will have the ability to choose a book based on their preference using a tool to help them read for pleasure.

CHAPTER 4

RESULTS

The findings of this qualitative case study were considered based on seven individual cases and then grouped into common themes. Yin (2014) suggested that a researcher may organize a qualitative case study into separate chapters during the analysis of the data. In Chapter 4, each of the seven high school level reluctant readers was studied as individual cases and then compared to other cases to give the reader an understanding of the common themes that occurred.

In this qualitative case study, the finding were collected using a naturalistic case study approach (Yin, 2014); therefore, the seven high school level reluctant readers were in their familiar settings, Sunwater High School, over a school's quarter semester (9 weeks). With all seven high school level reluctant readers being under the age of 18 and high school students, their identities, the adults mentioned in the study, and the high school are protected by pseudonyms. Table 2 shows the intervention schedule for the study.

Table 2

Intervention Schedule

Week	Schedule	Participants	Intervention schedule*
1	Orientation, Interview #1	The Gaming Flaco, 117, Captain Underpants, Annabeth Chase, Spiderman, Percy Jackson	10-15 minutes orientation (Appendix L) 7-10 minutes interview (Appendix F)
2	Interview #2, Observation #1	The Gaming Flaco, 117, Annabeth Chase, Spiderman, Percy Jackson, Rupi Kaur	7 minutes orientation (Appendix L- Rupi Kaur only) 3-22 minutes observation 7-10 minutes interview (Appendix F)
3	Interview #3	The Gaming Flaco, 117, Captain Underpants, Annabeth Chase, Percy Jackson	1-3 minutes member checking from interview #2 5-7 minutes interview (Appendix F)
4	Interview #4, Observation #2	The Gaming Flaco, 117, Captain Underpants, Spiderman, Percy Jackson	3-15 minutes observation 1-3 minutes member checking from interview #3 7-10 minutes interview (Appendix F)
5	Interview #5	The Gaming Flaco, 117, Captain Underpants, Spiderman, Percy Jackson, Rupi Kaur	1-3 minutes member checking from interview #4 5-7 minutes interview (Appendix F)
6	Interview #6	The Gaming Flaco, Captain Underpants, Annabeth Chase, Percy Jackson	1-3 minutes member checking from interview #5 3-5 Instructions on iPad and books in the library 5-7 minutes interview (Appendix F)
7	Interview #7	The Gaming Flaco, 117, Captain Underpants, Annabeth Chase, Spiderman, Percy Jackson	1-3 minutes member checking from interview #6 5-7 minutes interview (Appendix F) 10-15 minutes meeting with school librarian (Appendix I)
8	Interview #8, Observation #3	The Gaming Flaco, 117, Captain Underpants, Annabeth Chase, Spiderman, Rupi Kaur	1-3 minutes member checking from interview #7 5-7 minutes interview (Appendix F)
9	Interview #9, Observation #3	The Gaming Flaco, 117, Captain Underpants, Spiderman, Percy Jackson, Rupi Kaur	1-3 minutes member checking from interview #8 5-7 minutes interview (Appendix F) 1-3 minutes case-specific questions
10	Observation #3		10-15 minutes meeting with school librarian (Appendix I)

*The seven high school reluctant readers' times varied within the range, based on the complexity of their answers during interviews and the time spent viewing books during observations.

Case Studies

Case Study 1: The Gaming Flaco

The Gaming Flaco attended all nine interviews and two observations and was an active participant in voluntarily using the AR apps in the school library. The Gaming Flaco stated that he was given time in English class to read. He stated that he liked to read at home, study hall, and in English class. During Interview 4, he stated he had visited the city's local library for books and, by Interview 6, he was reading on the school bus. There was a research caution for The Gaming Flaco, as he said in Interview 3 that he would be better at reading the book he chose

through the AR apps. The researcher stated: "You do not have to read the book, if you so choose. You need to do what you do regularly or it could hurt the study."

Throughout the study, The Gaming Flaco mentioned that he liked reading in the library and liked sustained silent reading time in English class. In Interview 1, The Gaming Flaco was asked "How do you find books you like to read?" The Gaming Flaco responded: "I go to the library and ask the helper for books she recommends or I scan through the books to see what is available."

The school's librarian noted that he had asked if the AR apps were available in the school's library and he mentioned in Interview 5 that he was scanning the books in the library with his personal phone to see if the AR apps would work. He tried using the Aurasma app to scan books. Due to technical issues and the fact that the researcher had linked the 55 books presented in this study, personal scanning was unavailable for The Gaming Flaco to connect to any additional books. He chose two additional books, during the study, by browsing through the library stacks. During the nine weeks, he viewed using the AR apps a total of nine books out of the 55 books available through the researcher. He checked out one of the eight books he viewed and checked out an additional two books from the school library. In Interview 8, he stated that he was reading all three books at different times. In Interview 9, the researcher, after viewing his data, asked him:

Researcher:	In this study, you mentioned you were reading three books at once. Why are you reading three books at once?
The Gaming Flaco:	I get bored one of book. So I start reading another book to take my mind off of the other book.
Researcher:	Why do you read?
The Gaming Flaco:	I read, when I get bored.

The Gaming Flaco was highly comparable with Case Study 2, 117, so they were compared together. During the orientation, the two school reluctant readers, 117 and the Gaming

Flaco, who wanted to use their phones for the study, were instructed to download the two apps, LayAR and Aurasma. Both students were unable to connect to a Wi-Fi signal using their personal Wi-Fi or Sunwater High School's guest w-fi.

The Gaming Flaco and 117 finished two books during the study. The difference was that The Gaming Flaco read one book based on the AR apps and 117 read both of the books he chose after viewing the AR apps' book trailers.

The Gaming Flaco and 117 had a lot of the same patterns. They both described that they enjoyed video gaming in the orientation interview (Interview 1), choose names that related to their favorite video games, showed enthusiasm toward using the AR system during the entire study, and successfully read at least one book that was suggested by the AR apps. Video gaming was an interesting piece of data, but it was limited to The Gaming Flaco and 117 and was not within the scope of this study. Video gaming will be suggested for further research in Chapter 5, but it was not a common theme investigated within the scope of this study.

Another similarity came during observations; they both viewed three to four books in each observation and choose the book they wanted to read. They both watched the book trailer and choose a book immediately after viewing the AR apps in Observation 1. Both students stated they enjoyed the books they read. The Gaming Flaco did not read the book chosen through the AR apps as fast as 117, but both high school reluctant readers completed the book they read.

The one major difference between The Gaming Flaco and 117 was having time to read in school. The Gaming Flaco continuously read every day because his classroom teacher had implemented sustained silent reading into his curriculum. If he needed new books to read, his English teacher would send him to the school library to pick new books. 117 struggled to read the AR apps chosen book or any enjoyment book from Interview 1 to Interview 4. He noted that

he could not find time to read the book. However, in the Interview 5, 117 said he had read the entire book in one night.

Case Study 2: 117

117 only missed Interview 6 with the researcher, as he was absent. As stated in Case Study 1, The Gaming Flaco and 117 demonstrated similar characteristics, themes and patterns throughout the study. 117 showed increasing enthusiasm throughout the study and thanked the researcher for letting him be a part of the study in the beginning and throughout the study. He viewed a total of 8 books out of 55 books available through the researcher. He checked out three of the eight books he viewed and completed two of those books with the time of the study. When the researcher explained that the study was ending on Week 8, 117 showed discontent that he thought the book would be taken from him. The researcher explained that 117 could keep the books until he completed them. After the explanation from the researcher, he expressed his appreciation.

One of the major themes that emerged during the study was human influence. 117 was one of the major contributors to this section, but 117 showed enthusiasm for the use of augmented reality in Interview 1. With the technical issues with the AR apps, 117 felt there should be a dedicated iPad to use in the school's library.

By the end of the study, 117 was questioned about his likes and dislikes of the AR apps. 117:   "It helps you know more about the book." 117 stated that he had no dislikes about the system.

Case Study 3: Captain Underpants

Captain Underpants only missed Interview 2 with the researcher, as he was absent. Captain Underpants was the only student to choose a book immediately without using the AR apps. He chose the book *Junior Braves of the Apocalypse: A Brave Is Brave*. He was shown the book trailer during Interview 2, but he automatically chose a book during the orientation (Interview 1). He mentioned in Interview 1: "I like to read comic books." *Junior Braves of the Apocalypse: A Brave Is Brave* is a comic book. The researcher asked why he chose *Junior Braves of the Apocalypse: A Brave Is Brave*, he responded: "I liked the book cover."

This information was important to the common theme of being a main recommender, which will be discussed in Chapter 5 under Common Theme 2. During the study, he viewed a total of 8 books out of 55 books available through the researcher. He checked out one of the eight books he viewed and made progress with *Junior Braves of the Apocalypse: A Brave Is Brave*. During Interview 5, he reported that he left the book at his grandmother's house. During his sustained silent reading time, his teacher had a classroom library available for him to find another book. Captain Underpants said: "The teacher had a classroom library, so I looked through the books and found the book *Heat*."

Again, he described that he chose the book based on the book cover. He made more progress on the book *Heat* than on *Junior Braves of the Apocalypse: A Brave Is Brave,* throughout the study. He stated that his brother had taken *Junior Braves of the Apocalypse: A Brave Is Brave* and was reading the book.

When comparing Captain Underpants to the previous two cases (The Gaming Flaco and 117), all three showed enthusiasm about being in the study. Captain Underpants arrived early for every interview, as did The Gaming Flaco and 117. As compared with the other two case studies,

Captain Underpants felt the AR apps could help students find books. Unlike 117, Captain Underpants and The Gaming Flaco had sustained silent reading and their teachers expected them to read during that time. Both referred to sustained silent reading, as the 20 minute silent reading time.

The difference that Captain Underpants showed twice in his case study is that he chose books solely by the book cover. He said: "I like the bookcover. I find it appealing." This will be discussed in Common Theme 2, as the main recommender for Captain Underpants was the book cover over the book description, teacher recommendation or the AR apps.

Case Study 4: Annabeth Chase

Annabeth Chase missed the fourth, fifth and final interviews with the researcher due to sickness and an athletic competition. Originally, Annabeth Chase was reading two books prior to the study, one book she enjoyed after seeing the movie *Nerve* and decided to read the book. Also she was reading a book recommended by her mother, although she did not disclose the book during the study. It is noted in the interview notes as (title unknown). During the study, she viewed a total of 12 books out of 55 books available through the researcher. She checked out none of the 12 books, but mentioned she liked two of the books. She said: "I like these two book, *Next* and *Life as We Knew It,* but my mother has asked me to read another book."

During Interview 7, she said that she had started another book *The Other Side of the Island*, which was recommended by a teacher. She started reading this book during sustained silent reading that started during Weeks 6 and 7, but by Interview 8, she discontinued all three books. She noted that in sustained silent reading, she was distracted by the noise in the classroom. During the entire study, she mentioned in multiple interviews that she wished she had

sustained silent reading to read her books. Between soccer and her academics, she stated that she did not have time to read her books. When asked about her dislikes of the AR apps, she mentioned: "I dislike that sometimes, it lags."

To find out what would motivate Annabeth Chase to finish her books or implementation of sustained silent reading would require a deeper study. Also Yin (2013) stated that a researcher must look for the common themes. Though Annabeth Chase provided invaluable information for this AR study, she did not choose an AR-recommended book. Her data were inclusive when she rated all three books, but the researcher did not have an AR-recommended books for comparison.

Like The Gaming Flaco, 117, and Captain Underpants, Annabeth Chase showed enthusiasm toward the study. At the end of the study, she mentioned she liked the AR apps and would like to see them in the school library. When asked what she liked about the AR apps, she mentioned: "I like the popup trailers." The Gaming Flaco, 117, and Captain Underpants mentioned the same liking of the book trailers, but their terminology varied from YouTube video, pop-up trailers and book videos.

Annabeth Chase had more in common with Percy Jackson, who is the next case study. Both chose names from Percy Jackson's books, read the back cover description of the books and viewed the most books. Their viewing time ranged from 19-26 minutes during each observation. Annabeth Chase went a step farther than Percy Jackson, as she would read the first few pages of each book. The researcher noted that she read the first five pages of *Life as We Knew It* after watching the book trailer and reading the back cover description.

During Observation 1, she explored nine books on the table with the AR apps. At the end, she pointed to two books she would have chosen, but stated she was already reading a book called *Nerve* and a book her mother asked her to read. During Observation 2, she again explored

five books on the table, but gave the same reason for not choosing a book. She started a third

book during the study, but ended up not finishing or continuously reading any of the books. She,

however, expressed her hope for opportunities like sustained silent reading.

When viewing Annabeth Chase as a single case study for similarities and differences

from The Gaming Flaco, 117, and Captain Underpants, she did not choose an AR recommended

book and was the only high school level reluctant reader not to choose a book. Also, Annabeth

Chase discontinued reading for pleasure of any books by Interview 7.

<div align="center">Case Study 5: Spiderman</div>

Spiderman missed the third and the sixth interviews with the researcher. He was absent

on both days. He viewed three books out of 55 books available through the researcher. He

checked out one of the three books he viewed and was half through the book *Monster* by Walter

Dean Myers. Spiderman was very excited to tell the researcher in multiple interviews, including

the orientation, that he was reading a book *A Child Called It*. He was finishing it up as an

assigned reading before the study started. After finishing *A Child Called It*, he started to read

Monster. Spiderman was hard to capture as a single case, as he had a lot in common with Captain

Underpants and 117, but especially with The Gaming Flaco. The same was found with Percy

Jackson.

Spiderman had sustained silent reading within his English class. He had the same teacher

as The Gaming Flaco, Percy Jackson, and Captain Underpants, who expected the students to

silently read for 20-30 minutes daily. All four high school level reluctant readers made progress

through their reading material throughout the semester and all noted that sustained silent reading

was where they did the majority of their reading. Also, all four high school level reluctant

readers with sustained silent reading mentioned that they were reading at home. Out of the other three high school level reluctant readers without sustained silent reading, 117 was the only one to note that he read at home when he had time.

Spiderman and Captain Underpants mentioned that the book cover helped them to choose a book. This issue is explored deeper in Common Theme 2. Spiderman echoed the almost same dislike as Annabeth Chase with the AR apps. When the researcher asked what he disliked about the AR apps, Spiderman replied: "I don't like all the technical problems."

The Gaming Flaco and Spiderman had many commonalities, but there was one very important noticeable difference between them. The Gaming Flaco hand-selected his book, whereas Spiderman liked to be given books. This finding was not in the scope of the study or stated in the research questions but will be addressed in Chapter 5, as a suggestion for further research.

<u>Case Study 6: Percy Jackson</u>

Percy Jackson only missed one interview (Interview 8) with the researcher. He viewed a total of 6 books out of the 55 books available through the researcher. He checked out one of the six books he viewed but discontinued reading *The Dead* after one week. Before he could explore the books again with the AR apps system, his English teacher suggested he read *The Hunger Games: Catching Fire*. For the rest of the study, Percy Jackson spent his time finishing that book. Captain Underpants, Spiderman, and Annabeth Chase mentioned that a teacher had also recommended a book they were currently reading, which is developed in Common Theme 2.

Percy Jackson and Rupi Kaur were both reluctant about being in this study. Percy Jackson asked about being recorded and seemed hesitant or nervous during the pre-interview.

With Percy Jackson's hesitation, the researcher moved forward with other high school level reluctant readers. However, by the second interview, Percy Jackson stopped by the principal's conference room to inquire when his next interview would be. Along with 117, The Gaming Flaco, and Captain Underpants, Percy Jackson showed enthusiasm for this study and for using the AR apps. By the end of the study, Percy Jackson stated about the study: "I liked this study and I would use the AR apps." Like 117, when asked what he disliked about the study, he responded: "Nothing."

<center>Case Study 7: Rupi Kaur</center>

Rupi Kaur was present for a total of four interviews with the researcher. She was not present for Interviews 1, 3, 4, 6 or 7 due to absences. During multiple interviews, Rupi Kaur explained that she was hoping to pass her classes and was dealing with other academic issues. With Rupi Kaur being absent from the study so much, she missed Observation 2 and during the first part of the study showed no interest in reading *Street Love*, visiting the library to try the AR apps in the library, or even being in the study. Percy Jackson showed the same kind of discontentment in the beginning of the study, but his enthusiasm increased after the first observation of using the AR apps. With other issues plaguing this student, it was hard for the researcher to find success in this case study, except that Rupi Kaur connected to all the common themes in the few interviews. More importantly, in Interview 9, Rupi Kaur showed promise, as she had read a few pages of *Street Love* and asked to stay and talk with the researcher.

During the study, she viewed a total of 6 books out of the remaining 48 books available through the researcher. By the time she interviewed, some books had been checked out from the researcher, which made fewer books available.

Rupi Kaur's favorite book was *Milk and Honey* by Rupi Kaur, which is a poetry book. After Observation 1, the researcher noticed that Rupi Kaur chose a poetry book called *Street Love* by Walter Dean Myers, which is on the American Library Association's reluctant readers list. The same commonality of genres could be seen with Captain Underpants as he expressed his interest in comic books and choose *Junior Braves of the Apocalypse: A Brave Is Brave*, a graphic novel. 117 expressed his interest in video games and chose *Ready Player One*, and Spiderman expressed an interest in hardship books like *A Child Called It*. After the researcher modeled AR apps in the orientation, Spiderman quickly selected *Monster*, a book about a gang lifestyle and prison.

The second major theme that Rupi Kaur helped to establish is that she stated: "Book covers don't appeal to me," unlike Captain Underpants and Spiderman, who felt book covers helped recommend books they should read. Percy Jackson and Annabeth Chase said they enjoyed being able to read the back cover description. Rupi Kaur showed a common theme with 117 and The Gaming Flaco in which they expressed their disinterest in the book cover and the back cover description. Rupi Kaur, 117, and The Gaming Flaco felt the videos would help them select books, and Rupi Kaur said: "I really like the videos."

The major finding in this case study was that Rupi Kaur did not have sustained silent reading like Annabeth Chase and 117 did. Rupi Kaur did not express an interest in having a sustained silent reading time and said she was struggling academically. The long term effects Rodrigo et al. (2007) mentions with adults could also be seen during this study. Rupi Kaur, 117, and Annabeth Chase did not experience sustained silent reading throughout their school day. Rupi Kaur struggled with absenteeism and with passing her classes, Annabeth Chase stopped reading all three books she was reading for pleasure by the end of the study. At the same time,

Rupi Kaur reported in Interview 9 that she had started reading a few pages of her AR apps chosen book.

Lastly, 117 showed success in reading at home, but said he went weeks without reading, depending on academic challenges such as "a big test this week." The Gaming Flaco, Spiderman, Percy Jackson, and Captain Underpants all made progress in reading for pleasure using the books they choose. All four of these high school level reluctant readers stated they were reading for pleasure during sustained silent reading and at home.

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

After reviewing each case of the seven high school level reluctant readers and making a rolling comparison of the cases, themes emerged from the data collected. Although a lot of data were gathered, this study focused on two main questions:

1. What are the differences of engagement in high school level reluctant readers in finding books to read before and after using an Augmented Reality tool?

2. How do high school reluctant readers find books that engaged their interest using an Augmented Reality tool?

Question 1 is answered in Theme: Engagement of Reading, and Question 2 is addressed in Theme: The Relevance of Augmented Reality Apps on Reluctant Readers. Both questions relate to the relevance aspect of the ARCS model created by Keller (1979, 1987), which is based on the engagement of a learner with the AR apps, their pre- and post-reading habits, and how the seven high school level reluctant readers selected books.

Theme 1: Engagement of Reading

Krashen (1993, 1995, 2006) stated that sustained silent reading and having to read for pleasure is critical to the academic success of students. All seven high school level reluctant readers were at different levels of academic success, but as stated by Krashen (1993, 1995, 2006) the effects of reading for pleasure can have positive results for all students. However, Rodrigo et al. (2007) found that the long-term effects may not be seen until the student is an adult when an adult cannot read for pleasure or has already suffered academic issues. One of the main research questions of the current qualitative case study was to explore the engagement of reading before and after using the AR apps to choose a book. This study could have concluded after a student selected a book and filled out a survey on his/her opinions of the AR apps. Instead the focus of this study was to test if AR apps could be justified as a school library or academic tool and if they can help in the motivation of students reading for pleasure.

None of the seven high school level reluctant readers was forced to engage in reading or selecting a book they liked during this study. Instead they were given the opportunity to explore the 55 books with AR apps and check out a book they might enjoy reading. Over the school's quarter semester, all seven high school level reluctant readers varied in their ability to make progress with their reading materials and determining when they would read the materials. However, six of the seven high school level reluctant readers asked to finish the books they had selected after the study had concluded.

In this study, four students were given 20 minutes of silent reading in their English classes: Captain Underpants, The Gaming Flaco, Percy Jackson, and Spiderman. Rupi Kaur stated that she was instructed in study hall to bring a book to read, but she was allowed to work

on her academic needs during that time. Neither 117 nor Annabeth Chase had any structured time during the day to read their books.

The findings for the use of AR apps were mixed, but after comparing data, success was found based on which students had sustained silent reading. All four students who had sustained silent reading built into their schedules – Captain Underpants, The Gaming Flaco, Percy Jackson and Spiderman – made progress with their reading materials. A few stopped reading the book chosen with the AR apps based on their like or dislike of the book's content. All four reluctant readers said they were reading the book in their sustained silent reading time. This time is known at Sunwater High School as a 20 minute silent reading time. Captain Underpants reported his teacher gave him a "30 minute silent reading time." The researcher used the term sustained silent reading (SSR) during the study although the four high school reluctant readers who had 20 silent minute reading time used both terms to describe when they read the book. In addition, the four high school reluctant readers stated many times that they read at home along with their SSR time.

The three students who did not have SSR time – Annabeth Chase, 117 and Rupi Kaur – were very different in their reading for pleasure selections. 117 loved the books he picked with the AR apps and took two additional books after finishing *Ready Player One* by Clive in one night. He struggled to find time to read those books at school or at home. Rupi Kaur suffered from academic issues and had a hard time reading even one page of her AR app selected book, *Street Love*. Annabeth Chase was not hampered by not having a sustained silent reading period in school at first and stated in Interview 4 that "the teacher was supposed to start us reading for 20 minutes, but I don't know what happened to that."

The teacher, after Interview 6, started sustained silent reading, but it did not meet the conditions created for Sustained Silent Reading in which students must be silent during their free reading time (Heibert & Reutzel, 2014; Krashen, 1993). Annabeth Chase reported that students were allowed to talk and it was too loud for her to read. By Interview 7, Annabeth Chase had discontinued reading any books for enjoyment. By Interview 8 and at the end of the study, she was not reading any type of reading material. She was the only student who did not take a book after Observation 1. Originally, she was reading two books at the time and started a third book, after not enjoying the book recommended by her mother. During the study, she started three books and discontinued all three books. Annabeth Chase noted in Interview 7: I did not have time at home to read, because of travel soccer and homework… At school, during sustained silent reading, it is too noisy to read…I just put things in my planner and do homework." Captain Underpants, The Gaming Flaco, Percy Jackson, and Spiderman, who had sustained silent reading, all reported their classes were silent and were expected to have reading materials of their own choosing. All four high school level reluctant readers showed progress in their AR apps chosen or self-selected reading materials.

After four weeks of checking out a book, 117 reported that he read *Ready Player One* in one night (Monday) at his home due to the interest level of the book. 117 did not have sustained silent reading, but showed amazing progress with the books he chose. During the second observation, the student was offered a new book to view. After viewing four books, 117 chose *Hush, Hush* and *I am I Am a Seal Team Six Warrior: Memoirs of an American Soldier*. He reported that the book trailers helped him decide that he wanted to read those books. The researcher gave him both books. The second research question of this study that was evaluated was how do these seven high school level reluctant readers find books that engaged their interest

using the Augmented Reality tool. The engagement of reading was reported in Chapter 3 (case-by-case) and Theme 1 in Chapter 4. Exploration of the use of the AR app developed into three separate sub-themes: Use of the AR apps through one-on-one sessions, Use of the AR apps through the school library and Use of the AR apps for future recommendations. The seven high school level reluctant readers showed mixed results in their use of the AR apps in different settings during the school's quarter semester.

Sub theme A: Usage of the AR Apps through One-On-One Sessions

During Observation 1 (Week 2) and Observation 2 (Week 5), all seven high school level reluctant readers were given the opportunity to explore the AR books while the researcher observed them. The setting was the principal's conference room (see Figure 8) for the Observation 1 and the guidance conference room for Observation 2. All 55 books were placed on the conference table for the reluctant readers to explore. After the orientation, the researcher found many technical difficulties with the school district's filtering of YouTube, students being able to use their personal cellphones for the study, and the availability of the temporary school library. These issues are reported under Use of the AR apps for future recommendations. During Observation 1 (Week 2) and Observation 2 (Week 5), the seven high school level reluctant readers met with the researcher in the available private conference rooms. The researcher instructed the seven high school level reluctant readers with the following script:

> I would like you to take the iPad and explore some of the books on the table. It is up to you to decide how long to watch a book trailer or read a website or book review. Also, you can decide how many books you would like to view. After you are done, it is your decision to take a book that you like or not take any books at all. I will have a few questions after you are done.

Figure 8. Principal's conference room.

All seven high school level reluctant readers explored the books for a variety of times. During both observations, 117 viewed three books and immediately choose his book. He was the quickest selector. He expressed in the interview that he saw from the book covers what books he wanted to know more about. Both Percy Jackson and Annabeth Chase read the book description first before viewing the book trailer. Both spent the most time viewing the books. Captain Underpants and Rupi Kaur viewed books, and when they found a book they were interested in, during both observations, they flipped through the book. Both times, Captain Underpants choose the book he flipped through.

In the interview that followed the observations, the reluctant readers, except for Rupi Kaur, stated that the cover of the book and/or back description was most important feature to them in choosing a book. Rupi Kaur felt the AR apps was the most important feature to her choosing the book she wanted to read.

<u>Sub Theme B: Usage of the AR Apps through the School Library</u>

The last observation of this study was set over a period of time. The books and iPad were placed in the school's temporary library for the last three weeks of the study. Due to the iPad being of high value, the school librarian kept the iPad and books in a separate room. The school librarian was given a list of students in the study. Over the last three weeks of this study, the researcher asked the seven high school level reluctant readers if they had visited the library. The Gaming Flaco was the only student to visit the library over that three-week period. The school librarian noted that The Gaming Flaco had been asking if the system was available in the library. In Interviews 5 and 6, The Gaming Flaco stated he had been visiting the library and tried scanning the school library's books to see if the app would work with his phone. The researcher explained that only the 55 books in the study would work with the app. In Interview 5, The Gaming Flaco did mention since the AR app (Aurasma) would not work for him, he chose two books by their covers after browsing through the books. The Gaming Flaco was given time during English or had regular library visits, which the other seven high school level reluctant readers were not given or did not take advantage of.

<u>Sub-Theme C: Use of the AR</u>

In the orientation of this study, only two high school reluctant readers had prior knowledge of what Augmented Reality or AR meant. 117 said he had an understanding of AR through playing games with augmented reality. He stated: "I am very happy to be a part of this study." The other high school reluctant reader was The Gaming Flaco. He stated, "My cousin showed me what it was. He showed me on an augmented reality app."

Both 117 and The Gaming Flaco showed already understood what AR is. Both stated they were gamers and they picked pseudonyms that were from popular video games. The expected outcome for the case studies of 117 and The Gaming Flaco were projected to be positive. The other five high school reluctant readers had never heard the term AR. The expected outcome of their case studies could have been negative or positive. In Interview 7, all seven high school level reluctant readers were asked about their opinions on the AR apps. Their responses were as follows:

- 117 stated, "I like the augmented reality apps."

- Percy Jackson said "It helps you understand the book more."

- The Gaming Flaco exclaimed "Pretty cool."

- Annabeth Chase stated "Cool."

- Captain Underpants responded "You don't have to read the back of the book."

- Spiderman concluded "Cool and it could be useful for all students."

- Rupi Kaur said "I like it. Book covers do not appeal to me."

Unanimously, all seven high school level reluctant readers enjoyed using Augmented Reality. The Gaming Flaco enjoyed the AR apps so much, the school librarian reported that he had come to the library to scan other books. Through his interviews, he confirmed that he started to scan books in the library with his own cellphone. The Gaming Flaco was very excited to hear the AR system was available in the library after Interview 6.

In Interview 7, the researcher asked if the AR apps and system should be available in their school library and all seven participants said, "Yes." The split of the opinions developed, when the seven high school level reluctant readers were asked about their likes and dislikes of the AR apps and system. All of the students stated they liked the system and thought it should be

in the school's library, their dislikes varied. Annabeth Chase stated, "I do not like all the technology problems with the system. Sometimes things didn't come up."

The technical difficulties cited by the students happened in two different events. The first two technical difficulties happened during the orientation when the students could not see an example of the AR apps. The school system overseeing Sunwater High School blocked the access to YouTube, making it impossible for the students to see the attached AR videos for the 55 books in the study. The school's principal used his personal staff login, which was used for the entire study, to bypass the YouTube filters. However, a staff login still did not solve the problem. The researcher had to independently download each video from YouTube, using the website Keepvid.com, and uploaded the videos into the Aurasma app. This action solved the problem of the seven high school level reluctant readers being able to access the book trailers, which turned out to be the most popular feature for all seven high school level reluctant readers. Only 117 mentioned that he liked all the different features of being able to tweet the author and look at the book's website.

The next issue happened at the same time (during orientation) as the YouTube filtering issue. 117, The Gaming Flaco, and Percy Jackson offered to use their phones for the study but found that their cell signal was blocked by the school's structure. In certain parts of the school building, the students could receive a signal, but not in the locations where we met. At this point, in the study, an iPad was used to scan the 55 books (see Appendix J) and for the observation period in Sunwater High School's temporary library location. This one iPad idea was very successful and reduced the problems with the engagement with AR in the future.

Overall, the seven high school level reluctant readers enjoyed using Augmented Reality and stated it would be a benefit to the school library and that they would like to see AR book

trailer attached to every book. However, the technical issues were a sign of contention among three of the high school reluctant readers.

Theme 2: Relevance of Augment Reality Apps on Reluctant Readers

Sub Theme A: Relevance in a School Library

The last three weeks of the study focused on the school library and the placement of the AR apps in the school library. The first six weeks focused on monitored voluntary engagement with the AR apps by the researcher. The last observation (Observation 3) focused on voluntary engagement. After the Week 5 interview, all seven high school level reluctant readers were told that the AR system would be available in the school library for use among the students in the study. The setup included an iPad with the Aurasma and LayAR apps and two crates filled with books. The school's teacher librarian was worried about theft of the iPad, so the researcher used a locking case for the iPad and all items were placed in an enclosed room in Sunwater High School's temporary school library.

Over the three-week period, the only student to visit Sunwater High School's temporary school library and to voluntarily view the books with the AR system was The Gaming Flaco. The school librarian reported that The Gaming Flaco had been asking if the system was available in the school's temporary library. When The Gaming Flaco found out the AR system was not available, he chose two books by looking at the front cover of the books as he browsed through the school's temporary library collection. The AR system was only available for the last three weeks of this study in the school's temporary library for Observation 3.

The AR system engaged one high school reluctant reader, but failed to engage the other six high school reluctant readers. In Interview 9, the other six high school reluctant readers were

asked, "Did you visit the library or use the AR apps to help you find books?" The school's

librarian had a clipboard with all the students' names, in case they wanted to visit the library.

When questioned why they had not visited the library, the readers gave the following responses:

- 117 said "I have been too busy with tests…academics."

- Spiderman stated "I will try to get down there."

- Percy Jackson said "I just haven't had the time to go."

This theme came up often, except for The Gaming Flaco, who visited the library often,

because his teacher would allow him to go during class or sustained silent reading. By Interview

5, Captain Underpants had chosen a new book to read; he stated he had forgotten the AR apps

chosen book at his grandmother's house. Needing a book for sustained silent reading, he

browsed the teacher's classroom library for a new book. Percy Jackson was given *The Hunger*

Games: Catching Fire by his teacher, who felt he would enjoy reading it. Neither Percy Jackson

nor Captain Underpants had the opportunity to check out books from the school library because

their room contained a classroom library. Both students showed a high level of success with

reading throughout the school's quarter semester but found or were given books from the class

library.

Another major finding leads into the "who" is recommending the books to the students.

Along with Percy Jackson and Captain Underpants using a classroom library, Spiderman

mentioned throughout the whole study that he was reading the book *A Child Called It*, which he

stated his teacher recommended. Human influence played a part in Spiderman engaging in a

book he enjoyed reading for pleasure. From the orientation interview, many of the seven high

school level reluctant readers stated that a certain person (recommender) had recommended

books they enjoyed in the past. Throughout the study, the human influence of that recommender became a sign of relevance.

Sub Theme B: Relevance of Human Influence

In the ARCS model, Keller (1987) stated that if relevance was found, it would increase the student's motivation, which was shown by all seven high school level reluctant readers in different phases. The book trailers connected to the books were given a favorable rating by all seven participants. The interview questions and observations showed the students were highly engaged in the book trailers at the direction of an adult, but when left to voluntarily use the AR apps in a private room in the school's library, none of the seven high school level reluctant readers used the AR apps.

Keller (1987) emphasized a few strategies to meet the relevance of usefulness, experience and worth. Keller (1987) expressed that students need to be told why this new learning will be an advantage to their current skills and the relevance of how this new learning will matter to them today and tomorrow. The seven high school level reluctant readers seemed to find relevance in certain people (recommenders) who suggested reading material to meet the students' interests. The most creditable research can be found with Rupi Kaur, who did not make any progress until Interview 9. The study had concluded at that time and Rupi Kaur asked to stay with the researcher and talk. The topic of the conversation was about strategies for academic success. In qualitative study, a researcher may talk with participants and have a deeper conversation. Seidman (1998), Patton (2002), and Creswell (2005) stated that qualitative research studies are intended to explore issues, provide a deeper understanding of the topic being studied, and identify main themes from the gathered data. Interestingly, Rupi Kaur read her book by

Interview 9, had not skipped the last three interviews, and asked to stay with the researcher to

talk about academic issues during Interview 9. In the ARCS model, Ryan and Deci (2000) and

Keller (2010) stated that a participant wants familiarity with what they are being asked to do and

to be intrinsically or extrinsically motivated to do a task. When the researcher asked her to rate

Street Love during Interview 9, Rupi Kaur gave *Street Love* a rating of 5 on a scale from 1-10. At

the end of their personal talk, Rupi Kaur said "Thank you for talking with me." Rita Pierson, a

lifelong educator and speaker, said in her TED talk that "kids don't learn from people they don't

like" (Pierson, 2017). This reaction was repeated in Interview 9 with 117; he wanted to stay with

the researcher after the questions had concluded. 117 made the most progress with two of the

three books he had chosen through the AR apps. He read *Ready Player One* in one night, he

chose *I Am a Seal Team Six Warrior: Memoirs of an American Soldier* in Interview 6, and

finished the book by Interview 9. He asked to keep *Hush, Hush* to read and finish after the

completion of the study.

During the study, Percy Jackson and Captain Underpants stopped reading the book they

chose through the AR apps because their teacher had recommended a different book to.

Annabeth Chase stopped reading all books during the study and did not attempt to read a book

that she viewed through the AR apps. At the same time, she attempted to read a book her mother

suggested and her teacher suggested. Spiderman and Rupi Kaur both mentioned they loved

reading books that had been assigned to them by their teachers. In the orientation interview, both

mentioned that it made them want to read. Spiderman was currently reading *A Child Called IT*

and continued to read it for most of the study. Although he mentioned he wanted to read

Monster, the book he chose through the AR apps, the teacher-assigned *A Child Called IT* was his

preference to read during his free reading time. All seven high school level reluctant readers

reported that the book's back cover descriptions helped them choose the book or that a book was read, due to the recommendation of the teacher. After comparing all seven high school level reluctant readers, a common theme emerged that human influence (teacher, school librarian, researcher or parent) was more powerful than the AR apps.

Sub Theme C: Relevance for Reluctant Readers

Attendance of the seven high school level reluctant readers, engagement with Augmented Reality apps, the ability to have time to read, and technical issues complicated the study. Whittingham et al. (2013) experienced the same issues, with losing participants during his study of audiobook engagement with reluctant readers. Although all seven high school level reluctant readers highly recommended the AR apps for all readers, they varied in their post-experience of the AR apps. None of the seven high school level reluctant readers used the AR apps when they were available in the library. The Gaming Flaco did try to scan books in Sunwater's temporary school library prior to the AR apps system being available in the library. The Gaming Flaco was the only student who did not miss any interviews or observations with the researcher and looked forward to the meeting. When the absentee rate of the other high school reluctant readers was mentioned to the principal, he said in response: "That is what makes a reluctant reader, a reluctant reader. Attendance is an issue."

Being part of this study was encouraged by the teachers, the school librarian, the principal, and the researcher. In spite of the technical issues, attendance issues and engagement of the AR apps, the seven high school level reluctant readers were successful in their use of the AR apps. As evidenced during the observations, the seven high school level reluctant readers might have initially tried the AR apps, but their engagement after the initial usage might have

been a struggle. The final results showed that out of the seven high school level reluctant readers, the four high school reluctant readers who had the advantage of sustained silent reading were highly successful. Whereas, the three high school reluctant readers struggled to find relevance of the AR apps to suggest books they did not have time to read.

Nevertheless, all seven high school level reluctant readers rated the books picked by the Augmented Reality apps with a rating of five or above. Annabeth Chase did not chose a book the entire study. She was considered an outlier in the beginning of the study, but became a focal point by the middle of the study. She reported after all three observations that she enjoyed the AR apps and even pointed to the books she would have checked out. In Interview 2, Annabeth Chase said, "I am reading two books already. One book recommended by my mother and *Nerve*."

She stated that she was reading *Nerve* after seeing the movie and wondered if the book was better. During Interview 5, Annabeth Chase reported she was no longer reading the book recommended by her mother and discontinued her reading of *Nerve*, as there was a new book the teacher had the students reading. Also, Annabeth Chase reported that she was given time during English class, but she was using her time to read the book given by the teacher. Although she was given three books, which were influenced by two human recommenders and one visual recommender, by the end of the study, she stated she had stopped reading all three books. She was not reading anything at school or at home.

The other six high school reluctant readers showed the same pattern, unless given the time in school to read or a certain book peaked their interest to read at home. The other six high school reluctant readers showed progress with the book(s) they read, except when there was a required reading for class (teacher recommender) or students forgot their books. Captain

Underpants was the most successful student, when reading. He continuously read books and reported in every interview that he read during sustained silent reading. During Interviews 4 and 5, he reported he had left the book at his grandmother's house and needed a book for silent reading time. In Interview 4, he explained that he browsed the teacher's classroom library and found another book to read. When questioned about he found the book, Captain Underpants explained, "I read the back of the book cover and it seemed like a good book." Although he retrieved his book from his grandmother's house by Interview 5, he continued to read the book chosen from the teacher's classroom library through Interviews 5 and 6.

Only two students, 117 and The Gaming Flaco, finished the book that was selected through the AR apps. Spiderman reported that he was reading his book, *Monster*, after Interview 6, but he needed to finish *A Child Called IT*. 117 reported in Interview 4 that he finished the book in one night (Monday, October 24, 2016) at home, and this student does not have sustained silent reading. 117 became the outlier, after Interview 4. He credited the AR apps with helping him find a book that he enjoyed reading. The book he read was *Ready Player One* by Ernest Clive. The researcher added this book to the 55 book-collection from previous experience as a librarian, knowing that it would be of interest to reluctant readers. All seven high school level reluctant readers gave positive feedback on the AR apps and its use for recommending books. 117 followed through with providing evidence of a finished book that AR could be a main recommender for reluctant readers.

The main recommender continued to be human influence for relevance of reading. Keller (1987) suggested that a strategy to find relevance is allowing the learner to have a choice to pursue their work. The AR apps was a new choice the seven high school level reluctant readers

used to find reading materials, which could provide relevance to their reading for pleasure experience.

<u>Sub Theme D: Relevance to Support Engagement of Self-Selection of Reading</u>

All seven high school level reluctant readers found the AR apps relevant as a book selection tools that could be used in a school library. The Gaming Flaco remarked that he felt it was unfair that the AR apps were not available to the entire student body. The Gaming Flaco stated: "I feel this should be available to all students. I understand this is a study, but it would be nice for all students to use."

After five weeks of studying the seven high school level reluctant readers, the researcher asked the seven high school level reluctant readers to rank the books they had read during the current year (see Figure 9). Some of the high school reluctant readers included books they read for class assignments or books they were currently reading, but noted they enjoyed them so much they wanted to include them. Four of the high school reluctant readers were only able to name one other book outside of the book they selected with the AR apps. Being high school reluctant readers, this is an expected outcome.

In Figure 9, each of the seven high school level reluctant readers gave the researcher a rating for each book, based on a scale from 1-10, 1 being the lowest and 10 being the highest. The categories were based on the recommendation of the book: the AR apps, teacher, family member, friend, movie, or self-selected. To be noted, the school librarian is considered a teacher, so her data are intertwined with the teachers' data. In Figure 9, the AR apps books rated no lower than a 5 in interest. Please note that Annabeth Chase did not take a book from the researcher during the study. Annabeth Chase rated other books she had read. She did note that she was

reading the book *Nerve*, because of the movie, which offers almost the same effect, as the AR apps' book trailers. The other high rating areas were a friend's recommendation and self-selected book.
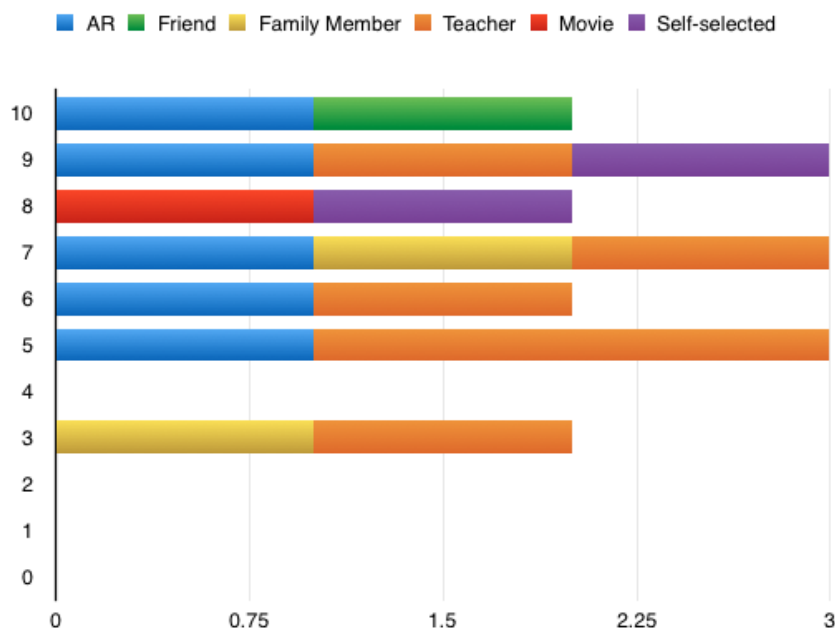
Figure 9. Ranking of reading materials for the current year.

From the ratings and the in-depth discussion during interviews, especially during the orientation interviews, each student described who influenced their decisions on what they read. Annabeth Chase stated that the first book she ever remembered was her mother reading a picture book to her and she was, at the beginning of the study, reading a book influenced by her mother. Rupi Kaur mentioned her friend recommended a book to her and she said, "I went on the internet and I searched around for that book. I watched the trailer on YouTube for *Milk and Honey* and I liked it!"

Percy Jackson, Spiderman and Captain Underpants mentioned teacher recommended books or relying on stories of a favorite book recommended by a teacher. The only student who did not have a valued source for books was 117. He mentioned he read another book over the year, but he could not remember the name of the book during the study. He could remember it had to do with different dimensions. When the researcher asked how he found that book, 117 said, "I saw it somewhere and it looked cool."

There was not a conclusive answer among all seven high reluctant readers, except there was a common pool of recommenders. The pool of recommenders were all visual tools (AR, YouTube, searching the internet, or a movie) or human influences (teachers, library helpers or school librarians, friends or family members).

Theme 3: Longevity of AR Apps on Reluctant Readers

The seven high school level reluctant readers showed success during Observation 1 and Observation 2 when they were asked to use the AR apps system to find books. This took place in a private setting with the researcher giving the students an iPad and having them explore the books. Yin (2014) titled this as a direct observation. In Observation 3, the seven high school level reluctant readers were indirectly observed over the last three weeks of the study. They were given the following directions by the researcher during interviews 7, 8 and 9:

> Over the next few weeks, the AR apps system with an iPad will be available in the school's library. I put some of the books from the study down there and if you would like more of a selection, let me know. If you would like to view the books, please just ask the school's librarian and she will let you into the room. She has a list of your names and knows you are in the study.

Interview 9 was the last interview, but the researcher continued Observation 3 to give the indirect observation three weeks. All seven high school level reluctant readers agreed they would check out the AR apps system if they were in the library.

In the three weeks of this indirect Observation 3, none of the seven high school level reluctant readers approached the school's librarian to view the books. The Gaming Flaco approached the school's librarian and reported that he wanted, and tried, to scan books preceding the indirect Observation 3. The AR apps were only available in the school library during the last three weeks of the study for Observation 3, but the request shows The Gaming Flaco was intrinsically motivated to continue to use the AR apps to help him find books to read for pleasure. After comparing Observation 1 and Observation 2, the research question of the engagement of the seven high school reluctant reader before and after use of the AR apps could be considered high. When Observation 3 is compared with Observation 1 and Observation 2, the after use of the AR apps could be considered low. Neumann (1986) explained that extrinsically motivated engagement is hard to see, but we know when it is missing or we see it. Also Schlechty (2002) stated that a student must be committed to a task and do it with enthusiasm to give that task inherent value. The engagement with the AR apps was highly successful when the seven high school level reluctant readers were extrinsically motivated to use the AR apps in a private room with a dedicated device by meeting with the researcher. When the AR apps were available the last three weeks in a private room in the temporary school's library, none of the seven high school level reluctant readers was intrinsically motivated to use the AR apps.

In Interview 9, 117, Rupi Kaur, Spiderman and Percy Jackson all asked that they be allowed to keep the books they had checked out until they finish the books they chose through the AR apps. 117 was reading the third book he chose through the AR app,s and both Spiderman

and Percy Jackson wanted to finish books given to them by their teachers before reading the books they chose through the AR apps. Spiderman was reading *Monster* and reported really enjoyed the book.

Table 3 gives a visual progression of the school's quarter semester and how the seven high school level reluctant readers moved through the timeframe of the study. Annabeth Chase was the only student who did not attend Interview 9, although she was reported to be in school. If a high school reluctant reader was absent one week, the researcher asked them about their reading progress in the preceding week. Annabeth Chase had stopped reading any materials, and Percy Jackson and Captain Underpants were influenced to read a certain book for pleasure based on different factors. Rupi Kaur, Spiderman, The Gaming Flaco, and 117 were all currently reading or had finished a book they selected through the AR apps. Each of the seven high school level reluctant readers showed their motivation and engagement to read in different ways, but their reasons supported the theory of the ARCS models that learners need choices to find relevance.

Table 3

Progression of Reading for the High School Level Reluctant Readers

	Not interested in reading or did not have time to read for pleasure	Showed progress with reading any materials	Showed progress with the book chosen through the AR apps	Finished a book chosen through the AR apps
Orientation interview (initial placement)	Rupi Kaur, 117	Annabeth Chase, Percy Jackson, The Gaming Flaco, Captain Underpants, Spiderman		
Week 2	Rupi Kaur, 117	Annabeth Chase, Spiderman	Percy Jackson, The Gaming Flaco, Captain Underpants	
Week 3	Rupi Kaur, 117	Annabeth Chase, Percy Jackson, Spiderman	The Gaming Flaco, Captain Underpants	
Week 4	Rupi Kaur	Annabeth Chase, Percy Jackson, Spiderman	The Gaming Flaco*, Captain Underpants	117
Week 5	Rupi Kaur	Annabeth Chase, Percy Jackson, Spiderman, Captain Underpants	117, The Gaming Flaco*	
Week 6	Rupi Kaur	Annabeth Chase, Percy Jackson, Spiderman, Captain Underpants	117, The Gaming Flaco*	
Week 7	Annabeth Chase, Rupi Kaur	Percy Jackson, Spiderman, Captain Underpants	117, The Gaming Flaco*	
Week 8	Annabeth Chase, Rupi Kaur	Percy Jackson, Captain Underpants	117, Spiderman, The Gaming Flaco*	
Week 9	Annabeth Chase	Percy Jackson, Captain Underpants	Rupi Kaur, Spiderman	117, The Gaming Flaco*

*The Gaming Flaco reported reading multiple books after Week 3.

Red- High school reluctant readers **without** sustained silent reading time.

Blue- High school reluctant readers **with** sustained silent reading time.

CHAPTER 5

DISCUSSIONS, RECOMMENDATIONS, AND CONCLUSIONS

Augmented Reality apps in a school library will not be the solution for every student, just as audiobooks, Playaways, QR codes and digital books are not for every student. These technology tools add diversity to a school library's book collection and could engage a small segment of the population to read. Brill and Park (2008), Fellerer (2009), Yuen et al. (2011), Whitchurch (2011), Chang and Liu (2012), Dunleavy and Mitchell (2012), Whittingham et al. (2013), Gagnon (2016), and Hahn (2016) are conducting or have conducted research to show ow haudiobooks, Playaways, QR codes, wayfinding technology in a school library, and augmented reality for classroom use and textbooks can potentially be successful with different populations. The current study was conducted to benefit school libraries and high school level reluctant readers' level of engagement to read for pleasure. In addition, this study tested the relevance of AR and AR apps with seven high school level reluctant readers.

Attention, confidence and satisfaction cannot be considered in the ARCS instructional model until relevance is met for reluctant readers. A reluctant reader who will use AR technology in a high school library will want to know why it is relevant to use the AR apps to find books. Keller (2009) clearly states that attention and relevance are the first two steps in the ARCS model. Human influence was the most important finding. The successful experiences that occurred during this study were from attention, arousal, or a spark of interest by the researcher, a teacher, parent or friend. During indirect Observation 3, the seven high school level reluctant

readers did not have the arousal by the researcher or encouraging human influence to guide them to find books with the AR apps. The same comparison can be based on sustained silent reading (SSR) in regard to the four high school reluctant readers who had SSR continuously read throughout the nine week study. The classroom teacher provided the attention, arousal, or spark of interest to read. AR provided relevance for three of the seven high school level reluctant readers by providing them an option of many different books and presented worth. Augmented Reality has shown to be a beneficial tool for reluctant readers, but the level of attention or arousal was caused by human influence.

Positive and negative results were found in this study, and many new questions emerged for further research, as this study only explored AR in a small facet in a school library. For this study, the research questions were

1. What are the differences of engagement in high school reluctant readers in finding books to read before and after using an Augmented Reality tool?

2. How do high school reluctant readers find books that engaged their interest using an Augmented Reality tool?

When this study began, it was stated by the researcher that AR could help a small population and join the tools – such as audiobooks, QR codes and others – to help reluctant readers. The AR apps did help the seven high school level reluctant readers find books within their interest. However, the real influencers to read a book and to continuously keep reading were three main factors: 1) the students needed time to read the books, 2) the main influencer was still human influence and the back cover of the book, and 3) the book had to peak the student's interest. Relevance is combined in all three main factors. The seven high school level reluctant readers needed a relevant reason or cause to read a book for pleasure. Even if they had

sustained silent reading or structured time to read, all seven high school level reluctant readers either read, or did not read, anything that was not relevant to their interest, academic or personal lives.

<div align="center">Engagement with the AR Apps</div>

In the ARCS model for relevance, Keller (1997) explained engagement of a learner must present the strategies of experience, worth, future usefulness, needs matching, modeling and choices. In the orientation interview, only two of the high school reluctant readers had experience with AR before the study, so AR was new to this population. In the future this study should be conducted over an entire academic school year (32 weeks) to show more relevance or long term effects and to give future study research participants extensive time to experience AR.

At the same time, the seven high school level reluctant readers found that they liked the AR apps and expressed that the AR apps presented worth to their reading lives. Annabeth Chase expressed positive views of the AR apps, but without sustained silent reading and without the involvement of human influence that suggested her reading choices, she showed disengagement from and frustration with the study. From her actions of skipping the last interview, comments in Interviews 7 and 8, her non-choice of an AR apps book (Observation 1 and 2), her lack of visit to the school's library for Observation 3, and her expressed frustration with not having time to read during the school day were evidence of her disengagement, possibly leading to not being able to find relevance in the AR apps or reading for pleasure. 117 had similar frustrations, but he found time to read at home and was one of the most successful students in the study. The source of their frustration was not having sustained silent reading during the school day.

The Gaming Flaco was the most successful in using the AR apps of the seven high school level reluctant readers. He voluntarily wanted to view books in the library with his personal cellphone, although the AR apps was only available in the school's temporary library during the last three weeks of the study. Only The Gaming Flaco voluntarily chose to use the AR system independently in Sunwater's temporary school library. This could be described as high engagement after using the AR apps, as he was intrinsically motivated without the researcher's influence. Whereas, the other six high school reluctant readers were extrinsically motivated to use the AR apps during Observation 1 and Observation 2 by meeting with the researcher and were not intrinsically motivated to allow the AR apps to influence their reading choices for the last three weeks for Observation 3.

It was found in the Chapter 4, that human influence was a major force in the use of the AR apps for the seven high school level reluctant readers in that the seven high school level reluctant readers relied on the teacher, school librarian or parent's recommendation of a book. This finding could be dissected in further discussion that AR apps should be used as a supplemental engagement tool, such as audiobooks, QR codes and many other school library tools to engage reluctant readers. For example, Whittingham et al. (2013) used reading groups in which the reluctant readers were engaged in the reading groups and used audiobooks as supplemental tools to reading. Although the seven high school level reluctant readers showed enjoyment and engagement in using the AR apps, the research shows that it is a supplemental tool to human engagement.

Schlechty (2002) stated that a student must be committed to a task and do it with enthusiasm to give that task inherent value. In the ARCS model, Ryan and Deci (2000) and Keller (2010) found that participants want familiarity with what they are being asked to do and to

be intrinsically or extrinsically motivated to do a task. All seven high school level reluctant readers showed no engagement in the indirect observation (Observation 3).

During the study, six of the high school reluctant readers found worth in the AR system, future usefulness, and the choices the AR apps provided. From the orientation interview to Interview 9, all seven high school level reluctant readers enjoyed the AR apps and expressed their high interest for it to be used in the library for the future. 117 mentioned in Interview 9 that "I would like the AR apps attached to every book in the library" and the other five other high school reluctant readers echoed his recommendation.

The issues that arose in study and could be researched in depth in future studies stem from sustained silent reading and the use of classroom libraries. All seven high school level reluctant readers found worth in the system, but did it meet their needs? Should it have been modeled with a classroom library and not the school library, with the teacher, rather than the school librarian, being trained to use it with her students? Only The Gaming Flaco visited the library at least two times during nine weeks. Spiderman, Percy Jackson, and Captain Underpants mentioned a teacher giving them a book to read from a classroom library or they scanned through the classroom library and chose a book. Lastly, the AR apps were not used for the last three weeks in the temporary school's library (private room), bringing up the point that possibly the AR apps being in the school's library did not meet the participants' needs and the consultation of the classroom teacher, who has sustained silent reading in the classroom, was important.

Stated in Chapter 1, Thompson (2007) and Brinda (2011) found that many teachers were unfamiliar with the different genre of books and relied on the genres they knew. 117 clearly showed by reading *Ready Player One* in one night that he found a book he enjoyed and gave it a

rating of 10 on a scale of 1-10. He had only read one other book the entire year for pleasure and could not remember the name of the book, but referred to it as "a different dimensions book." He did not have sustained silent reading and said he visited the library throughout the year, but struggled to find time to visit during the nine weeks of the study. He chose *Ready Player One* after viewing a book trailer of the book and completed the book in one night. He stated in Interview 9: "My mother kept yelling at me to stop reading and to come eat dinner." When questioned by the researcher what made him read the book, he stated: "The video trailer looked great, so I wanted to read it."

117, after reading the book, choose two other books through the AR apps in Observation 2 when extrinsically motivated by meeting with the researcher. He continued to read and finished *I Am a Seal Team Six Warrior: Memoirs of an American Soldier*. The Gaming Flaco finished his book, *Need*, at the same time and was reading two other books he chose from the school's library. He had requested to use the AR apps, although the system was unavailable at that time. Success was achieved with the AR apps book selection in these two case studies, and The Gaming Flaco was highly successful in his involuntarily engagement with the AR apps. At the same time, six of the high school reluctant readers choose books when extrinsically motivated by meeting with the researcher and when time was provided to pick books.

Relevance in a School Library

Due to the school library being unavailable, this study was conducted in the principal's conference room and in Sunwater High School's temporary library. As stated in Chapter 5, the human influence and extrinsically motivation of the school librarian would be necessary to help reluctant readers choose books. The human influence and extrinsic motivation by meeting with

the researcher cannot be ignored in this study. In a higher socioeconomic setting or in AR use with non-reluctant readers, the results may be different, but the research shows that some of the high school reluctant readers did engage with the AR apps and did enjoy using the AR apps, as they stated in Interviews 6 and 8. The seven high school level reluctant readers were asked their opinions of the AR apps twice to confirm their opinions of the AR apps.

Many school libraries are facing tight budgets and limited resources, but they must find ways to motivate all readers to continue reading. Chen and Tsai (2012) stated that budget cuts could push education to find new ways to educate students and, at the same time, engage them to learn in a way that will enhance their learning over traditional methods. Also, Chen and Tsai (2012) found that only basic instruction on the use of a library with augmented reality showed high engagement. The current study showed similar results. Human influence (teacher, school librarian and parents) is still a vital part of a student reading for pleasure. The AR apps appeared to be a supplemental tool that libraries could use, but only when extrinsically motivated by meeting with the researcher. Whitchurch (2011), Yuen et al. (2011), Dunleavy and Mitchell (2012), Whittingham et al. (2013), and Mahadzir and Phung (2013) discovered that audiobooks, QR codes, mobile devices and AR pop-up books for students have shown positive results on their populations, but their studies were extrinsically motivated through meetings with the researcher. AR apps could be a cost-effective supplemental tool that could be added to a school library to help small segments enjoy reading for pleasure using audiobooks, QR codes and many other technology tools.

The second part of this discussion deals with classroom libraries. This qualitative case study was based on the school library, but during the study, some of the high school level reluctant readers used their classroom libraries to find books to read for pleasure. Captain

Underpants and Percy Jackson used a classroom library to find books to read. Only The Gaming

Flaco used the school's library on a regular basis. All three students had sustained silent reading,

but two of the three reluctant readers were not given time to visit the school's library. Six of the

seven high school level reluctant readers did not have structured time to visit the library. Captain

Underpants chose his book, when he discontinued reading *Junior Braves of the Apocalypse: A*

Brave Is Brave, by searching through the classroom library. Percy Jackson was recommended to

read a book given to him by his teacher from her classroom library. The enjoyment of AR apps

was not expanded to where the seven high school level reluctant readers might pick a book.

Pilgreen (2000) stated that a successful sustained silent reading program should include a

classroom library. With AR apps, the technology must be available, not only in the school's

library but also as an extension into the classrooms. If the students had visited the library, that

would have taken away from their sustained silent reading time. This research finding merges

sustained silent reading, reading for pleasure, and human influence (teacher, school librarian,

parents) for recommending books.

Recommendation for Future Research

Recommendation 1: AR Apps' Full Functionality

During the orientation interview, the seven high school level reluctant readers were

unable to view the AR apps and begin to explore the books (Figures 10 & 11). Miranda,

Williams-Rossi, Johnson and McKenzie (2011) experienced the same blocking of certain

websites, wi-fi issues, and school district permission for access to wi-fi, when studying eReaders

with middle school level reluctant readers. For this study to be a success, the researcher had to

independently download each book trailer from YouTube using keepvid.com and upload them to
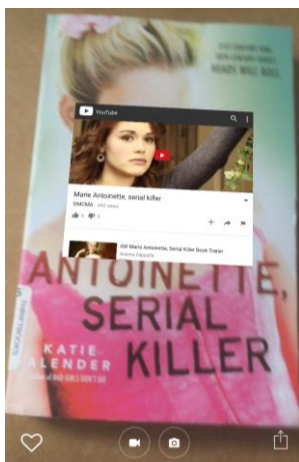
Aurasma and LayAR (Figures 10 & 11).

Figure 10. YouTube book trailer- Example 1
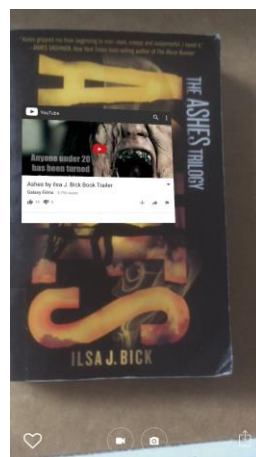
Figure 11. YouTube book trailer- Example 2

The book reviews from Goodreads.com worked perfectly, and they were not blocked by

the school district. The seven high school level reluctant readers found the videos to be the most

beneficial to them. Only 117 said that he enjoyed having the diversity of different ways to

connect with the book. The other seven high school level reluctant readers said they enjoyed the

videos only. Annabeth Chase and Spiderman pointed out that their dislike for the AR apps were

the technical problems. It is critical that the school district and the implementing school have

conversations about how to make the AR apps reliable. Although wi-fi bandwidth was not an

issue during this study, it is important that a school district and/or implementing school have

enough bandwidth to allow Aurasma, LayAR or any AR app to perform as soon as a book is

scanned by a student. Other issues a school district and/or implementing school should discuss

are the following:

- Bandwidth

- Blocking of YouTube

- Blocking of Aurasma or LayAR

- Personal device for student usage versus a dedicated iPad(s) for student usage

- How students will connect to the Aurasma or LayAR apps

Success was found with a few of the high school reluctant readers, although the technical and attendance issues and the personal cellphone use could have adversely affected to the study. In Interview 9, six of the seven high school level reluctant readers stated they would prefer a dedicated device for their viewing of the AR-recommended books and felt it should be linked to as many books as possible.

<u>Recommendation 2: School Library Usage</u>

Due to the school library being closed and the school library being in high demand, it was very hard to see the full effect of the AR apps in the school library. At the same time, a common theme of the use of classroom libraries emerged with sustained silent reading. If AR apps were implemented in a school's library would it reach the full pool of reluctant readers. Captain Underpants and Percy Jackson showed that they chose their reading materials from a classroom library based on a back cover description or a teacher's recommendation. Both Pilgreen (2000) and Krashen (2006) suggested that a successful sustained silent reading program must have a classroom library; AR apps and its accompanying technology must be studied in a classroom that has a classroom library. Excluding 117, Annabeth Chase, and Rupi Kaur, who did not have sustained silent reading in their schedules, the AR apps being available in the classroom might have changed the results of their engagement with the AR apps and the books recommended to

them. Classroom libraries are filled with books or genres the teacher could be unfamiliar with, and the AR apps could have helped the teacher help those who were unable to find time to visit the school library.

<div align="center">Recommendation 3: Teacher Involvement</div>

From the research and continuing the common theme from Recommendation 2, human influence was a vital part of this study. Krashen (2006) suggested that reading for pleasure must be constantly encouraged and reinforced by teachers and students alike to create a culture of loving to read. The researcher found that engagement with reading for pleasure came in the form of human influence. Percy Jackson finished the study by reading a book, *Hunger Games: Catching Fire*, based on a teacher's recommendation of. On the opposite side of the research, Annabeth Chase did not chose a book but was influenced to read three books by her teacher, her mother, and her viewing of a movie. Rupi Kaur and 117 were reading books, but the researcher found that they might be reading the books based on the personality of the researcher. Although both Rupi Kaur and 117 were successful in their progress of reading, both showed an interest in the researcher by wanting to stay with him after Interview 9. The Gaming Flaco mentioned he frequently references the book binder available in the library, which has synopses of the books the school librarian recommends or those on the state's award lists. These findings suggest that human influence is a huge part of the AR apps success.

In fairness, the book binder, classroom libraries, and a movie are all supplemental tools for a teacher or school librarian to help students read for pleasure. AR apps showed that it could be a beneficial supplemental tool to help reluctant readers choose a book from a genre they might enjoy. Further research is needed to see the scope of the teachers' and school librarians'

influence. In Interview 9, many of the high school reluctant readers in the study stated they would like the AR apps connected to as many books as possible. The seven high school level reluctant readers said they would like it on as many books as possible. This leads to more research on how teachers recommend books and why the reluctant readers would want AR apps on every book in the library. This would be a huge undertaking by any library to connect as many books as possible. The students felt they would like the largest selection of books rather than being limited to a book or shelf of books.

This finding was very major of this study is that teacher involvement is very important. Lifelong long readers are created by reading for pleasure. Krashen, 1993, 1995, 2006, Jenkins, 2009, Whitmire, 2010, and Allyn, 2011 found that students must be allowed to choose their reading material without direction from the teacher or school librarian and must be allowed to pick their own genre without influence from teachers or parents. However, in this study, all seven high school level reluctant readers mentioned they were influenced to read a book over the past year because a teacher, school librarian, parent family member or friend recommended a certain book to them or they were not reading at all. In this study, the seven high school level reluctant readers were given the AR apps and 55 books to choose from. Everyone except Annabeth Chase voluntarily chose a book without human influence. That was a success for this study, but for continued reading and for self-selected reading, the seven high school level reluctant readers said they would like as many books as possible to be connected to the AR apps. There would need to be future research to maintain the balance of human influence and self-selected reading with the AR apps to ensure that reluctant readers have as many choices as possible when selecting their reading materials. This study was limited to 55 books from the researcher's influence and the American Library Association's reluctant reader list, which was

made with professional librarians' influence. After high school, high school reluctant readers most likely need to be intrinsically motivated to continue reading for pleasure.

<p style="text-align:center">Recommendation 4: Gamers and the AR Apps</p>

In Interview 9, the researcher asked 117 and The Gaming Flaco if they were gamers. Both had chosen names based on video games and had expressed interest in gaming and the AR apps in Interview 1. Both high school reluctant readers were highly comparable in their results of reading for pleasure after using the AR apps and expressed high engagement with the AR apps. Although 117's enjoyment of the AR apps was extrinsically motivated by meeting with the researcher, he did note that he did not have free time during the school day to read and that he had academic tests that took precedence over reading for pleasure. 117 was still very successful in finishing two of the books he chose through the AR apps. He asked to keep the book *Hush, Hush* after the study had concluded. The Gaming Flaco differed slightly, as he had free reading time (sustained silent reading) that he could use during the day to read and he could visit the school library for new books.

This case study was based on reluctant readers, but the success of 117 and The Gaming Flaco could have been due to their enjoyment of gaming. In an interview with Jim Hahn, he said: "Augmented reality is a great tool that can bring new users, who might not have ever stepped into a school library" (personal communication, 2016). Hahn (2016) continued that computer science majors often look things up on the internet. He felt that augmented reality might bring the computer science majors to the university library. In a personal interview with Dave Gagnon, director of the ARIS project – an augmented reality gaming system, he stated that augmented

reality could be used in the school library. He expressed that it could help students find the books they would like to read.

This study suggests that augmented reality in a school library could be useful for small segments of the population that may not be interested in other conventional methods to help them find books in a school library.

<center>Recommendation 5: Sex and Race</center>

Rupi Kaur was often absent and missed five interviews and an observation with the researcher. She was very important to this study because reluctant readers typically have academic issues, as stated by Krashen (1993, 1995, 2006). If a Google search is done for the search terms "reluctant readers academic issues," around 3 million results will be produced. Although this was not ideal for a scholarly study, academic issues impede reluctant readers.

Including Rupi Kaur was important because Annabeth Chase was the only other female in this study. The results of the study demonstrated that both females did not read a book and that Annabeth Chase was the only participant who did not chose a book after using the AR apps. This study's focus was on reluctant readers, but the participants were Hispanic, freshmen and predominantly male.

In a qualitative study, Creswell (2012) suggested that a qualitative study be a pool of three to six study participants. This case study used seven high school level reluctant readers to establish proper equality. The success was mainly found among the male students over the female students. Rupi Kaur may have been influenced by the human influence of the researcher or needing relevance before reading the material she chose, whereas Annabeth Chase stated she was reading three books, which she did not complete. Annabeth Chase was influenced to read

the three books by her teacher, her mother, and after seeing a movie. There would need to be a deeper study to test if female reluctant readers are more receptive to a human influencer over technology recommendations.

For race, all seven high school level reluctant readers were of Hispanic origin, but that was expected as the school population is over 50% Hispanic origin (IIRC, 2016). A more heterogeneous group could produce different results, as could a higher socioeconomic status of the students or a school district in a different part of the country. The researcher would like to repeat this study at an urban high school with six high African American students, as Krashen (2013) mentioned in a personal interview that low-cost technology could be the most beneficial to low socioeconomic minority students. At the same time, the effect of AR apps on a student's motivation or relevance to read for pleasure should not change regardless of a student's demographics.

Conclusion

Researchers reading this study may have the opinion that seven high school level reluctant readers is not a large enough study to know how or whether AR apps affect reluctant readers in a school library. In the end, this study was conducted to find out if AR apps and their adjoining technology could be beneficial to a small segment of students, essentially reluctant readers. Reluctant readers are students who do not read for pleasure and are not motivated by the recommenders available in school libraries and/or society. AR apps are another tool to help reluctant readers read for pleasure. As we know from Krashen's (1993, 1995, 2006) research, reading for pleasure can help a child be academically success in the present or in the future or may help them achieve a level of education and learning they never considered. Life-long

reading could open new doors for these readers. With many school libraries being the center of

for reading in a school, it could be the place to embrace this technology. Although AR apps

failed to help one high school reluctant reader, other issues and factors played an important role

in each of the seven high school level reluctant readers' successes and failures. Rupi Kaur

showed her frustration at not having time to read during the school day. If she had structured

sustained silent reading, would the results have been different? From a few pages to finishing

two entire books, six of the high school reluctant readers were encouraged to read.

Future research will be needed to find the path of how AR apps can help girls, high

socioeconomic schools, and many more reluctant readers. Also, technical issues could be a

barrier for a school to begin the use of AR apps. A smaller research study can be conducted on

special populations, such as gamers, to study if AR apps would motivate gamers to read for

pleasure. The main recommendation for research is the combination of AR apps in classroom

libraries, sustained silent reading, and teacher involvement. Both Spiderman and Percy Jackson

were influenced to read books during their sustained silent reading time from their classroom

libraries with a teacher's influence rather than the AR apps. Much research has been done on

reluctant readers and the influence of not reading for pleasure on their academic success. This

study poses a possible solution to help those reluctant readers read for pleasure.

During the study, 117 and The Gaming Flaco finished the books recommended by the

AR apps. In a school of 2,600 students, two students represents only .0007% of the school's

population. 117, a student without any time to read during the day, took the time to read three

books during the study. He finished *Ready Player One* in one night. He finished *I Am a Seal

Team Six Warrior: Memoirs of an American Soldier* by the end of the study and was continuing

to read *Hush, Hush*. When the researcher explained that the study was coming to an end, he

observed 117's sadness. The researcher said, "You can keep the books until you are done reading them and turn them in to the school librarian whenever you finish with them." 117 smiled at the researcher. The Gaming Flaco showed the same reaction. Even Rupi Kaur, who reported in the final interview that she had only read a couple of pages, had the same reaction as 117. All three students held an AR apps recommended book. Of these three cases, these three students found relevance, whether through the AR apps or human influence. AR apps could continue to help these students find books in the future. The relevance will come from the human influence to use AR to find books. With AR apps, we could help reluctant readers step forward academically and read for pleasure.

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APPENDIX A

LETTER TO PRINCIPAL-HIGH

██████████,

My name is Kai Rush and I am a doctoral candidate at Northern Illinois University. During September and November of the 2016-2017 school year, I will be conducting research for my dissertation. My research topic is *Augmented Reality (AR): A school library tool to engage high school students to read for pleasure*. I have linked many books to a 3D graphic, YouTube book trailer or poll to engage students and help them self-select books. This project is to study if augmented reality can motivate students to read for pleasure and/or self-select books to read for pleasure.

I need your assistance with this research project, as I would like to send out a request to your librarian, English and Social studies teachers. I could have used many different selection tools to pull students, but I feel teacher-selection is the strongest selection tool in education. No one knows a student better than a teacher. Since this research project will be conducted immediately once school begins in the fall, I need the teachers to recommend students for this project by the end of the school year. The teachers can type a list of students or print a roster and highlight the students. The students will be put into a pool and seven high school level reluctant readers will be randomly selected. With the help of your staff, I will ask for parent permission to interview them every week on Friday for 9 weeks. The interview will take no longer than 20-30 each and the student can meet with me during a study hall period, after school or a time chosen by you. In addition, I would like to observe the students three times checking out books on specific Tuesdays. For confidentiality, their names will be replaced with fictitious characters from books. There is no benefit to this study, other than the encouragement to read for pleasure and snacks, when interviewing with me. If you would like to see a form of the requested information, please go to: https://goo.gl/6QhDmZ. If you have any questions, please contact me. I hope you can help me with this project!

Kai Rush
Krush2@niu.edu

APPENDIX B

LETTER TO TEACHERS-HIGH SCHOOL

Dear Sunwater High School teachers,

My name is Kai Rush and I am a doctoral candidate at Northern Illinois University. During September and November of the 2016-2017 school year, I will be conducting research for my dissertation. My research topic is *Augmented Reality (AR): A school library tool to engage high school students to read for pleasure*. I have linked many books to a 3D graphic, YouTube book trailer or poll to engage students and help them self-select books. This project is to study if augmented reality can motivate students to read for pleasure and/or self-select books to read for pleasure.

I need your assistance with this research project. I could have used many different selection tools to pull students, but I feel teacher-selection is the strongest selection tool in education. No one knows a student better than a teacher. Since this research project will be conducted immediately once school begins in the fall, I would like for you to recommend current freshmen and sophomores you feel are reluctant readers. Also, students who struggle to self-select books from the library. This behavior may have been observed during sustained silent reading or any time you have allowed students to select books for a classroom projects or pleasure reading. You can type a list of students or print your roster and highlight the students. They will be put into a pool and seven high school level reluctant readers will be selected randomly. I will ask for parent permission to interview them every week on Friday for 9 weeks. The interview will take no longer than 20-30 each and the student can meet with me during a study hall period, after school or a time chosen by you. In addition, I would like to observe the students three times checking out books on specific Tuesdays. For confidentiality, their names will be replaced with fictitious characters from books.

There is no benefit to this study, other than the encouragement to read for pleasure and snacks, when interviewing with me. **The list can be electronically sent to disneyprofessor@gmail.com or dropped off in the front office in an envelope with my name on the front.** If you would like to print a form of the information needed, please go to: https://goo.gl/6QhDmZ . If you have any questions, please send them to Kai Rush (disneyprofessor@gmail.com). I hope you can help me with this project!

Kai Rush
disneyprofessor@gmail.com

APPENDIX C

PARENT PERMISSION FOR CHILD TO PARTICIPATE IN A RESEARCH STUDY

Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for pleasure

Investigator(s):

Kai Rush (krush2@niu.edu)

Research Sponsor:

Dr. Rebecca Hunt, Associate Professor, Educational Technology, Research and Assessment (rhunt@niu.edu)

Introduction

My name is Kai Rush. I am a doctoral candidate in the Department of Educational Technology, Research and Assessment at Northern Illinois University. I am doing a research study on the use of augmented reality (AR) to help students pick books in a school library. This case study is to investigate if Augmented Reality apps can be a benefit to students in a school library. In this case study, Augmented Reality (AR) will be used to take 3D virtual objects and attach those 3D virtual objects to book covers and book spines. Augmented Reality will allow a student, with a mobile device to explore books with their cellphone through two apps, LayAR and Aurasma. PokemonGo is a perfect example of a game that is using Augmented Reality. This study, will use Augmented Reality apps to help students find books they might want to read. We invite your child, with your permission, to participate (be a "subject") in this case study.

Before you and your child decide whether he/she will be part of this study, it's important for all of you to understand why we're doing the research and what's involved. Please read this form carefully. We encourage you to discuss the study with your child. If you or your child has questions about the research, feel free to ask me.

Purpose

The purpose of this case study is to find if high school reluctant readers will be engaged by using augmented reality apps in a high school library. With technology in today's society, augmented reality could help students find books that interest them.

The goal is to find out how students feel about using the augmented reality apps to help them find books in the library. The results will be used to help other students and teachers in the future.

Procedures

If your child is selected, and you agree, the researcher will meet with him or her during their study hall period, during lunch, English class (teacher permission) or after school every Friday for nine weeks. The researcher and student will meet in the Principal's conference room at a table and talk about what the student liked about reading and their

attitudes toward the Augmented Reality apps. The researcher will ask them the same eight questions, but this is a qualitative case study, so a student may talk freely and begin a discussion. The researcher will record the meeting, as to transcribe what your child said into a dissertation. If he/she agrees to being recorded, but feels uncomfortable at any time during the interview, the recording device can be stopped, or conclude the interview at his/her request at any time. The interview will take about 15-20 minutes, every week, with a 45-minute orientation. During the 45-minute orientation, there will be three objectives:

I.   The students will learn what Augmented Reality is and how it is used in society around them.

II.   The students will be introduced to the Aurasma and LayAR apps and their functionality with the 50 books that have 3D virtual objects attached to them.

III.   The students will examine at least three books, using the Aurasma and/or LayAR apps, to exhibit they know how to use the AR apps for future exploration of the 50 books on their own.

In addition, the students will be invited to the library to check out books by using the AR apps, while the researcher observes how they use the AR system. These observations will take place on three separate Tuesdays during the nine weeks. These observations should take no more than 10-15 minutes, depending on how in-depth your child would like to explore.

Study location: Learning Resource Center, Principal's Conference Room

Benefits

There are no benefits to you or your child personally for taking part in this study. However, we hope that the results of the research will help us develop technological tools for the school library to help readers find books that they want to read for pleasure.

Risks/Discomforts

Your child might get bored or tired and decide that he or she does not want to complete the study activities. If so, your child can just tell me that he or she wishes to stop.

Confidentiality

Confidentiality: Your child will pick a fictitious name from their favorite novel, so they will only be identified by that fictitious name. Only the researcher, yourself and your child, will

be able to identify your responses and your fictitious name.

Rights

Participation in research is completely voluntary. You have the right to decline to allow your child to participate or to withdraw your child at any point in this study without penalty or loss of benefits to which you are otherwise entitled. Your child has the same rights to decline to participate or withdraw from the study at any time.

Questions

You and your child can ask questions about this study at any time, now or later. You can talk to me at any time during the study. You can contact me, *Kai Rush*, at ***krush2@niu.edu***. I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588.

PARENT PERMISSION

If you decide that your child* may participate in this study, ***please sign and date below***. We will give you a copy of this form to keep for future reference.

_____

*Child Participant Name (*please print*)

_____   _____

Parent/Guardian's Name (*please print*)   Date

_____   _____

Parent/Guardian's Signature (if required)   Date

APPENDIX D

CHILD ASSENT FORM- STUDENTS THAT ARE 18 YEARS OF AGE OR YOUNGER

Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for pleasure

Investigator(s):
Kai Rush (krush2@niu.edu)

Research Sponsor:
Dr. Rebecca Hunt, Associate Professor, Educational Technology, Research and Assessment (rhunt@niu.edu)

These are some things we want you to know about this study:
This case study is to investigate if Augmented Reality apps can be a benefit to students, like you, in a school library. In this case study, Augmented Reality (AR) will be used to take 3D virtual objects and attach those 3D virtual objects to book covers and book spines. Augmented Reality will allow a student, with a mobile device to explore books with their cellphone through two apps, LayAR and Aurasma. PokemonGo is a perfect example of a game that is using Augmented Reality. This study, will use Augmented Reality apps to help students find books they might want to read.

Why am I being asked to be in this research study?:
You have been identified as a student, who might enjoy having extra tools, to find books you might want to read for pleasure. In past studies, some students found that audiobooks, QR codes and other types of technology tools helped them find books they enjoyed reading. Over a nine week period, you will have the chance to investigate 50 books with the Augmented Reality (AR) apps, LayAR and Aurasma, and give your feedback to the researcher, Kai Rush, in a weekly interview. In addition, the researcher will ask you to attend three observations and a 45-minute orientation to explain what Augmented Reality (AR) is and how you will use it with the selected books in the library.

What is the study about?:
The purpose of this case study is to find if high school students will be engaged by augmented reality apps used in a high school library. With technology in today's society, augmented reality could help students find books that interest them.

What will happened during this study?:
If you are selected, and you agree, the researcher will meet with you during your study hall period, during lunch, English class (teacher permission) or after school every Friday for nine weeks. You can chose which of the times will be best for you. The researcher and student will meet in the Principal's conference room at a table to talk about what you like about reading and using the Augmented Reality (AR) apps. The researcher will ask you the same eight questions every week and will record the meeting. If you agree to being recorded, but feel uncomfortable at any time during the interview, the researcher can turn off the recording device, or stop the interview at your request at any time. The interview

will take about 15-20 minutes, every week, with a 45-minute orientation. During the 45-minute orientation, there will be three objectives:

I.   The students will learn what Augmented Reality is and how it is used in society around them.

II.   The students will be introduced to the Aurasma and LayAR apps and their functionality with the 50 books that have 3D virtual objects attached to them.

III.   The students will examine at least three books, using the Aurasma and/or LayAR apps, to exhibit they know how to use the Augmented Reality (AR) apps for future exploration of the 50 books on their own.

In addition, you will be invited to the library to check out books by using the Augmented Reality (AR) apps, while the researcher observes how you use the Augmented Reality (AR) system. These observations will take place on three separate Tuesdays during the nine weeks. These observations should take no more than 10-15 minutes, depending on how in-depth you would like to explore. I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588.

Would you like to be a part of our research study?
Please check one.
_____ Yes _____ No

_____
Student's signature

APPENDIX E

INFORMED CONSENT FORM- STUDENTS THAT ARE 18 YEARS OF AGE
OR OLDER

Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for pleasure

Investigator(s):

Kai Rush (krush2@niu.edu)

Research Sponsor:

Dr. Rebecca Hunt, Associate Professor, Educational Technology, Research and Assessment (rhunt@niu.edu)

Introduction

My name is Kai Rush. I am a doctoral candidate in the Department of Educational Technology, Research and Assessment at Northern Illinois University. I am doing a research study on the use of augmented reality (AR) to help students pick books in a school library. This case study is to investigate if the Augmented Reality apps can be a benefit to students in a school library. In this case study, Augmented Reality (AR) will be used to take 3D virtual objects and attach those 3D virtual objects to book covers and book spines. Augmented Reality will allow a student, with a mobile device to explore books with their cellphone through two apps, LayAR and Aurasma. PokemonGo is a perfect example of a game that is using Augmented Reality. This study, will use Augmented Reality apps to help students find books they might want to read. We invite your child, with your permission, to participate (be a "subject") in this case study.

Before you decide whether you will be part of this study, it's important for you to understand why we're doing the research and what's involved. Please read this form carefully. If you have questions about the research, feel free to ask the researcher, Kai Rush (krush2@niu.edu).

Why am I being asked to be in this research study?:

You have been identified as a student, who might enjoy having extra tools, to find books you might want to read for pleasure. In past studies, some students found that audiobooks, QR codes and other types of technology tools helped them find books they enjoyed reading. Over a nine week period, you will have the chance to investigate 50 books with the Augmented Reality (AR) apps, LayAR and Aurasma, and give your feedback to the researcher, Kai Rush, in a weekly interview. In addition, the researcher will ask you to attend three observations and a 45-minute orientation to explain what Augmented Reality (AR) is and how you will use it with the selected books in the library.

What is the study about?:

The purpose of this case study is to find if high school students will be engaged by augmented reality tools used in a high school library. With technology in today's society, augmented reality could help students find books that interest them.

What will happened during this study?:

If you are selected, and you agree, the researcher will meet with you during your study hall period, during lunch, English class (teacher permission) or after school every Friday for nine weeks. You can tell me the best time to call for you once a week. The researcher and student will meet in the Principal's conference room at a table and talk about what you like about reading and using the Augmented Reality (AR) apps. The researcher will ask you the same eight questions every week and will record the meeting.

If you agree to being recorded, but feel uncomfortable at any time during the interview, the researcher can turn off the recording device, or stop the interview at your request at any time. The interview will take about 15-20 minutes, every week, with a 45-minute orientation. During the 45-minute orientation, there will be three objectives:

I.   The students will learn what Augmented Reality is and how it is used in society around them.

II.   The students will be introduced to the Aurasma and LayAR apps and their functionality with the 50 books that have 3D virtual objects attached to them.

III.   The students will examine at least three books, using the Aurasma and/or LayAR apps, to exhibit they know how to use the Augmented Reality (AR) apps for future exploration of the 50 books on their own.

In addition, you will be invited to the library to check out books by using the Augmented Reality (AR) apps, while the researcher observe how you use the Augmented Reality (AR) system. These observations will take place on three separate Tuesdays during the nine weeks. These observations should take no more than 10-15 minutes, depending on how in-depth you would like to explore.

Benefits

There are no benefits to you personally for taking part in this study. However, we hope that the results of the research will help us develop technological apps for the school library to help readers find books that they want to read for pleasure.

Risks/Discomforts

You might get bored or tired and decide that you do not want to complete the study's activities. If so, you can tell me to stop.

Confidentiality

 You will pick a fictitious name from your favorite novel, so you will only be identified by that fictitious name. Only the researcher and you will be able to identify your responses and your fictitious name.

Rights

Participation in research is completely voluntary. You have the right to decline to participate or to withdraw at any point in this study without penalty or loss of benefits to which you are otherwise entitled.

Questions

You can ask questions about this study at any time, now or later. You can talk to the researcher at any time during the study. You can contact *Kai Rush* at ***krush2@niu.edu***.

Statement of Consent:

By signing this consent form you certify you are at least 18 years of age and agree to participate in the project entitled, Augmented Reality (AR): A school library tool to engage

high school reluctant readers to read for pleasure. I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588.

_____   _____

Signature   Date

APPENDIX F

AUDIO RECORDING AUTHORIZATION FORM

Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for

pleasure

Investigator(s):
Kai Rush (krush2@niu.edu)

Research Sponsor:
Dr. Rebecca Hunt, Associate Professor, Educational Technology, Research and Assessment

(rhunt@niu.edu)

During your participation in this research study, Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for pleasure, you will be audio recorded. If you agree to being recorded, but feel uncomfortable at any time during the interview, the researcher can turn off the recording device, or stop the interview at your request at any time.

A digital recorder and an iPad will be used to record during our interviews every week. After the study, the researcher will save the audio recordings on a flash drive for future reference.

Statement of Consent:
By signing this consent form you certify you are at least 18 years of age and give your permission for audio recording(s) produced in the study, Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for pleasure, which contains voice recordings of me, to be used for the purposes listed above, and to also be retained for 10 years. I understand that if I wish further information regarding my rights as a research subject, I may contact the Office of Research Compliance at Northern Illinois University at (815) 753-8588.

_____   _____

Student's Signature   Date

_____   _____

Signature of parent or guardian   Date
(Please sign If your child is under the age of 18)

APPENDIX G

PSEUDONYM FORM

Augmented Reality (AR): A school library tool to engage high school reluctant readers to read for pleasure

Investigator(s):

Kai Rush (krush2@niu.edu)

Research Sponsor:

Dr. Rebecca Hunt, Associate Professor, Educational Technology, Research and Assessment (rhunt@niu.edu)

During your participation in this research study, you will be referred to by a fictitious name in audio recordings, field notes and in the final published dissertation. Once you pick a pseudonym name below, you will be referred to by that name during the study. The only individuals who will be able to link your real name to your pseudonym name is the researcher and yourself. Your parents may request your pseudonym, if you are under the age of 18, through verbal or written request.

Please pick a fictitious character from a book or magazine that you would like to be referred to. If you do not have a favorite character from a book, please pick from the list below:

_____

Pseudonym name

| Young Adult Fictitious Name	Book
Katniss Everdeen	*The Hunger Games*
Percy Jackson	*Percy Jackson and the Olympians*
Hermione Granger	The *Harry Potter* book series
Trish Prior	*Divergent*
Carl Grimes	*The Walking Dead*
Spider Man	The *Spider Man* series
Jazz Dent	*I Hunt Killers*
Alaska Young	*Looking for Alaska*
Freesia Summers	*Bubble World*

APPENDIX H

ORIENTATION PRESENTATION

AUGMENTED REALITY (AR): A SCHOOL LIBRARY TOOL TO ENGAGE HIGH SCHOOL RELUCTANT READERS TO READ FOR PLEASURE

DISSERTATION
BY KAI RUSH, ABD
DR. REBECCA HUNT, COMMITTEE CHAIR
DR. WEI-CHEN HUNG, COMMITTEE MEMBER
DR. PI-SUI HSU, COMMITTEE MEMBER

WHAT IS THIS STUDY ABOUT?

THIS CASE STUDY IS TO INVESTIGATE IF **AUGMENTED REALITY APPS** CAN BE A BENEFIT TO **STUDENTS**. AUGMENTED REALITY WILL ALLOW YOU, WITH A MOBILE DEVICE TO EXPLORE BOOKS WITH THEIR CELLPHONE THROUGH TWO APPS, **LAYAR** AND **AURASMA**. THIS STUDY, WILL USE AUGMENTED REALITY APPS TO HELP STUDENTS FIND BOOKS THEY MIGHT WANT TO READ FOR PLEASURE.

EXAMPLE
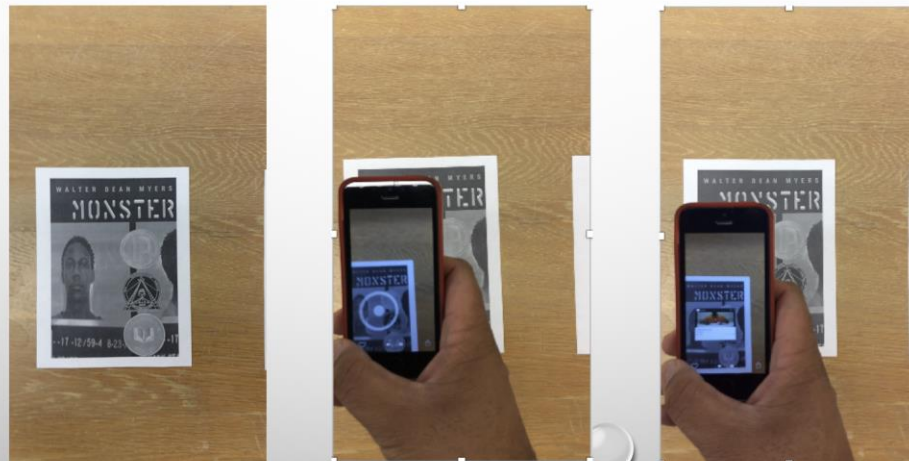
WHAT DO I NEED FROM YOU?

- ORIENTATION

- INTRODUCTION MEETING

- 9 INTERVIEWS (ONCE PER WEEK)

- 3 OBSERVATIONS

- REVIEWING OF MY NOTES AFTER EVERY MEETING

DOWNLOADING THE APPS

DEMOGRAPHIC SHEET

- FICTITIOUS NAME
- DEMOGRAPHIC SHEET

APPENDIX I

QUESTIONS- ORIENTATION/ WEEKLY INTERVIEWS

Orientation questions

Reading

What do you like to read?

If you do not read books, why do you not read books that you enjoy?

Where do you like to read?

What books or magazines appeal to you?

Do you like digital, hardcover or softcover books? Why? (Examples will be on the interview table)

Have you ever used YouTube to find books you might like?

Inspiration to read

What was the first thing you ever read?

What is your favorite type of books?

Are you given free time or structured time to read anything during the school day or at home?

If you read a book, magazine or any other source of reading material, what or who made you read it?

Augmented Reality

Do you know what Augmented Reality is?

Do you have an iPhone, smartphone or iPad?

What do you think about your phone being able to help you find books?

School's quarter semester (9 weeks) questions- (conducted weekly)

Augmented Reality

What are your thoughts on the augmented reality apps?

Do you believe that AR usage would be useful in a school library to find books?

What was your favorite type of 3D image, when used the augmented reality apps?

Reading

What books did you read?

Inspiration to read

How many pages of the book or any book have you read so far?

What was the main influencer for you to read this book (friends, the augmented reality app, your parents, the bookcover, etc.)

What books or magazines do you feel you might read in the future?

Additional questions

What was your favorite app, Aurasma or LayAR? (Interview 5)

How would you rate the books you read or that you remember reading? (Interview 4)

When are you reading the book you pick or any book? (added after Interview 3)

Do you feel gaming is like AR? (Interview 9- 117 & The Gaming Flaco)

APPENDIX J

SCHOOL LIBRARY RECORDING SHEET

No	Student	Notes (Books checked out or visits- Please record date(s) or the asset tags control number of any books checked out
1	Student 1 (named removed for confidentiality)	
2	Student 2 (named removed for confidentiality)	
3	Student 3 (named removed for confidentiality)	
4	Student 4 (named removed for confidentiality)	
5	Student 5 (named removed for confidentiality)	
6	Student 6 (named removed for confidentiality)	
7	Student 7 (named removed for confidentiality)	

APPENDIX J

BOOKS SELECTED FOR THIS RESEARCH STUDY

| Title of book	Author of book	Control Number	Referenced from:
An Abundance of Katherines	Green, John	AURA NIU1028	Kai Rush
Annie on my mind	Garden, Nancy	AURA NIU1014	Kai Rush
Ashes	Bick, Lisa J	AURA NIU1040	YALSA 2014 Pick
Bad Boy	Jordan, Dream	AURA NIU1008	YALSA 2014 Pick
Bike Thief	Feutl, Rita	AURA NIU1036	YALSA 2015 Picks
Caged Warrior	Sitomer, Alan Lawrence	AURA NIU1012	YALSA 2014 Pick
Crank	Hopkins, Ellen	AURA NIU1038	Kai Rush
Eragon	Paolini, Christopher	AURA NIU1031	YALSA 2016 Picks
Dead End In Norvelt	Gantos, Jack	AURA NIU1052	Kai Rush
Duplicity	Traver, N. K.	AURA NIU1051	YALSA 2016 Picks
Feed	Anderson, M.T.	AURA NIU1029	Kai Rush
Hold Me Closer	Levithan, David	AURA NIU1024	Kai Rush
How it Went Down	Magoon, Kekla	AURA NIU1010	YALSA 2014 Picks
Hush, Hush	Fitzpatrick, Becca	AURA NIU1050	Kai Rush
Incantation	Hoffman, Alice	AURA NIU1051	Kai Rush
I Am a Seal Team Six Warrior: Memoirs of an American Soldier	Wasdin, Howard E.; Templin, Stephen	AURA NIU1044	YALSA 2014 Pick
I am J	Beam, Cris	AURA NIU1046	Kai Rush
I Hunt Killers	Lyga, Barry	AURA NIU1043	YALSA 2014 Pick
In Darkness	Lake, Nick	AURA NIU1039	Kai Rush

Junior Braves of the Apocalypse: A Brave Is Brave	Smith, Greg	AURA NIU1030	YALSA 2016 Picks
Killer Instinct	Green, S. E.	AURA NIU1037	YALSA 2015 Picks
Life as we knew it	Smith, Jennifer E.	AURA NIU1025	YALSA 2014 Pick
Marie Antoinette, Serial Killer	Alender, Katie	AURA NIU1034	YALSA 2015 Picks
Monster	Myer, Walter Dean	LAYAR NIU1003	Kai Rush
More Happy than not	Silvera, Adam	AURA NIU1018	Kai Rush
Need	Charbonneau, Joelle	LAYAR NIU1002	YALSA 2016 Picks
Next	Crichton, Michael	AURA NIU1015	Kai Rush
No Safety in Numbers	Lorentz, Dayna	AURA NIU1042	YALSA 2014 Pick
Peak	Smith, Roland	AURA NIU1033	Kai Rush
Penny Chic: How to Be Stylish on a Real Girl's Budget. 2014	Miller, Shauna	AURA NIU1048	YALSA 2016 Picks
Putting makeup on a fat boy	Wright, Bill	AURA NIU1047	Kai Rush
Ready Player One	Cline, Ernest	LAYAR NIU1005	Kai Rush
Scarlett Undercover	Latham, Jennifer	AURA NIU1023	YALSA 2016 Picks
Shiver	Stiefuater, Maggie	AURA NIU1035	YALSA 2015 Picks
Skink No Surrender	Hiaasen, Carl	AURA NIU1006	YALSA 2016 Picks
Speak	Anderson, Laurie Halse	AURA NIU1016	Kai Rush
Straight Punch	Polak, Monique	AURA NIU1011	YALSA 2014 Pick
Street Love	Myer, Walter Dean	AURA NIU1017	Kai Rush
Survive The Night	Vega, Danielle	AURA NIU1007	YALSA 2016 Picks

Swagger	Deuker, Carl	LAYAR NIU1000	YALSA 2015 Picks
Tap Out	Devine, Eric	AURA NIU1041	YALSA 2014 Pick
Tears of a Tiger	Draper, Sharon	AURA NIU1026	Coretta Scott King Award
Tell Me Again How A Crush Should Feel	Farizan, Sara	AURA NIU1009	YALSA 2015 Picks
The Book of Unknown Americans	Henriquez, Cristina	LAYAR NIU1001	Kai Rush
The Catcher in the Rye	J.D. Salinger	AURA NIU1045	Kai Rush
The Chocolate War	Cormier, Robert	AURA NIU1032	Kai Rush
The Dead	Higson, Charlie	AURA NIU1022	Kai Rush
The Game of Love and Death	Brockenbrough, Martha	AURA NIU1021	Kai Rush
The Lovely Bones	Sebold, Alice	AURA NIU1019	Kai Rush
Uglies: Shay's Story	Westerfield, Scott	AURA NIU1013	YALSA 2016 Picks
Unchained	Tillit, L.B	AURA NIU1049	YALSA 2014 Pick
Wicked Lovely	Marr, Melissa	AURA NIU1020	Kai Rush

APPENDIX K
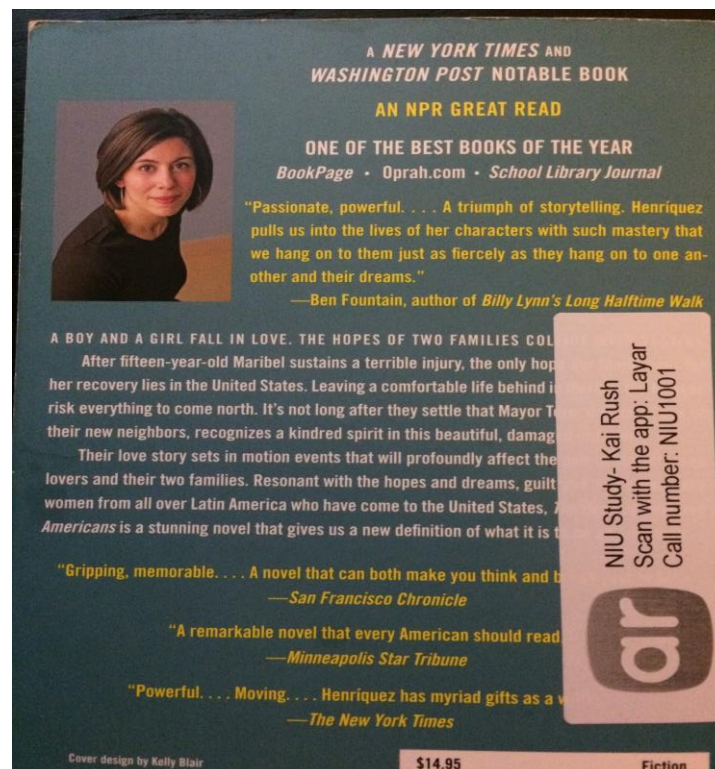
ASSET TAGS
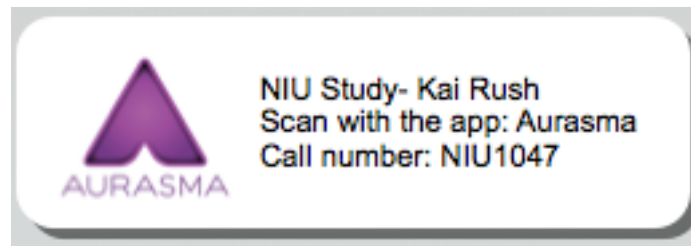
Aurasma Tag
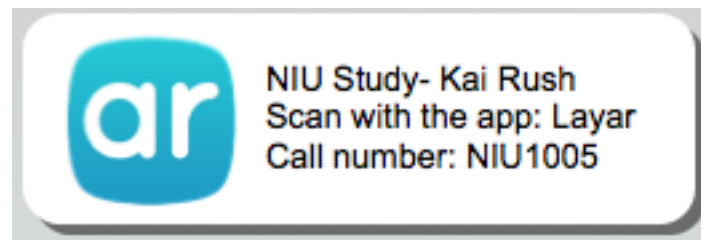
LayAR Tag

Placement of 1 label

Placement of 2 label

APPENDIX L

QUALITATIVE DATA ANALYSIS CHART

Collection Type	Correlating question or observation	Codes	Categories	Common Themes
Interview	Do you know what Augmented Reality is?	AR Usage	-Yes -No	Reported in Chapter 4 (Theme #1C)- This question was used for demographics to find out what background the seven high school reluctant readers had with Augmented Reality.
Interview	Do you believe that AR usage would be useful in a school library to find books?	AR Usage in the school library Usage of AR to find books	-Positive Opinions -Negative Opinions	Reported in Chapter 4 (Theme #1B, Theme #2A, Theme #2D): This question was one of the most important questions in the study, as the seven high school reluctant readers gave their feedback on the AR, the AR apps and its usage for future library usage.
Interview	What are your thoughts on the augmented reality apps?	Opinion of AR apps	-Likes -Dislikes	Reported in Chapter 4 (individual cases), Chapter 4 (Theme #1C) and Chapter 5 (Discussion #1): This question was one of the most important questions in the study, as the seven high school reluctant readers were able to give their opinions on the likes and dislikes of the AR apps and the experience it provided.
Interview	What was your favorite type of 3D image, when used the augmented reality apps?	Favorite 3D image	-Book trailer -Twitter -Book review -All	Reported in Chapter 4 (individual cases) and Chapter 4 (Discussion 1): This question was asked to investigate what features of the AR apps the seven high school reluctant readers preferred.
Interview	What was your favorite app?	Favorite App	-Aurasma -LayAR -Both	Reported in Chapter 4 (individual cases), Chapter 4-This question was asked to investigate if the seven high school reluctant readers preferred Aurasma, LayAR or both AR apps.
Observation		AR apps used		
Interview	What was the main influencer for you to read this book (friends, the augmented reality app, your parents, the book cover, etc.)	Main influencer to read the current book	-AR apps -Teacher -Mother -Internet -Sister -Movie -Book binder -Librarian	Reported in Chapter 3 (individual cases), Chapter 4 (individual cases, Theme #2B, Theme #2C, Theme #2D) and Chapter 5 (Discussion 2)- This question was one of the most important questions in the study, as the seven high school reluctant readers were able to name the whom or what influenced them to read.
Interview		Recommender		

Collection Type	Correlating question or observation	Codes	Categories	Common Themes
Interview	How would you rate the books you have read?	Rating of the book chosen	Scale 1-10	Reported in Figure 9, Chapter 4 (Theme #2D) and Chapter 5 (Discussion #1)- This question allowed students to name books that they could remember and rate those books from 1-10. This helped the researcher to understand where the AR apps-recommended books ranked.
Interview	Are you given free time or structured time to read anything during the school day or at home?	SSR	-SSR -At home -Does not read	Reported in Chapter 3 (individual cases), Chapter 4 (individual cases, Theme #1, Theme #2) and Chapter 5 (Discussion 1)-This question was one of the most important questions in the study, as the seven high school reluctant readers were able to discuss when they read, if they had sustained silent reading (SSR) in one of their classes and/or their opinions in finding time to read.
		When do you read?		
Observation		Checking out books	-Cover -Back of the book -Read pages -Viewed the AR app only	Reported in Chapter 4 (individual cases and Theme #2C)- This observation was made by the researcher, during observation #1 and #2, while the seven high school reluctant readers browsed the books with the AR apps.
Interview	Do you have an iPhone or iPad?	Personal cellphone	-Yes -No	Reported in Chapter 3 (individual cases)- This question helped the researcher understand the need for an iPad over personal cellphones in the study.
Interview	What books did you read? How many pages of the book have you read so far?	Progress of Reading	-50 pages -0 pages -20 pages	Reported in Chapter 4 (individual cases)- This question was one of the most important questions in the study, as the researcher was able to record the reading habits of AR apps-chosen books or other books the seven high school reluctant readers had chosen through a different method.
Interview	Do you like digital, hardcover or softcover books? Why?	Book preference	-Digital -Hardcover -Softcover	General question- This question provided the researcher with feedback that the seven high school reluctant readers did prefer hardcover and softcover books over digital books.

Collection Type	Correlating question or observation	Codes	Categories	Common Themes
Interview	When are you reading the book you pick or any book?	When do you read?	-At home -Does not read -SSR	Reported in Chapter 4 (individual cases, Theme #1)- This question was critical to the study, as the researcher discovered if the seven high school reluctant readers were reluctant readers and their reading habits, before and after using the AR apps.
Interview	What do you like to read?	Favorite Genres	-Horror -Holocaust books -Comic books -Poetry -Mystery -Romance	Reported in Chapter 3 (individual cases), Chapter 4 (individual cases)- This question was one of the most important questions in the study for two important reasons. First, the researcher was able to assess his 55 book collection that he had books that would peak all of the seven high school reluctant readers' interest. Secondly, the researcher was able to observe students' choice of books during the two observations periods and make comparisons, based on their picks.
Interview	What books or magazines appeal to you?			
Interview	What is your favorite type of books?			
Interview	Where do you like to read?	Where are you allowed to read?	-English class -School library -Reading class -SSR -Study Hall	Reported in Chapter 4 (individual cases)- This question was one of the most important questions in the study, as the seven high school reluctant readers were able to discuss where they like to read or if they were given time to read.
		Where do you like to read?		
Interview	Why do you read?	Why do you read?	-Bored -SSR -Class assignment -Recommended by a human influencer -I don't know -(no answer)	Reported in Chapter 4 (individual cases)- This question was one of the most important questions in the study, as the seven high school reluctant readers were able to discuss why they read, when they are asked to read or if they choose to read an item for pleasure.
Interview	Do you feel gaming is like AR? Why? (117 and The Gaming Flaco)	Gaming	The answered were not coded, as it was only two participants.	Reported in Chapter 4 (individual cases), Chapter 5 (Recommendation #4)- This was an exploratory question for further research to form a recommendation of further research for the link between AR and gaming.