

Reluctant Readers in Middle School: Successful Engagement with Text Using the E-Reader

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Abstract

Attitudes and response to text using e-books read on e-readers by reluctant middle school students were studied at an urban middle school in Texas. 199 students in the middle school's reading improvement classes were given approximately 15-25 minutes during their reading improvement class period to read high interest chapter books and stories on the Amazon Kindle® reader. Satisfaction with the Kindle® e-reader program was rated highly by the 199 students and their two teachers. A random sample of students (n=26) provided data for pre- and post-treatment assessment in self-concept and value of reading. Significant increases were found for boys on one variable - the value of reading. Implementation challenges regarding district permissions and access to Internet, ordering, uploading book material and procedures for e-reader classroom use in middle school are discussed as well. Extending the study in length is planned for further investigation.

Key words: e-readers; adolescent students; reading improvement; technology implementation

Introduction

One of the innovative and increasingly popular mediums for delivering text, especially for middle and high school students, is the portable digital reading device, or e-reader, designed primarily for reading electronic books (e-books). E-readers have been on the market for a relatively short time; new models have replaced old models with upgrades and customer-pleasing changes in the space of five years or less. Examples of e-readers include: Amazon Kindle®, Sony Reader®, Apple iPhone®, Ipod® and iPad®, Blackberry SmartPhone®, Barnes and Noble Nook®, Netbook® and others (Milliot, 2010). In addition, application software for reading e-books can be downloaded onto computers, mobile “smart” phones and music playing devices. It is possible that before this article is in print, there will be an additional device, tool, or reader application, similar yet different, that explodes onto the technology market, which further enables readers to read e-books and/or digital materials. The popularity of such electronic devices can be seen in sales; in e-reader devices alone, Yankee Group, a technology research group in Boston, MA, analyzed sales data and reported in February 2011 that global e-reader sales were \$1.9 billion in 2010.

The Yankee Group then predicted such revenue would increase to \$2.7 billion in the U.S. alone by 2013, with over 381 million units sold (Molchanov & Howe, 2011). Presently, the Amazon Kindle® is the device used most frequently to read e-books, according to Publishers Weekly (Milliot, 2010). In analyzing the popularity of electronic books, the Association of American Publishers reported an increase of 202% in e-book revenue from February 2010 to February 2011, and also observed that the e-book format is growing in popularity while printed text is selling less (Woodward, 2011). Electronic books for adolescents have only recently begun to rise in popularity. With prices for e-readers under \$200, more children and young adults have begun to use e-readers for leisure and academic reading. This new phenomena of reading may be perhaps in part due to receiving e-readers for recent Hanukkah, Christmas or birthday gifts. In 2010, young adult e-books were 6% of total electronic sales at St. Martin's Press, but in February 2011 the percentage of sales had risen to 20% (Bosman, 2011).

Schools, colleges and universities have slowly added electronic books and the necessary digital readers into classes and with various groups of students. Early studies of electronic books and readers have reported mixed reviews, as the hand-held readers were not as consumer friendly as it would seem. Challenges of providing reliable delivery systems and accessibility (Coleman, 2004), as well as issues of purchasing, uploading and downloading (Bell, McCoy & Peters, 2002) gave both e-books and e-readers low marks. Even recently, Damast (2010) found that students using Amazon's upgraded Kindle® as a substitute for textbooks in a pilot study involving seven U.S. universities had abandoned their e-readers after several weeks into the project. Students reported problems of flexibility, slow navigation, and inadequate materials management as reasons to not use the Kindle® and to return instead to their normally printed textbook. Also, the Amazon Kindle® system was not adequate for the blind or visually impaired students.

E-Readers in Schools and Student Reactions

In a study of undergraduates at the College of Mount St. Joseph in Cincinnati, Ohio, Gregory (2008) found that usage and attitudes towards electronic books varied, depending on the type of reading material necessary for coursework. Convenience, cost, and ability to print only necessary material from an e-text were reasons to use electronic books. Difficult navigation, eyestrain, and preference for print were reasons that the students gave for not using electronic books. However, some studies indicate positive trends in e-book use and more positive reception of e-books and e-reader use in schools and colleges by teachers and students. In the Mount St. Joseph study, Gregory (2008) found that flexibility in format was a key factor that guided college students' choice of print or e-books.

A two-semester pilot study in a first year English course at California Luther University focused on whether the e-readers enhanced student learning rather than savings in text and access to resources (Wines & Bianchi, 2010). Concluding the study of forty students using Kindle® e-readers, Wines and Bianchi found the e-reader system to be highly supportive of the course's objectives such as learning new vocabulary words and writing reflective and structured essays. Students reported that the functions of the e-reader such as instant access to a dictionary, adapting font size to their needs, listening to music as they read, and using the text-to voice function were helpful study aids. To improve writing and engagement with text, students used the function "My Clippings" to store their notes and highlights which provided a body of material to use for writing the assigned academic essay.

While several authors suggest positive strengths and encourage use of e-readers with children and adolescents (Norris & Soloway, 2009; Weber & Cavanaugh, 2006), few studies on these populations have actually emerged. One researcher, Larson (2009, 2010), observed both fifth graders and second graders reading electronic books on e-readers in their classrooms. In the fifth grade class, she observed 10 fifth grade students reading *Bud, Not Buddy* (Curtis, 1999) and *The Watsons Go to Birmingham-1963* (Curtis, 1996) on e-readers. After several sessions of getting used to the e-reader and its functions of highlighting and bookmarking, the fifth grade students began to spontaneously leave personal notes and queries within the e-reader comments function, demonstrating engagement and thinking with the electronic books. The same kinds of activities were observed in Larson's case study of two girls in the second grade class (Larson, 2010). For three weeks, Larson observed the girls reading for 40 minutes daily on their own Kindles®. They added personal notes in response to what they were reading, occasionally resorted to the text-to-speech feature, used the dictionary feature and highlighted key passages and words. Analyzing the girls' notes and markings, Larson found all the makings of appropriate literature response: the girls worked through their understanding of the story, they wrote personal notes about the meaning of the story, they wrote questions and answers, they utilized text features and they evaluated the story and themselves as readers.

She concluded from her studies that Rosenblatt's transactional theory of reader response (1978) was at work as students read electronic books on their e-readers – perhaps more evident, due to the nature and ease of personal engagement with the text using the e-readers' functions.

Larson argues that reader response features may be the most valuable reason why children and adolescent readers in schools should be allowed and encouraged to use e-readers with electronic text (Larson, 2009; Larson, 2010). Superintendent Rick Miller and IT Director Jay F. McPhail, administrators at Riverside Unified School District in California, agree with Larson (Ash, 2011). The large school district recently adopted digital textbooks for over 100 classrooms in which teachers volunteered to teach with an electronic text rather than a normal hardcover textbook. The district has not published a formal study, but teachers have anecdotally observed an increase in students' highlighting and note-taking and an increase in time on task, due to the electronic book novelty, technology and instant accessibility. Other teachers in the district are successfully using a mixture of e-reader devices to access novels, plays and short stories, through iBooks® and Kindle® applications, with observed greater student interest and engagement.

Engagement with Reading

Engagement is the key to successful reading, and consequential learning. The engaged action of reading is “the best predictor of measures of reading achievement, reading comprehension, vocabulary and reading speed, including gains in reading comprehension between second and fifth grade” (Anderson, Fielding, & Wilson, 1988, p. 285). However, recent studies indicate that students in upper elementary and middle grades tend to read less (Ivey & Broaddus, 2001; Nippold et al., 2004) due to time spent with peers, participation in sports activities and other after-school activities, and to a growing lack of interest in textual materials. Students, particularly boys, may not value reading as much as when they were younger (Marinak & Gambrell, 2009). In a study of 26 fifth graders' attitudes towards reading, being a good reader was highly rated by the majority of students in the study. However, most students also indicated that “reading is a boring way to spend time” and that they do not share titles of good books they have read with their friends (Corcoran & Mamalakis, 2009, p. 140).

Another reason for lack of reading texts in upper elementary and middle grades is that of skill. Low-skilled readers find difficulty in beginning, continuing or finishing any text. Words are unknown, strategies for decoding words or comprehending difficult text are weak, and consequent lack of interest simply keeps an unskilled reader from doing what would improve his or her reading (Cunningham, 2008; Krashen, 2009). In grades four through six, those who are not engaged may fall on a continuum from “fake readers” to “challenged readers,” to “unrealistic or wannabe readers” (Kelley & Clausen-Grace, 2009, p. 315-316). These students need particular strategies for developing their skill and engagement as readers. On the other hand, skilled, interested and engaged readers actively seek to understand what they are reading, usually enjoy what they are reading and often share what they are reading with others (Kelley & Clausen-Grace, 2009).

Most importantly, the changing nature of literacy in the present technological society may be a helpful construct in teaching students who struggle with the printed hardcover book. Evans (2005) makes a compelling argument for connecting portable literacy with students who are already surrounded by gadgets and technology- it is their medium of preference. According to Rosenblatt (1978), non-linguistic physical factors such as environment, surroundings, and even size of text may influence the reading experience, and thus encourage or discourage the reluctant reader. The e-reader, then, may be one way to encourage reluctant readers to read more.

Research Questions

As reading educators and clinicians, we wondered whether reading electronic books with the popular e-readers would increase reluctant adolescent readers' engagement with text? Would such engaged reading have pay-offs in students' further motivation to read and value of reading, and as a consequence, increased skill in reading? Our colleagues at Rotary International were given funding to put “excitement” into the reading improvement classes at an urban middle school by providing e-readers to the school and to the school library, and when they asked us to gather data on their project, we gladly agreed. Our interest in this community-driven project helped formulate the following research questions:

Research question 1. Do “reading improvement” middle school students' attitudes towards reading change positively after two months of reading with an electronic reader?

Research question 2. Do “reading improvement” middle school students’ reading scores on state tests (Texas Assessment of Knowledge and Skills, i.e. TAKS) change positively after a described duration of time reading with an electronic reader?

Research question 3. What kinds of “response to text” notes are made by “reading improvement” middle school students who read on the electronic reader?

In addition, we wanted to understand teacher and student levels of satisfaction with the e-reader program once implemented. To that end, satisfaction questionnaires were given to teachers and students.

Research Design

The Rotary International grant provided funding for the purpose of increasing e-reader use in an urban middle school’s reading improvement classrooms and the library. The research team, school personnel, and Rotary members met several times to design the research study and solve implementation issues as they arose. In an attempt to provide adequate answers for the research questions, a mixed-methods design that included quantitative quasi-experimental data and qualitative data was chosen. A large, urban middle school in a North Texas school district was designated for implementation of the e-readers and subsequent research. Two teachers with multiple classes of reading improvement students took part in the study. A total of 199 students participated in the study, ranging in three grade levels (sixth, seventh, and eighth grades). From mid-March through mid-May, reading improvement students were given 15-25 minutes each day to read on the Kindles® during the sustained silent reading (SSR) time of their class period.

A random group of 26 students from the reading improvement classes were interviewed in depth with Gambrell, et al.’s (1998) Motivation to Read Profile, which was scaled and scored to uncover two distinct facets of reading motivation--self concept and value of reading. During the SSR time, the researchers conducted 30 hours of classroom observations coding for reader engagement and text response. Informal student interviews and photographs recording the use of the e-readers were also included in the study. Student satisfaction surveys, as well as teacher satisfaction questionnaires, were given in May to gain further feedback. In addition, pre- and post-treatment state reading test scores (TAKS) of all reading improvement students and the random group were analyzed.

Implementation of the E-Reader Program

Implementing the e-reader program into the reading improvement classrooms was not without its challenges. Despite principal and Rotary support, difficulties with district permissions delayed the intended start of the program from early November to mid-March, so that the actual first day that students began using the e-readers was after the spring break recess. Permission from the district’s instructional technology team proved challenging, particularly due to the regulations that surround necessary Internet access. District policies regarding wi-fi accessibility were satisfied before the e-readers could be placed in the hands of students. In the meantime, 60 Kindles® were ordered and registered on the Amazon® website. This process also required a great deal of time and volunteer help. The two reading improvement teachers and the librarian then made decisions about which books to upload onto the Kindles®, as well as procedures they would follow in the classrooms, so that each reading improvement class would be able to easily access the e-readers. Books then had to be uploaded onto the e-readers, another time-intensive procedure. It should be noted that once district technology leaders granted permission for the Kindles® to be allowed in operation, the teachers were ready to put the program into action in their classrooms in a matter of two days.

Research Findings

Using a mixed methods design, our three research questions were answered both quantitatively and qualitatively.

Research question 1. Do “reading improvement” middle school students’ attitudes towards reading change positively after two months of reading with an electronic reader? Two assessments, as well as classroom observations and teacher feedback, gave us data to answer this question.

Motivation to Read Profile

In order to assess reading attitudes, a randomly selected sample (n=26) of the population of reading improvement students (N=199) were given the Motivation to Read Profile (MRP) protocol (Gambrell, et al., 1998) prior to and immediately following the e-reader usage. The MRP was used to measure treatment effects on reading motivation in terms of reader self-concept and value of reading for our adolescent struggling readers.

First, we assessed the instrument for score reliability with pre- and post-measures. Then, we conducted a repeated measures ANOVA to further analyze student outcomes.

When creating the MRP, the authors of the protocol (Gambrell et. al, 1998) conducted a Chronbach's alpha coefficient on both the self-concept and value variables in order to assess score reliability. Our research team conducted the same test statistic on pre- and post-MRP assessments of our sample. A measure of internal consistency, this statistic relates item homogeneity to the degree to which similar items jointly measure the same construct (Henson, 2001). Moreover, Chronbach's alpha is useful in the case of the MRP tool because of the ease in which the statistic deals with Likert type interval data (Huck, 2000). According to Nunnally and Berstein (1994), research studies in the early stages of research are considered reliable when a Chronbach's alpha score of .70 is attained. The authors of the MRP, when conducting their pilot survey (n=300), found that the Chronbach's alpha was .75 for the self-concept scale and .82 for the value scale, indicating moderate score reliability. For our sample (n=26), we found a Chronbach's alpha of .709 for self-concept and .674 for value for the pre-test. For the post-test, we found a Chronbach's alpha of .756 for self-concept and .648 for value. Due to the smaller sample size, some slightly smaller alphas are to be expected; therefore, it can be concluded that our results were in line with those of the survey designers.

After ensuring score reliability of the MRP, a repeated measures ANOVA was employed on our random sample (n=26) of reading improvement students. More specifically, reader self-concept, reader perception of the value of reading, and a combined measure representing the full survey as dependent variables were all measured at the interval level. Treatment consisted of use of the e-reader for approximately two months between the pre- and post-assessment.

We also assessed the normality of our sample. All values of skewness and kurtosis on each dependent variable were computed and were found to be within the limits of normality except for the self-confidence variable during the post-test (kurtosis=2.914). According to Zarr, all normality statistics should fall between -3 and +3 (2008). According to others, though, measures of normality should be more conservative (-2 and +2) (Field, 2009; Stevens, 2009). For our sample, the value for kurtosis for self-confidence during the second round of assessment was transformed using a square root transformation, leading to a somewhat more normal distribution (kurtosis=2.4) (Tabachnick & Fidel, 2007). It should also be noted that repeated measures designs are fairly robust in terms of overcoming normality deviations (Field, 2009). After assessing normality, we also ensured that other design assumptions of sphericity and independence of observation were met (Stevens, 2009). We then reviewed the repeated measures ANOVA and found that there were no significant differences ($\alpha=.05$) on any of the dependent variables when comparing all participants as a group on the pre- and post-assessment in terms of self confidence in reading ability, value of reading, and the full survey. Data were then analyzed in terms of grade level and teacher, and again no significant differences were found between grade levels and teachers.

When analyzing the data by gender, we found that male (n=12) and female (n=14) self-concept scores remained relatively stable across time, although male reader self-concept levels were consistently higher (pre-treatment M=68.66, SD=10.35; post-treatment M=69.33, SD=6.14) than female reader self-confidence (pre-treatment M=60.86, SD=7.57; post-treatment M=60.21, SD=11.05). Most interestingly, scores for value, when analyzed by gender, differed in terms of statistical significance between pre- and post-treatment ($\alpha=.05$, $p = .022$). In further exploring this data, we found that male's attitudes improved with treatment in terms of value of reading (pre-treatment M=73.33, SD=11.35; post-treatment M = 75.08, SD=9.00). Conversely, female attitudes regarding the value of reading declined after receiving and utilizing e-readers (pre-treatment M=72.86, SD=6.88; post-treatment M = 66.29, SD=5.62).

When analyzing effect size for this finding, we found that gender exerted an effect of $d=.512$ (by use of 1-Wilk's lambda formula). Cohen (1988) provides benchmarks for small, medium and large effect sizes in measures of standard difference for univariate d family metrics (.2 small, .5 medium, .8 large). As previous research in this area is limited, comparing to Cohen's benchmarks for measures of standard difference indicate that .5 represents a moderate effect size. This effect size finding thus suggests that our finding is not only statistically significant but is moderately different from the expected finding.

Student Satisfaction Surveys

Another measure that we used to assess general reading attitude improvement after e-reader usage was a satisfaction survey (see Appendix).

All reading improvement students (N=199) were given a simple, 3 point (1=not at all, 2=somewhat, 3=very much) Likert-scale satisfaction survey at the end of the treatment. Survey questions asked whether the students liked using the e-reader and whether students felt that they had become better readers. Students were also asked how many books they read while using the e-reader (1=1 book, 2=2-4 books, 3=more than 4 books).

According to the normally distributed, independently-gathered, interval-level data (all values of skewness and kurtosis between 2, -2) analyzed in this survey, students generally liked using the e-reader (M=2.30, SD=.58) and many felt that their reading had improved due to e-reader usage (M=2.11, SD=.64). Also, most students reported that they read between one and four e-books over the course of the two month treatment period (M=1.61, SD=.58).

In further exploring the data, a one-way ANOVA was run to compare for group differences in terms of teacher and gender. While there were no significant differences in student satisfaction across the survey at the $\alpha < .05$ level in terms of gender, there was a significant difference in comparison of teachers, specifically in terms of how well the students liked using the e-reader based on teacher-assignment ($p = .013$, $F = 6.271$).

Subsequently, a calculated effect size of $d = .35$ indicates that teacher assignment contributed moderately to student differences in satisfaction with the e-reader. More specifically, students (N=85) in teacher M's class liked using the e-reader significantly less (M=2.18, SD=.58) than students (N=114) in teacher F's class (M=2.38, SD=.56).

Qualitative Observations

During the treatment period, we observed that most students readily understood how to use the e-reader, and that during each class period, the students quickly became engaged with the texts being read. Some students changed font size often, and others tried the text to voice feature. One student brought his earphones so that he could listen rather than read. Most followed their teachers' directives on how to use the e-reader and store and make their bookmarks. We observed that sixth graders and seventh graders as a whole were more enthused than the groups of eighth graders, and the two teachers confirmed this behavior.

Students in Teacher F's classroom did not read for the entire SSR time, as some of the time was spent responding to the teacher's questions in their spiral journals, whereas students in Teacher M's classroom were given longer amounts of time to read. They did not write responses in journals. Discussions in each classroom were held about how to use the e-reader, how to access features, and contractual issues about the use of the Internet. We did not observe any note-taking on the e-reader in the feature My Clippings.

Qualitative Teacher Interviews

At the end of the study, we interviewed the two teachers regarding their own observations of their students' attitudes towards reading. Teacher F was very satisfied with how the students began to use the dictionary feature of the e-reader, looking up words that they didn't know. This teacher felt that the novelty of the e-reader made the students more excited to read and planned to use e-readers more during the next school year. Teacher M observed that many of the reluctant readers read more readily, i.e. they more quickly "got down to the business of reading" each day. Teacher M observed that the majority of students were more engaged on e-readers than when they read print books, and that earphones were very useful to students whose first language was not English.

Both teachers expressed frustration at having to police the use of the e-reader with Internet sites so easily accessible, despite the school district's filtering system. To the teachers, this was the most challenging part of implementing the program, that of monitoring students and the time involved. One teacher wondered if there could be a password protection on each e-reader.

Teacher M highlighted other challenges for implementing e-readers with students: 1) more money is needed to upload more books, because, at this point, not enough books have been uploaded on the e-readers for adequate student selection; while classics are freely available, most struggling readers will not choose to read a classic, 2) there is additional stress on the teacher of keeping up with expensive equipment, and 3) there are added logistics of keeping the e-readers charged, checked-out, and locked up each night. Despite these challenges, both teachers intend to incorporate the e-readers in next year's reading improvement classes.

Research Question 2: Do "reading improvement" middle school students' reading scores on state tests (TAKS) change positively after a described duration of time reading with an electronic reader?

We compared our sample group with a similar, randomly selected control group (ethnicity, grade level, school demographics) regarding state reading scores for 2011 and 2010.

For this comparison, our sample size was reduced to 22, due to the fact that four of our 26 sampled students did not have state reading test scores from the 2010 school year. Our data indicated there was no difference in improvement in the two groups. Actually, both groups, who were the same size and who had normally distributed data on all dependent variables, improved their TAKS reading scores from 2010 to 2011. In the treatment sample of struggling readers who read with e-readers, there was a mean 46 point increase between 2010 TAKS scores and 2011 TAKS scores. In the comparison control school, the sampled group of struggling readers showed a 52 point increase between 2010 TAKS scores and 2011 TAKS scores. By running an ANOVA to compare these difference scores for each school, there was not a significant difference and there was negligible effect ($p=.793$; $d=.003$). In other words, the two groups of students behaved similarly, making comparable gains across time. As such, TAKS score increases with the reading improvement students could not be attributed as the result of using the e-reader.

Research Question 3: What kinds of “response to text” notes are made by “reading improvement” middle school students who read on the electronic reader?

Our initial intent was to examine what kinds of responses were made by students and how effective the e-reader may have been with adolescent readers in capturing their responses to text, using Larson’s study as a backdrop (2009). However, the teachers chose to not use this e-reader feature. In Teacher F’s classroom, students responded to their reading by writing in traditional spiral bound journals, while in Teacher M’s classroom, students read in a readers’ workshop format (Atwell, 2005) and were not required to respond in writing. Neither teacher asked students to use the e-reader capabilities available to respond to text. When asked about using this function, Teacher F explained that because the e-readers were shared with all the classes, it would be too difficult for the students to write a response on the e-reader and know whose it was.

Both teachers participating in the study were veteran reading teachers who provided students with 15-25 minutes of SSR at the beginning of class, but the typical structure of each class was different.

Teacher F’s Classroom

As students entered Teacher F’s classroom, they picked up their e-readers from a designated location, took their seats, and began reading. The teacher would move through the room to distribute reading response cards to students, to be answered in their spiral journals and based on the text they had read on their e-readers. The teacher would then sit at a desk in the front corner of the classroom to grade papers or journals. Frequently, the silent reading was interrupted with Teacher F announcements. Towards the end of their reading time, Teacher F instructed students to complete their responses in their journals. In addition to their responses, students also made a note of where they stopped reading their e-books. Often, students needed assistance in completing their journal response and sought help at the teacher’s desk. It was noted that after completing their response and others were still working, most students quickly returned to reading their e-books. We observed that Teacher F responded to students’ answers in their response journals, checking for grammar and complete answers to questions, rather than extensive written dialogic responses. Students read from self-selected texts, and most responses related to personal, but general, kinds of questions, such as “Do you think the main character made the right choice? Why or why not?” Once students had their work checked by Teacher F, they were allowed to return to their desks and continue reading their selected text or browse other texts to download and read. When the silent reading time ended, all e-readers were put away so that the next class of students could use them.

In Teacher F’s class, student responses written in their spiral journals ranged from feelings about characters, to connecting with characters, to making judgments about characters’ actions. One student wrote as she read the story “Math Whiz” in *They’re Coming for You: Scary Stories that Scream to be Read* (Penn-Coughin, 2011), “My feelings changed every time I was reading. I couldn’t stop reading the part where it says that he died right after she saw him. That was interesting. My feeling was excited because I wanted to know what was going to happen next.” Another predicted while reading “Secret Admirer” in *They’re Coming for You* (Penn-Coughin), “I look forward to Selina finding out who the stalker is. I think Selina will face some problems with the stalker. She’ll have a problem with her not getting killed.” Each of these responses were given as answers to specific questions on a response card, and Teacher F corrected spelling, punctuation and format throughout the responses.

Another response card assignment asked, “Think of a problem that a character had to face. Write the problem and how the character solved it, or is working to solve it. If you were that character, what would you do differently?”

A student who was reading *Forever Neverland* (Killough-Walden, 2011), responded, “Wendy has been having problems because five years ago she went to Neverland with her brother and when they got home, their parents told them that they had been kidnapped and were abused. So she goes to Dr. Coffey and he tells her to stop writing and she gets angry. What I would do is just be calm and do what he tells me.”

All responses were written as answers to a response card assignment. We were not able to ascertain whether struggling readers in reading improvement classes would use the response feature to write more original kinds of responses to what they were reading. A more controlled case study may be necessary to answer this question thoroughly.

Teacher M’s Classroom

In Teacher M’s classroom, the usual SSR time was supplemented with the e-books on the e-readers. Teacher M passed out the e-readers, one by one, once all students were seated. During the time that students were reading, the teacher modeled SSR for the students while sitting in a chair in the front of the classroom, reading in an e-reader as well. No written “response to text” activities were observed in this class. There were no announcements or interruptions by the teacher during the silent reading time. Occasionally, one student chose to read from a hard copy book rather than the e-reader, and the teacher did not discourage this choice. The classroom was filled with over 1000 paperback novels and non-fiction texts, and the teacher gave the students free access to all the books. When the SSR reading time ended, students returned their e-readers to the teacher and after some discussion about their reading and e-reader functions, they began the scheduled reading lesson for the day.

Discussion of Findings

Our research results gave us much to think about. Two unexpected limitations in the study impacted the direction of our study. One limitation involved the regulations in implementing technology in middle school classrooms. Even though the research team, the Rotary Club, and the local school and school district all supported and collaboratively worked on the project, the e-reader technology implementation took more time than was expected, and therefore, students did not begin using the e-readers until mid-March. The implementation process was hindered as we secured permission for Internet access, which satisfied the school district guidelines for use in classrooms. Several sites were blocked for student use in the classroom and the Amazon® website had to be cleared for students and teachers to use in downloading and using texts in the classroom. Even after permissions were given and the e-readers arrived in the classrooms, the Internet access use gave the teachers additional difficulties in monitoring their students. Further development of implementation guidelines and policy for e-reader use are needed.

Another unexpected limitation of the study was the non-use of the e-reader feature response to text. We were fortunate to have strong teacher support and involvement with the e-reader program; however, the two teachers chose not to use this particular feature, which limited our findings on how reading improvement students could use the feature to respond to text. Despite these two limitations, we found that students and teachers responded positively to using the e-readers. Most students were observed as engaged in reading texts while using the Kindles® for the majority of the allotted SSR time. During our classroom observations, students in one classroom were moving between their texts and reader response journals while answering the questions that were assigned to them and/or taking the opportunity to reflect upon their readings. In the other classroom, students took the lead from their teacher and read steadily during the allotted time. Both teachers made strong efforts in encouraging student engagement by monitoring students reading, making sure that the e-readers were working, and that all students were working on the Kindles® appropriately.

In our conversations with the students, we asked questions regarding their comfort level with e-readers and did they enjoy reading on the e-readers. Students responded positively; one student responded that using the e-reader had an advantage because the book he was reading was always available to be read without someone else reading it or taking it out of the classroom. It is possible that the novelty of the e-readers and the notion of being involved in a research study may have influenced the students to appear to like the e-readers and to become more engaged in reading. However, students who were not in the reading improvement classes asked us how they could join the “Kindle® classes,” which implied that throughout the middle school, students in reading improvement classes were receiving positive attention and reinforcement, all of which may have had a ripple effect on positive attitudes towards reading. In other words, the excitement of using a new reading device had spread outside of the reading improvement classrooms and into the rest of the school.

One particular response to the student satisfaction survey came from a student who reported that he could read what he wanted to without carrying around a lot of books. Another said she liked the privacy. These responses caused us to realize that e-readers may provide a more private, efficient way of assigning or selecting appropriate texts for a student's reading level, especially for middle school students who struggle with reading. Many low-level readers would prefer for their peers to not know the level of books that they are reading, and e-readers could easily house a wide variety of texts on appropriate levels. Other student responses indicated that the e-readers appeared to give the reading improvement students some additional confidence. Reading on a technology gadget may have subtly given a message to their peers that "we too are a part of the 21st technological century."

Understanding the phenomenon that students with Teacher M liked the e-reader significantly less than students with Teacher F caused us to analyze the differences in the teachers' classrooms and/or teaching style. Teacher M was an avid reader of young adult novels and had equipped the classroom with hundreds of paperback books for students to read. This teacher frequently encouraged students to self-select reading material from the many shelves of books and to read at all available times. While we reached no clear-cut answer to this finding, student satisfaction responses suggested that the e-reader's selections of books were limited in comparison to the large classroom library in Teacher M's class, and perhaps this was the reason that students in Teacher M's class were less satisfied with the e-reader.

Regarding improvement in state tests (TAKS), there were reading score increases at the school from year 2010 to year 2011, but due to the limited amount of time that students spent reading on the e-readers, it would not be appropriate to claim the increase due to the implementation of the e-reader. In addition, the control group's state reading scores increased as well. At our test school, in 2010, only one student of our treatment sample passed the state reading test (TAKS), and there was a 9% passing rate overall in our sample; in 2011, 32% or 7 of the reading improvement students in our sample passed the TAKS test. The same increase was seen in our control group. Factors which may have contributed to increases in TAKS scores were increased instruction time, stronger support by parents and administration, and/or stronger motivation by students.

Most importantly, our finding regarding how boys significantly increased in the value of reading after reading on the e-readers is worth noting. Our data suggest that boys' attitudes toward reading may change positively with use of an e-reader, and that girls' attitudes may not. Further attention should be given to the effect of gender and possible gender differences in terms of reading attitude when e-readers are employed. What characteristic of the e-reader caused boys to value reading more? Did boys find the medium more accessible than printed books? Our research indicates that boys who struggle in reading may profit from reading on an e-reader, simply because the act of reading has greater value to them. More value may lead to more engagement, and more engagement may build stronger skills in reading for boys. Future research could aim to replicate our repeated measures design by including a control group of similarly struggling adolescent readers so that our satisfaction survey and MRP results could be more strongly generalized to the secondary, struggling reader population as a whole.

Conclusion

A critical limitation to this study was the actual amount of time the students were able to use the e-readers in relation to the school year, and we recommend that e-readers be used in reading improvement classes as another choice for reading during SSR time. Despite the limited time of our study, reluctant readers demonstrated motivation, engagement and expressed high levels of satisfaction with the e-readers. Boys, particularly, benefited from the e-reader use. If school budgets allow, it would be most beneficial for reluctant readers to have their own individual e-readers, so that reader responses to text could be written during SSR time. Finally, we found that the process of adding new technology such as e-readers into middle school classrooms, is aided by clear guidelines, contractual agreements, and Internet usage policy, all of which are necessary for teachers to monitor and encourage student use. It is inevitable that e-reader technology will enter school classrooms; our study presents reasons why e-readers may be beneficial, in particular, to reluctant readers in middle grades.

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Appendix

E-Reader Student Satisfaction Questionnaire

Please circle:

Grade: 5th 6th 7th
 Female Male

1. I like using the Kindle® e-reader to read stories.

Not at all somewhat very much

2. I use the dictionary feature on the Kindle®.

Not at all somewhat very much

3. I use the speech to text feature on the Kindle®.

Not at all somewhat very much

4. During silent reading, I read approximately this many stories:

1 total 2-4 total 4+ total

5. I am a better reader because of my Kindle® reading:

Not at all somewhat very much

6. Favorite story I read on the Kindle®:

7. Anything else about the e-reader or e-books you want to say?