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The influence of peer tutors and technology-actuated reading instruction process on third-grade students' self-perceptions as readers: A multiple case study

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THE INFLUENCE OF PEER TUTORS AND TECHNOLOGY-ACTUATED READING INSTRUCTION PROCESS ON THIRD-GRADE STUDENTS' SELF-PERCEPTIONS AS READERS: A MULTIPLE CASE STUDY

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ABSTRACT

The influence of peer tutors and Technology-Actuated Reading Instruction process on third-grade students' self-perceptions as readers: A multiple case study.

by

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Driven by Lev Vygotsky's Sociocultural Theory (1986), my study investigated the self-perceptions and interactions of seven underperforming, third-grade readers while using Technology-Actuated Reading Instruction (TARI). Partnered with same-age peer tutors, readers used digital tools to listen to, read/record, and playback oral reading passages. They practiced, peer- or self-edited, and selected their best reading products as part of the iterative process. As reading is a complex cognitive skill (Reinking, 2005), TARI incorporated higher cognitive learning activities via a synthesis of Gagné's (1985) nine conditions of learning and the Four-Component Instructional Design Model (van Merriënboer & Kester, 2005).

Much of the current literature on tutoring and underperforming readers has focused on academic gains and quantitative measures. It is also lacking in discussion about the interactions underperforming readers have with peer tutors while using digital tools and the influence these interactions have on readers' self-perceptions. Therefore, three questions guided the study. First, how do underperforming, third-grade readers interact

with their peer tutor while using TARI? Second, how does the TARI process influence underperforming readers' self-perceptions as readers? Third, how does the process of same-age, peer tutoring influence underperforming readers?

The process-oriented, microgenetic approach was conducted during flexible school hours at a charter school located in a large, southwestern, urban city. It encompassed four weeks and captured data during 50-minutes of daily observations and field notes, and/or interviews or videotaping. The study explored how, and at what point, self-perceptions of underperforming readers became *actualized:* the realization by the underperforming reader that their potential or ability as a reader had changed.

Three themes emerged from the findings: levels of interaction with tutors, the use of digital tools, and developing independence. It was found that readers exhibited proximal (high), moderate, or distal (low) levels of interactions; however, the degree of interaction did not consistently correspond to their changes in self-perception. Proximal interaction did not guarantee the most substantial gains. The iterative TARI process coupled with peer tutoring positively influenced six of seven readers as evidenced by their improved self-confidence, self-efficacy, independence, and changes in self-perception. Additionally, the self-perceptions of all but one *tutor* moved in a positive direction.

The study adds to the body of knowledge currently available on the interactions of underperforming readers while using digital tools and the influence TARI and peer tutoring had on individual students' self-perceptions as readers. It offers copious details of *how* the process of change occurred for seven readers, makes recommendations for

multimedia instructional design, and provides implications and direction for future research in immersive environments.

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To each who have helped along the way, THANK YOU for making the prospect of earning my doctorate a reality! Never short of words, may I end with *An Irish Blessing* to all of you:

> May the road rise to meet you, may the wind be always at your back. May the sun shine warm upon your face, may the rains fall soft upon your fields. And, until we meet again, May God hold you in the hollow of His hand. (Anonymous, 2011)

This paper is dedicated to my beloved father

George Rothrock Shill

September 11, 1910 to August 13, 2000

Teacher, Phoenix Unified School District

Phoenix, Arizona

1937 to 1980

A life-long learner and educator:

His life was spent helping others reach their potential.

"The heights by great men reached and kept, were not obtained by sudden flight. But they, while their companions slept, were toiling upward in the night."

Henry Wadsworth Longfellow (1807-1882)

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CHAPTER 1

INTRODUCTION

As a former elementary school teacher in a large, urban school district in the southwestern United States, I tried to adopt the most effective instructional practices to assist underperforming readers. Now as an administrator in the same district, I am aware of the challenges teachers face in tailoring assistance for individual students and preparing them for success in a global environment with ever-demanding standards and benchmarks.

Complicating their development are the self-perceptions associated with those who feel unsuccessful. Marchand and Skinner (2007) reported that students with a sense of incompetence were less likely to exhibit help-seeking behaviors and were more likely to exhibit concealment. When students experience difficulty during an instructional task, without asking for reiteration or clarification they may not be able to successfully proceed and may remain mired in a reading conundrum while other, more proficient readers, continue to progress (Chandler & Sweller, 1991; Honig, Diamond, Gutlohn, 2008). Stanovich (1986, 1993) refers to this as the *Matthew effects* and extends the phenomenon suggesting unsuccessful readers become increasingly distanced from successful readers. Those rich in reading ability continue to become richer while students who have poor reading ability become poorer over time. Other research shows that reducing early academic failure leads to a reduction in dropout rates. It is apparent that

the ability to read is critical skill needed for success (Greenwood & Delquadri, 1995; Lo & Cartledge, 2004; Roswal, Mims, Evans, Smith, Young, & Burch, et al., 1995).

Reinking (2005) stated that discussions regarding reading instruction were "sometimes controversial, often raising issues about . . . the causes of reading difficulties and how to ameliorate them" (pp. 355-56). To answer this call, numerous reading approaches (e.g. Whole Language) and reading structures (e.g. choral reading) have become the instructional technique in vogue only to be discarded or modified for newer, "more effective" practices. Missing in some educational settings is a discussion and conceptual underpinning to a theoretical construct wherein underperforming readers may develop reading skills and improve their self-perceptions as readers. Considering reading is a complex cognitive skill, the ability to synthesize instructional reading practices such as peer tutoring with digital tools in a sociocultural construct may benefit underperformers (Jonassen, Lee, Yang, & Laffey, 2005; Mayer, 2005; Radecki, 2009; Reinking, 2005).

Use of immersive environments for instructional purposes has many vocal critics. Cuban, Kirkpatrick, and Peck (2001) have addressed the value of digital tools in classrooms and have challenged research findings stating that the cost to purchase, connect, and train teachers to effectively use this medium is substantial considering there are limited or mixed results in student achievement. An additional issue with the use of technology has been noted by Wenglinsky (2005/2006) and Radecki (2009) in relation to use in schools. They note that the focus may be on lower-order cognitive skills as the primary instructional strategy for digital tools in many schools. These lower-level skills which include e-mailing and/or skill and drill practice impede the development of higher-

order thinking skills necessary for students to be successful in an ever-changing world (Radecki, 2009). Taken within the context of reading instruction mediated by peer tutoring, digital tools must go beyond skill and drill exercises to afford readers the ability to create, analyze, and evaluate reading products. Opportunities for learning that are not found in traditional educational settings may then be provided. Students should be able to use digital devices as tools rather than as mechanisms to support a program. In a review of the literature, I found very few examples among the numerous programs which allowed students to record their own voices as a function of improving reading skills. It became apparent that many traditional methods and curricula are not based on theoretical foundations which promote optimization within the learning environment (Radecki, 2009).

Current literature is also lacking a discussion about the interactions underperforming readers have with peer tutors while using digital tools and the influence these interactions have on readers' self-perceptions. A synthesis of the construct of peer tutoring modeled after Vygotsky's Socialcultural Theory (1986) coupled with the Technology-Actuated Reading Instruction (TARI) process was therefore investigated. Given the relationship between perceptions of competence and the likelihood underperformers conceal rather than exhibit help-seeking behaviors (Marchand & Skinner, 2007), exploration into the learning environment and dynamics which mitigate self-perception was warranted. Educators must know how to best support and enable students to reach their potential and develop positive self-perceptions in the process when there is a tendency for underperforming readers to inherently conceal their difficulties.

Purpose of Study

The topic of my study was to investigate the interactions and self-perceptions of underperforming readers as they worked with same-age peer tutors during the Technology-Actuated Reading Instruction process. Technology-Actuated Reading Instruction (TARI) was defined as a multimedia, text and sound program which afforded readers opportunities to leverage digital tools to listen to adult-modeled narrations, read and record all or part of stories (reading performances), playback and peer- or self-edit reading performances, and save their best reading products in an electronic portfolio. The threefold purpose involved seven underperforming, third-grade readers and their seven peer tutors. All participants attended a charter school in a large, southwestern, urban city in the United States. Via observations, field notes, interviews, artifacts and videotaping the multiple case study explored and documented: (a) the interactions underperforming readers exhibited with same age peer tutors while using TARI; (b) how the TARI process influenced underperforming readers' self-perceptions as readers, and (c) how the process of same-age peer tutoring influenced underperforming readers. Emphasis was on how, when, or if change occurred.

It has been suggested that we first learn to read and then read to learn (Honig, Diamond, Gutlohn, 2008). If this is indeed the case, will learners who do not learn to read ever be able to read to learn? Some would argue, "No!" Although in a Vygotskian approach the inclusion of a more capable other helps mediate learning, Heron, Villareal, Yao, Christianson, and Heron (2006) found that peer tutoring programs and incidental tutoring approaches have not been well-defined in current literature. Their findings support the importance of exploring, documenting, and understanding how learners

interact with tutors and digital tools, and how self-perceptions are influenced during the cognitively demanding process of learning to read (Reinking, 2005).

The purpose of the study was also to investigate a learning environment created to synthesize socioculturalism with the affordances available through leveraged digital tools. This was accomplished by incorporating authentic grade level reading curricula into the TARI activities. It is challenging for teachers to provide tailored assistance for a classroom of varied-ability students (Topping, Peter, Stephen, & Whale, 2004) and it was anticipated that the learning environment, peer tutoring coupled with TARI, would reconcile this issue. The digital tools were designed to assist underperforming readers through an iterative process which was structured to be within their zone of proximal development (Vygotsky, 1986). This was accomplished by enabling readers to select, pace, and interact freely without expectation, reward, or punishment. In traditional instructional settings it is uncommon for students to select learning activities and monitor their own pacing and the influence which this type of self-directed environment may have had on the interactions and self-perceptions of readers was central to my study.

Statement of Problem

An on-going challenge for educators is how to deliver rigorous and authentic core and elective curricula into a limited amount of time during the school day. Added to the time demands are the issues of differentiating instruction to meet the needs of diverse ethnic populations (e.g. English language learners), familial risk factors (e.g. dysfunctional families or poverty), and varied ability levels which are prevalent in most classrooms today (Bronfenbrenner & Morris, 1998; Kourea, Cartledge, & Musti-Rao, 2007; Topping,

Peter, Stephen, & Whale, 2004). It is unlikely that the school day, or school year, will be extended to address these needs and it is imperative educators use time effectively.

While the inclusion of digital tools and peer tutoring may answer the call currently facing educators today, without their proper implementation and use, preferred outcomes may never come to fruition. Radecki (2009) identified three levels of use with digital tools. Most prevalent was Level One wherein digital tools were typically used by teachers for e-mailing or grading purposes. Level Two was the second most often used practice and involved students' skill and drill programs. Seldom found were Level Three uses of digital tools: activities fostering cognitive development and reinforcing complex thinking. Level Three requires higher-order thinking skills such as analysis, synthesis, and evaluation which can be incorporated into scientific inquiry, problem solving, reasoning, and decision making (Moersch, 2002).

Two other concerns affecting educators and students today are how assistance is structured and how students' self-perceptions influence success. Tutoring is a common instructional practice in educational settings and tutoring frameworks have been organized in a variety of structures. Same-age peer tutoring, cross-age peer tutoring, and classwide peer tutoring are often seen in classrooms. Heron, Villareal, Yao, Christianson, and Heron (2006) found that, although tutoring was a common practice, peer tutoring programs and incidental tutoring approaches have not been well-defined in current literature. Less common still are tutoring frameworks that include underperforming readers paired with tutors within a multimedia environment which leverages digital tools. My study addresses this gap in research and literature.

Unlike the apotheosis chronicled in the fabled tale of Archimedes shouting "Eureka!" when he understood the relationship between mass and the displacement of water, it is often difficult to pinpoint when change occurs. This was particularly evident when exploring self-perceptions of readers *while* their skills developed. Lavelli, Pantoja, Hsu, Messinger, and Fogel (2004) posited that traditional research designs have been cross-sectional or longitudinal studies which document the *product* of change (e.g. achievement data), rather than the *process* of change. The time-consuming nature of longitudinal designs influences research in two ways. The number of observations is often small and/or collected over distant intervals of time and longitudinal and/or cross-sectional studies provide only a snapshot of what occurs (Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2004). Furthermore, statistical models are often linear in approach and "ill-suited as operational models for developmental investigations in the discovery mode" (Bronfenbrenner & Morris, 1998, p. 1001). Microgenetic studies provide counterpoint with a continuous flow of information by intensely studying short-term occurrences (days, weeks, or months) and document change through frequency of observation. Microgenesis entails the conditions and mechanisms that are fundamental in promoting the emergence of change (Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2004).

Observing and documenting the process of change in self-perception was pivotal to my study. Consequently, the research design took a process-oriented, microgenetic approach which explored how, and at what point, self-perceptions of underperforming readers become *actualized.* Actualized in this sense was the conscious or unconscious realization by readers that their potential as a reader had changed. In this type of dynamic assessment the changing individual was the unit of analysis.

Significance of Study

The potential significance to researchers and educators interested in better understanding the process of change, self-perceptions of third-grade, underperforming readers, and the influence of same-age peer tutoring and Technology-Actuated Reading Instruction process, is threefold. First, most research studies available in current literature focus on academic achievement and quantitative data (Jonassen, Lee, Yang, & Laffey, 2005). Studies are typically longitudinal with large sample sizes and, as such, offer information on a pattern of change over time based on snapshots and periodic data collection. What longitudinal studies do not offer are ongoing, microgenetic details of the process of change while it occurs and what that process looks like in a classroom setting (Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2004). My study offers copious details on *how* the process of change occurred for seven readers. While some experiences are more exemplary than others, all are included to provide a rich, thick narrative and broaden the scope of the research. Through observations, field notes, artifacts, and videotaping, data were collected, analyzed, and interpreted to provide insight into the interactions which occurred between readers and tutors during Technology-Actuated Reading Instruction, as well as, how the process of peer tutoring influenced underperforming readers' self-perceptions as readers.

Second, my study adds to the body of knowledge on peer tutoring structures and extends the construct to include immersive environments. To ensure an accurate and more complete picture of the processes involved and experiences of readers, in addition to the aforementioned data collection methods, interviews were conducted and the Reader Self-Perception Scale (Henk & Melnick, 1995) was administered to readers and tutors at

pre- and post-intervention intervals. These data were triangulated to document interactions, analyze the authentic manner in which tutors engaged readers, and explore how self-perceptions regarding reading changed over a four-week period of time.

Third, the inclusion of learning tasks which require higher-order cognitive skills will inform instructional designers as they create digital tools which enable students to develop complex reasoning and problem solving skills. It is essential to demonstrate ways in which educators can move away from lower-level, skill and drill tasks if we are to justify the need for computers in classrooms (Crook, 1990; Radecki, 2009).

Digital Tools

The title selected to describe the process of using digital tools for learning intentionally included the term *actuated:* Technology-Actuated Reading Instruction (TARI). Considering the changing individual was the unit of analysis, actualized in this sense was the realization by the subject that their potential as a reader had changed. The only quantifiable tool to measure change was the Reader Self-Perception Scale (Henk & Melnick, 1995). However, the students' behaviors changed as evidenced by, but not limited to, students arriving early to spend more time using TARI or checking out books overnight. It is important to note that change can be nurtured by instructional design which optimizes learning by providing multiple representations and opportunities for understanding and practice. These immersive environments allow for discovery and user-control in interactive ways that may not be available in traditional classroom settings (Lawless & Brown, 1997; Mayer, 2005; Schrader, 2008).

Digital tools enable readers to self-regulate their learning and it has been suggested that the benefits of effective multimedia instructional design can actuate the learning process through scaffolding of information (Kalyuga, Chandler, Tuovinen, & Sweller, 2001; Lawless & Brown, 1997; Paas, Renkl, Sweller, 2003; Wink & Putney, 2002). Technology-Actuated Reading Instruction provided scaffolding opportunities through various applications and practices: listening to adult-modeled narrations, pacing oneself, reading and recording stories, and peer- or self-editing reading performances through playback functions. Leveraging affordances through navigational properties such as replay and record/rerecord allowed readers to work within their zone of proximal development (Vygotsky, 1986).

> Features of these delivery systems enable students to visit and revisit scenes or segments of the lesson quickly and easily . . . [and] the process of repeatedly viewing [multimedia] from multiple perspectives and goals allows for a richer, deeper understanding of the interaction of factors present in any instructional situation. (Schrader, Leu, Kinzer, Ataya, Teale, Labbo, & Cammack, 2003, p. 321-22)

It was my intent to synthesize digital tools with Vygotsky's Sociocultural Theory to create a learning environment which built on readers' skills and abilities. This complemented Mayer's (2005) and other research suggesting learning can be better attained through collaborative, multimedia learning tasks.

Theoretical Framework

The theoretical framework of this study was founded on the Sociocultural Theory posited by Lev Vygotsky (1896-1934). One of the factors that distinguished Vygotsky from other theorists of the time was the idea that learning occurred through social

interactions (Jennings & Di, 1996). We begin therefore with a characterization of learning as seen through Vygotsky's perspective.

Contrary to the stage theory posited by his contemporary, Jean Piaget (1896-1980), Vygotsky (1978) argued that an individual's cognitive abilities are extended through the use of language and interaction in a social environment. He argued that the language which flowed between individuals was the actuator of learning (Wertsch & Tulviste, 1992). In a reciprocal sense, the use of language changes thinking and actions, and thinking and actions change language (Wink & Putney, 2002).

Vygotsky (1978) explained that the process of acquiring knowledge was co-constructed and extended through the mediating guidance of a more capable other and facilitated when the more capable other interacted with a student in the student's zone of proximal development (ZPD). Defining ZPD Vygotsky stated that the theoretical zone is

> the distance between the actual developmental level determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers (Vygotsky, 1978, p. 86).

Rather than an adult providing guidance, in my study a more capable other was the same-age peer tutor who was partnered to assist a reader. The tutor's role was to intercede, assist, and guide the reader by conveying, demonstrating, and/or explaining concepts, terms, or skills. Vygotsky further explained that knowledge is formulated during the construction process and information which is inconsistent with an individual's understanding is reformulated through an interactive process of co-generation and co-construction (Duran & Monereo, 2005; Vygotsky, 1986). Applying the construct to readers, knowledge acquisition becomes an externally activated, social

construction mediated by their tutor. As a recipient of this process the reader is better able to formulate or reformulate their own knowledge as they operate within their ZPD.

In order to minimize the use of the pejorative connotation, an *underperforming* or *struggling* reader was simply referred as a *reader*. Each reader was paired with a third-grade more capable other who guided and assisted them during the iterative TARI process within the sociocultural framework. The more capable other was referred to as a tutor and was assigned to a reader/tutor dyad if they read at or above grade level and exhibited characteristics which were amenable to tutoring structures (e.g. friendliness, helpfulness, and ability to communicate effectively).

Research Questions

Three research questions guided this study:

1. How do underperforming, third-grade readers interact with their peer tutor while using Technology-Actuated Reading Instruction?
2. How does the Technology-Actuated Reading Instruction process influence underperforming readers' self-perceptions as readers?
3. How does the process of same-age, peer tutoring influence underperforming readers?

Learning is a cognitively demanding process (Sweller, 2005) and, as the Elementary and Secondary Education Act (ESEA, 2009) continues to drive instruction, educators are increasingly under scrutiny and accountable for student achievement (Henk, Moore, Marinak, Tomasetti, 2000). Quantitative data alone cannot provide insight into the complex nature of learning. It is my position that in order for educators to improve instructional practices, they must first investigate the subtle changes that take place

during the learning process. A descriptive and dense microgenetic approach addresses this need.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of my study was to investigate the interactions and self-perceptions of underperforming readers as they worked with same-age peer tutors during the Technology-Actuated Reading Instruction (TARI) process. Via observations, field notes, interviews, artifacts and videotaping the multiple case study specifically explored and documented: (a) the interactions underperforming readers exhibited with same age peer tutors while using TARI; (b) how the TARI process influenced underperforming readers' self-perceptions as readers, and (c) how the process of same-age peer tutoring influenced underperforming readers. Emphasis was on how, when, or if change occurred. Therefore, this chapter is organized around issues related to tutoring as well as use of digital tools in the classroom.

In the first section I discuss the theoretical framework which was the backdrop within which subjects performed TARI activities: the Social Learning Theory. The theory posited by Lev Vygotsky (1978; 1986) addressed the use of language as a means to co-construct understanding in a sociocultural environment. A brief comparison of Vygotsky's constructionism to Piaget's constructivist approach is offered, as are specific elements of Vygotsky's framework: assistance provided by a *more capable other* and the *zone of proximal development*. Literature related to self-perception, self-efficacy, and perceived competence are included in the second section. The third and final section of

the review of literature discusses the debate over the effectiveness of using digital tools, how digital tools are most often used in schools, and how digital tools may be used as a means to expand learning opportunities for underperforming readers.

Conceptual Overview

Throughout the ages, human cognitive development has typically involved interaction with the world and its inhabitants. Whether with other individuals or by using digital tools which have become available in the past thirty years, the need to interact has not changed. It is a fundamental part of that which drives most human beings and influences instructional and curricular decisions (Maslow, 1943; 1954; 1968; Vygotsky, 1986). How interaction is facilitated in today's classrooms is found in educators' efforts to establish productive learning environments. Within a Vygotskian construct, it is interaction which is essential to the learning process. A Vygotsky-sensitive classroom pairs students of differing ability levels which facilitates the co-construction of knowledge by working together and sharing ideas (Vygotsky, 1986; Wink & Putney, 2002). Interactive peer relationships have a profound influence on whether or not students' social and cognitive development blossom and/or flourish (Gunn, 2008; Witt, 2008).

Various tutoring structures have been designed and incorporated into classrooms nationwide to address frameworks conducive to interaction and instructional efficiency. These have included, but were not limited to, same-age peer tutoring, cross-age peer tutoring, and classwide peer tutoring. It was anticipated that, by using tutoring configurations as an instructional strategy, the challenge of providing tailored assistance for underperformers may have been mediated if not ameliorated (Topping, Peter,

Stephen, & Whale, 2004). The desired results did not consistently come to fulfillment and while the popularity persists, the effectiveness of tutoring frameworks within the instructional domain continues to be debated (Darrow, Gibbs, & Wedel, 2005; Fulk & King, 2001; Greenwood, Maheady, & Carta, 1991; Portillo Peña, 2008). Researchers have therefore advocated further exploration on the interaction which occurs in learning environments (Jonassen, Lee, Yang, & Laffey, 2005; Newell, 1996).

The debate is fueled by tutoring frameworks which focus on quantitative academic achievement which leaves an awareness of *how* students interact with each other primarily overlooked (Jonassen, Lee, Yang, and Laffey, 2005; Newell, 1996). Research that only considers the *product* of change through quantifiable data collected at widely spaced intervals is prone to miss the subtle nuances and *processes* that ultimately affect the product (Lavelli, Pantoja, Hsu, Messinger, Fogel, 2004). Literature distinguishing between tutoring approaches has been undefined and adds to the challenge of visualizing and explicating what occurs during tutoring processes (Heron, Villareal, Yao, Christianson, & Heron, 2006).

The importance of reading in the core curriculum is indisputable (Sokal & Katz, 2008). However, issues which warrant further discussion are how young readers develop and how educators present curricular components that promote improved self-perceptions, self-actualization, and perceived competence (Karagiannakis, 2008; Marchand & Skinner, 2007). Without this discussion, quantitative measures may merely offer a snapshot into what occurs in classrooms rather than a continuous flow of dense details (Lavelli et al., 2004). My study offers observations and analysis of interactions and self-perceptions of underperforming readers with their tutors. Subjects were

primarily observed while using Technology-Actuated Reading Instruction (TARI) but their behaviors before and after TARI activities were also documented. The microgenetic approach provided the structure by which the *process of change* was observed.

Individuals bring their own emotions, feelings, and aspirations to the learning environment and an understanding of how they influence the self-perception of underperforming readers is essential. Those who feel less successful may exhibit avoidance and withdraw from participation, thereby impacting future progress. Marchand and Skinner (2007) reported that children with a sense of incompetence were less likely to exhibit help-seeking behaviors and were more likely to exhibit concealment. When faced with a difficult learning task, these children typically do not ask for reiteration or clarification, which may then hinder their development and performance (Chandler and Sweller, 1991).

Not only does a feeling of incompetence influence student achievement, academic success or failure has a corresponding relationship on the likelihood of dropping out of school (Greenwood & Delquadri, 1995; Lo & Cartledge, 2004; Roswal et al., 1995). Coupled with research indicating that nearly half of fourth grade students are not fluent in reading grade level texts (Vadasy & Sanders, 2008), concerns regarding underperforming readers' self-perceptions as readers, drove my investigation.

In the review of literature, I first discuss the theoretical framework which was the backdrop within which subjects performed TARI activities: the Social Learning Theory. The theory posited by Lev Vygotsky (1978; 1986) addressed the use of language as a means to co-construct understanding in a sociocultural environment. A brief comparison of Vygotsky's constructionism to Piaget's constructivist approach is offered, as are

specific elements of Vygotsky's framework: assistance provided by a *more capable other* and the *zone of proximal development*.

Peer tutoring aligns with the philosophy advocated by Vygotsky and current research regarding tutoring structures and instructional practices have been embedded within my sociocultural overview. Characteristics and attributes of effective peer tutoring dynamics and designs are included to provide a foundation for my investigation of underperforming, third-grade readers. While the scope of my study did not explore the attributes and dynamics of tutoring systems, they should not be overlooked. Verba and Winnykamen (1992) recommended an examination of the characteristics of tutors and their *tutees* in an effort to better define the interactive aspects of tutoring relationships (Duran & Monereo, 2005). In an effort to set the groundwork for future research in this area, I offer findings for the following questions.

- How do underperforming, third-grade readers interact with their peer tutor while using Technology-Actuated Reading Instruction?
- How does the Technology-Actuated Reading Instruction process influence underperforming readers' self-perceptions as readers?
- How does the process of same-age, peer tutoring influence underperforming readers?

Literature related to self-perception, self-efficacy, and perceived competence are included in the second section. As early as 1990, researchers began to consider the importance of affective factors which influenced academic achievement, performance, and behavior (Henk & Melnick, 1995). However, an underlying problem was related to the development of an accurate measure to gauge the varied elements within the affective domain, and their influence or impact on the self-perception of children. This has been

somewhat improved with a measure directly attuned to qualitative indicators: the Reader Self-Perception Scale (RSPS).

The third and final section of the review of literature discusses the debate over the effectiveness of using digital tools, how digital tools are most often used in schools, and how digital tools may be used as a means to expand learning opportunities for underperforming readers. Brief mention is made of the instructional design models central to developing digital tools intended for the target population. These models are Gagné's (1985) nine conditions of learning (instructional events and mental processes), and the Four-Component Instructional Design Model recommended by van Merriënboer and Kester (2005). Further explanation of the models is found in Chapter 3: Methodology.

Research has indicated that there is a need to examine more than digital tools and user relationships in isolation (Jonnasen, Lee, Yang, & Laffey, 2005) warranting an integration of tutor-mediated learning *in* an immersive environment to add to the current body of literature available to researchers and educators (Crook, 1996; Mayer, 2005; Newell, 1996). The intent of my study was to investigate these interrelated factors and their influence on underperforming, third-grade readers.

Learning in a Sociocultural Environment

One of the foremost psychologists and educators of the early twentieth-century was Russian born Lev Semyonovich Vygotsky (1896-1934), whose theories of cognitive development are still relevant in instructional settings today. My study explored the interactions between underperforming readers and tutors, of particular relevance were

Vygotsky's theories on language and the interactive construction and co-construction of knowledge. Vygotsky's Sociocultural Theory argued that knowledge acquisition was mediated by a *more capable other* within an individual's *zone of proximal development*. As each component is essential to understanding his theory, we begin with a characterization of learning as seen through a Vygotskian perspective.

The Sociocultural Theory emphasized that sources of thinking were social activity and cultural practice (Wink & Putney, 2002). Vygotsky's position was that learning occurred through, and was extended by social interactions. This distinguished him from contemporary theorists, most specifically, Jean Piaget (1896-1980). Contrary to the stage theory and individualistic constructivist position argued by Piaget (1972; 1990; 1997), Vygotsky argued that *language* was the actuator of learning (Wink & Putney, 2002). Figuratively speaking, language is a fruit from a social and cultural heritage tree: Its use feeds changes in thought and action. In a reciprocal manner, when thought and action change, language changes.

There are distinct differences in constructionism, a Vygotskian approach, and constructivism advocated by Piaget. Piaget's constructivism suggests that knowledge is first formulated inwardly rather than a product of social interaction. Conversely, constructionism involves the formulation of knowledge that occurs during social relationships between individuals (Wink & Putney, 2002). Knowledge becomes reformulated through a process of co-generation and co-construction when information is inconsistent with initial understanding (Duran & Monereo, 2005; Vygotsky, 1986). Although his theory did not focus primarily on inner thought, Vygotsky addressed the issue of an individual's ability of "knowing how . . ." with his concept of *internalization*.

Internalization is an active process of restructuring shared knowledge. It includes four distinct components: (a) meaning making which is shared between and among individuals; (b) external and internal action and the resulting developmental relationship; (c) creative contributions stemming from the active co-construction of knowledge; and (d) the progression from collaborative accomplishments to individual achievement (Wink & Putney, 2002). Inner speech develops as a result of the internalization of external speech which has commenced outside of the individual. Whereas external speech requires an expanded vocabulary, inner speech is semiotic of more expansive concepts. A sociocultural approach to learning therefore must be analyzed in terms of socially structured activities rather than a change which has been initiated within and by the individual. Dimensions of participatory problem solving and the cultural resources that are accessed during learning activities are essential to understanding this construct and the environment in which interactions take place (Crook, 1996; Wertsch & Tulviste, 1992).

Wells (2000) identified several characteristics of a classroom environment which are founded on the sociocultural and constructionist perspectives. The characteristics include

- a community where collaboration is key;
- purposeful activities which are situated and unique;
- curriculum which is used as a *means* rather than an *end*;
- goals and outcomes which allow for emergent, extended learning; and
- activities which are constructed and provide opportunities for diversity and originality.

In addition to creating a Vygotskian-sensitive environment, two important elements of the sociocultural construct were particularly applicable to my study. These were

concepts of a more capable other and the zone of proximal development. We first address the concept of a more capable other which is referred to herein as a "tutor."

Vygotsky (1978; 1986) found that children could problem solve beyond their developmental level if they were given assistance in the form of prompts, guiding questions, or assistance from someone whose skills were more advanced. As such, knowledge was co-constructed in conjunction with factors, such as the degree of assistance a tutor can provide. A tutor in this sense is an "actuator of learning" and guides a learner through complex tasks, processes, or concept-building (Wink & Putney, 2002, p. 32). Knowledge is extended as the tutor serves as a mediator between the content to be learned and the learner him- or herself. As a recipient, the learner is then better able to formulate or reformulate their own knowledge. This is substantiated by Duran and Monereo (2005) who found that the co-construction of knowledge is a process which provides scaffolds and builds upon existing knowledge. As such, the tutor's role is integral to the degree to which the learner's cognitive development is obtained.

Identifying who should act as a tutor is not easily determined and in some classrooms the same student serves as a tutor in all curricular areas. In the Vygotskian perspective, however, the determination of a tutor is dynamic rather than static. Tutors need not be experts in all areas but must have the requisite skills and abilities higher than that of the intended learner in the content area being studied.

Tutoring relationships cannot be viewed in isolation and in a Vygotskian framework a tutor intercedes within the learner's zone of proximal development. Vygotsky illustrated this concept by the analogy of a hot air balloon lifting from the ground (representing the actual development of an individual) and rising upwards toward a cloud (the individual's

potential development). The distance between the ground and the cloud is the area referred to as the student's zone of proximal development: an area in which learning is extended based upon mediating factors. Vygotsky's idea was to provide effective instruction which built on the present level of knowledge and led the individual toward greater understanding and cognitive development (Wink & Putney, 2002). More explicitly, Vygotsky (1978) describes the zone of proximal development as

> the distance between the actual developmental level determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers. (p. 86)

Considering learning is cognitively demanding (Sweller, 2005), it is essential to be cognizant of an individual's zone of proximal development and the structure of collaborative tutoring. Crook (1996) stated that frameworks of collaboration can be an impediment to learning if they are not designed after more naturalistic settings. He recommended *referential anchors* to develop a commonality, joint understanding, and focus. This was further addressed and supported by research findings in Valenzuela-Smith's (1984) dissertation and, more recently, the study by Darrow, Gibbs, and Wedel (2005).

Valenzuela-Smith (1984) evaluated a tutoring program designed for Latino middle school students by identifying learning problems and categorizing them into cultural, social, cognitive, and emotional conditions. Issues of academic achievement, behaviors displayed at school, and self-esteem were elements of her study. The research was driven by questions of whether these factors were positively influenced due to the students' participation in a tutoring program. The study was grounded on the theoretical framework that through collaboration with a tutor who shared conceptual and lingual characteristics,

students of lower ability would develop problem solving skills. Valenzuela-Smith found that tutors and tutees who shared a personally relevant connection (e.g. language or culture) were emotionally invested in more than academic achievement. Valenzuela-Smith also reported that there was a large positive correlation between the self-esteem scores of students and their teachers' behavior assessments.

Darrow, Gibbs, and Wedel (2005) reported that the use of peer tutoring served tutees in ways that may be neither addressed nor perceived by classroom teachers. These too included such features as shared language or experiences. The researchers argued that tutors may be more aware of lower-ability students' lack of understanding and may be able to explain concepts in child-friendly language. They stated that the relationship was beneficial to both tutor and tutee in that increased interaction between students provided additional opportunities to process and encode information. This prompts the question, "Does it matter with whom an individual collaborates?" Vygotsky would argue, "Yes!"

The most-able students do not necessarily make the best tutors (Chabot College Tutoring Program, 2010) and it is imperative that educators are mindful of the idiosyncratic variables of individuals and instructional conditions when creating tutor/tutee partnerships, or *dyads* (Cates, 2005). The most important factor is that the tutor is an effective communicator who works well with other students. Being able to communicate involves more than simply speaking fluently. It requires receptive listening skills to receive and assess when assistance needs to be provided and when the tutor should wait. Considering much of communication involves non-verbal language, it is important for the tutor to be observant and attuned to body language and changes in behavior. Tutors should also exhibit emotional attributes: patience, honesty, adaptation to

limited space and personalities, and willingness to help others improve. While these characteristics are preferable and influence the tutor/tutee relationship, the importance of the design of dyads cannot be overlooked.

Duran and Monereo (2005) state the "most effective dyads are those composed of students of the same age, but with different skill levels" (p. 181). Their recommendation mirrored the type of structure I created for my study. The researchers defined peer tutoring as a collaborative, cooperative learning method with roots in asymmetrical, paired relationships which share a common goal or objective.

In their second generation extension of cooperative learning methods, Duran and Monereo explored engagement and the collaboration between pairs of tutors who had been assigned to differing tutoring structures. This was one of the few examples of research which took into account interactions of students. Structures included reciprocal tutoring where there was minimal distance between the ability levels of tutor and tutee and fixed tutoring where the distance in ability level was greater. Sample size consisted of 24 students with a mean age of 14 and their intent was to answer several questions: (a) how are messages *generated* during each interactivity segment and how do reciprocal versus fixed generated tutoring messages differ; (b) are differences evident in the *types* (configurations) of messages/conversations between tutor and tutee; and (c) is there a sequence to the exchanges and, if so, do reciprocal versus fixed tutoring structures differ?

In order to unearth patterns of tutoring, Duran and Monereo (2005) synthesized a categorized system to analyze the first level: interactivity segments. Specific descriptors were assigned to each of the eight categories: (1) ideas; (2) drafting; (3) reading; (4) editing; (5) best copy; (6) evaluation; (7) inquires; and (8) outside tasks. The researchers

found that messages were predominately generated during the drafting period of writing tasks with no distinguishable difference between reciprocal and fix tutoring frameworks.

The second level of analysis investigated message configurations and, as suggested by Person and Graesser (1999), followed the initiation, response, feedback, cooperation (collaborative and tutorial), evaluation, and parenthesis structure. Analyses revealed that cooperation between partners was more commonly observed in the fixed tutoring design because roles were assigned and clarified. Message configurations were distributed between the tutor and the tutee: The initiation and feedback configurations were actively initiated by the tutors while tutees' messages/conversations were more reactive during the response processes.

The third level simply documented three sequences of interaction: (a) the initiation-cooperative/questioning-evaluation model (*ICE*); (b) the initiation-response-cooperative/guidance-evaluation process (*IRCE*); and (c) the initiation-response-feedback (*IRF*). ICE required tutors to initiate a message which prompted the tutee's cooperation question rejoinder. Guided by the tutor, the dyad jointly constructed a response which gave way to evaluation. IRCE began with a tutor's initiation message followed by a required response from the tutee. Responses were guided and improved through a system of cooperative interchanges but ended with an evaluation provided by the tutor. In this model the tutor both began and ended the sequence.

The third and final sequence, IRF, was a prototypical structure of three-part dialogue. Mimicking teacher/student relationships, the tutor initiated the discussion by using questioning, explaining, or question formulation strategies. The tutee responded then the tutor provided feedback by evaluating and, if needed, offering correction.

Duran and Monereo's results suggested several elements which may benefit tutoring dyads. First, the role of the tutor and tutee should determine the interactive relationship. Second, the role of tutors and tutees determines the types of interaction that will evolve. Third, the initiation-response-feedback sequence was suitable for both reciprocal and fixed tutoring models. Fourth, the initiation-response-cooperative/guidance-evaluation sequence was better for fixed tutoring. Fifth, the initiation-response-feedback was more characteristic of reciprocal tutoring models. Most importantly, Duran and Monereo found that regardless of whether tutoring structures were fixed or reciprocal, the mere act of "having a companion with whom to dialogue and exchange points of views" may enable development (p. 181).

Tutoring has continued to expand in popularity due, in part, to compensate for sociocultural or familial risk factors: dysfunctional families or poverty (Kourea, Cartledge, Musti-Rao, 2007). To counterbalance societal insufficiencies, tutoring has served as an instructional strategy and equalizer for differentiated instruction and mitigates negative societal influences. Positive effects of tutoring have been reported which range from reducing early academic failure to lessening the likelihood of students becoming dropouts (Greenwood & Delquadri, 1995; Lo & Cartledge, 2004). It is recommended that tutoring involve active engagement, assistive interventions, and practice. Kourea, Cartledge, and Musti-Rao (2007) reported that tutoring as an instructional methodology "enhances and supports the learning of *all* students . . . in mainstream settings" (p. 96).

Kourea, Cartledge, and Musti-Rao (2007) investigated the academic reading performance of six, second/third grade students who shared a classroom in an urban

elementary school. They stated that five of the six subjects made significant improvement in oral reading fluency as measured by the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and the Woodcock-Johnson III Tests of Achievement measures. Beyond academic performance however, their research unearthed qualitative data about emotions related to tutoring experiences. They received positive responses regarding tutoring based upon three qualitative questionnaires which the subjects, their parents, and teachers completed. The majority of subjects reported that they enjoyed the tutoring structure but one student stated that she neither liked it nor disliked it because her partner was "mean" (p. 104). This reinforced the need for careful consideration of partnership assignments and, as was found in my study, the behaviors of tutors can have an impact on the self-perception of tutees.

A dissertation by Gunn (2008) explored *Proximal Mentoring* as a means to provide graduate students with someone who collaborated, clarified, guided, served as a model, and provided feedback and content. The proximal mentor was not viewed as an expert but rather one to assist, as needed. Gunn found a relationship between the proximal mentors' increased depth and breadth of knowledge and the assistance they provided to the graduate students within their (the students') zone of proximal development. She also reported that gains were made by students at a more rapid rate than they would have otherwise. She added that this occurred because proximal mentors were caring and shared their own growing knowledge with students: a behavior that was found to be advantageous to both parties.

Examining the social interactions that occurred during and following reading intervention programs, Kulich's (2009) study focused on elementary-aged, Karen

children. The term “Karen” refers to an ethnic minority who primarily reside in southeastern and southern Burma. Although small in sample size, the duration of the Kulich’s study was over a six-month period. The research design involved three English language learners who received intensive English fluency instruction during a nine-week summer program and after school from September through December.

Kulich investigated the teacher-to-student and student-to-student interactions by administering pre- and posttests, documenting behaviors and interactions via observations, and conducting interviews with subjects and their parents. While part of the study focused on systematic English language development, fluency, and achievement (e.g. comprehension), attitudes towards academic and leisure reading were also measured. Kulich found that of the three subjects, all benefited from the varied instructional environments: (a) teacher-to-student instruction; (b) small and large group instruction; and (c) peer tutoring. She further discovered that the process positively impacted the literacy progress of each student. More applicable to my study were Kulich’s findings regarding attitudes. She found that the tutoring experiences “impacted their overall ability to function successfully in their regular classroom setting” (p. 258).

Differing from the findings of most researchers was the investigation by Hannah (2008). She explored an after-school, peer tutoring intervention program examining the mathematics achievement and attitudes of high school students. Hannah’s research was considerate of the Sociocultural Theory in that she designed the study using the *zone of proximal development* construct and interactive framework. Her investigation lasted six weeks and involved a large sample size of 138 high school students. Of these subjects, 46 Algebra and Geometry students were paired with 46 Advanced Placement Calculus

students. Treatment subjects were compared to a control group consisting of 46 students who received no tutoring interventions. Measures were threefold and included a Mathematical Disposition Survey (Donovan & Beveridge, 2004) pretest which showed no differences between either group, a comparison of the subjects' Math grades from the first and sixth week of the study, and a posttest survey. No significant changes in attitudes towards mathematics were found but gains were found in math achievement. It is unknown why attitudes did not change and Hannah did not offer possible reasons for the findings. An explanation of why results are conflicting may be found in the research by Portillo Peña (2008).

Portillo Peña (2008) found that mixed results (or no positive outcomes) may spring from methodological shortcomings such as confusing research designs, small sample sizes, or unsuitable analysis of the data. She examined attitudes towards reading, motivation to read, and reading achievement. The effects of paired intergenerational reading programs of at-risk elementary students were of primary focus. Sample size consisted of 866 students selected from 12 public schools in an urban city located in north-central United States and the research accrued data over five years and categorized subjects into four cohorts representing a one-year implementation.

Portillo Peña found positive longitudinal effects of community reading intervention programs on the subjects. While not overly significant, Portillo Peña reported that paired reading intervention programs can have modest, yet long lasting impact on the reading attitudes, motivation, and achievement of urban, elementary students. She stated that intergenerational paired read aloud programs offer students opportunities to interact and discuss content with caring adults. She found that this environment also enhanced

comprehension, improved vocabulary and decoding skills, and promoted an interest in reading.

Based on the literature it is evident that sociocultural tutoring programs influence the learning outcomes and self-perceptions of students. It appears to be the structure of tutoring programs rather than the strategic skill development which have had the greatest impact on learners. Where gains were found, it was typically attributed to the tutor-tutee interactions.

Self-perceptions of Underperformers

As early as 1990, researchers began to consider the importance of affective factors which influence children's academic achievement, behavior, and self-perceptions. Henk and Melnick (1995) stated that long-held intuitions concerning the impact of values, attitudes, motivation, and the desires of students, were beginning to receive the attention they deserved. The underlying problem had been the development of an accurate and empirical measure to gauge these various elements within an affective domain, and their influence or impact on student performance. The need for understanding self-perceptions has not diminished over the past 20 years. Pershey (2010) reported that increased self-perceptions of ability and confidence show a correlation with better test scores: lesser self-perceptions correlate with lower test scores. While it may be helpful to understand self-perceptions of students in all curricular areas, my study incorporated only the content of reading as a vehicle to observe social interaction, behaviors, and changes in self-perception.

It has been inferred that we first learn to read and then read to learn (Honig, Diamond, Gutlohn, 2008). If this is indeed the case, can students have not learned to read ever be able to read to learn? Sokal and Katz (2008) stated that competent reading is the strongest predictor of success in school and that effective reading programs are essential. However, discussions regarding reading instruction raise issues about the causal nature of reading difficulties and ameliorating these dilemmas are often a topic of controversy (Reinking, 2005).

The two primary purposes were to observe and document the interactions underperforming readers had with their tutors, and to explore how self-perceptions were influenced by this relationship within an immersive environment. As such, it is important to discuss the impact this type of structure has on students in general.

Robinson, Schofield, and Steers-Wentzell (2005) explored tutoring designs and its influence on learners. They stated that students of every ethnicity may have positive academic, socio-emotional, and attitudinal outcomes (e.g. self-concept, school attendance, academic efficacy) when participating in tutoring programs. They did not distinguish between ethnicities nor did they identify the best tutoring relationships (e.g. same- or mixed-age tutoring dyads). However, their findings are consistent with Newell (1990) who found tutoring frameworks for learning produced positive effects on subjects' attitudes, friendships, and self-efficacy. In sum, Robinson et al. found that

- classroom behavior such as time on task improved with peer tutoring;
- attendance was improved;
- the desire to drop out of school was reduced;
- subjects felt a sense of belonging, social acceptance, and improved self-concept;

- mixed-sex pairs did not consistently have the positive effects that same-sex partners evidenced;
- longer or more rigorous programs did not ensure academic gains; and
- tutor training showed positive effects for both tutor and tutee.

It is important to understand the influence attitudes have on unsuccessful students. Smith (1990) described attitudes as "a state of mind, accompanied by feelings and emotions that makes reading more or less probable" (p. 215). This aligns with Marchand and Skinner (2007) who reported that in early adolescence children with a sense of incompetence were less likely to exhibit help-seeking behaviors and more likely to exhibit concealment. Their expansive study centered on the motivational self-perceptions, social relationships, and engagement of 765 students in grades three through six during the fall and spring of one school year. Supporting their analyses was Ismail and Alexander's (2005) research which suggested that peer tutoring may reduce feelings of incompetence. They stated tutoring "fosters positive intrinsic motivation and enhances cognitive skills within participating peers [and] increases students' task persistence and feelings of competence and personal control" (p. 67).

Furthermore, attitudes and self-concepts were investigated by Roswal, Mims, Evans, Smith, Young, Burch, et al. (1995) during a 16-week study involving 282 seventh-grade students from an urban middle school. They administered the Piers-Harris Self-Concept Scale to measure subjects' self-concept and collected data related to students becoming dropouts. Roswal et al. concluded that subjects in peer tutoring were more likely to exhibit improvement in self-concept and attitudes toward school than students in traditional, non-tutoring settings.

Tutoring frameworks help all students in mainstream classrooms (Kourea, Cartledge & Musti-Rao, 2007). This is particularly important for elementary school-aged boys since there is a relationship between academic and socio-emotional problems and boys' behavior during the early years of their education. Boys who exhibit poor behavior often have negative self-perceptions and without interventions such as tutoring these problems may persist into adolescence and adulthood (Karagiannakis, 2008). Their findings substantiate Marchand and Skinner's (2007) investigation thus illustrating the long-lasting, detrimental effects of low self-perception.

Attitudes were also a primary focus in the analysis of three action research projects reviewed by Topping, Nixon, Sutherland, and Yarrow (2000). The findings which were most applicable to my study were from the Yarrow Project which involved ten year old students with excessive behavior problems who were randomly placed in either a treatment (Paired Writing; interaction) or control group (Writing Individually; no interaction). Subjects in the treatment group were partnered with same-age students of higher ability and were asked to co-construct a creative or technical writing product. Partnerships were assigned to fixed roles based on writing ability and, as a secondary consideration, personality. All 28 participants were pre-trained in using a writing flowchart.

Step One began with the "helper" (tutor) asking questions and the "writer" (tutee) answering (p. 80). Tutors took single-word notes of the tutees' responses. Questions stemmed from the notes, were structured, and incorporated elements of writing: who; what; to; with; where; when; how; why. Insufficient information was extended through prompting words or statements: What's next; If; And; But?

During Step Two each dyad created a rough draft from the notes they had made during Step One. The tutee would verbally state one idea or sentence and then select one of five activities which determined their' and the tutors' roles. The roles included variations of writing or copying sentences and spelling or adding difficult vocabulary. The collaborative process required an active interchange which continued through Steps Three, Four, Five, and Six: reading, editing, best copy, and evaluate, respectively.

Topping, Nixon, Sutherland, and Yarrow found that those subjects in the Paired Writing structure who used the flowchart and increased their practice time showed gains than those in the Writing Individually (control) group. They stated that "the interactive component with the metacognitive component [peer editing] led to greater improvements than the latter alone" (p. 86). Furthermore, subjects in Paired Writing (treatment) groups showed higher self-esteem as writers than the control subjects. When returned to an environment which required independent, rather than assisted writing products these subjects declined in skill but their abilities were still significantly higher than they had been at pretest. The researchers' findings on generalization to other curricula and the gains of tutors as a result of the process were also important. They found that writing skills transferred to other curricular areas and that, as with tutees, self-perceptions improved for tutors. They stated, "Paired Writing appeared to be a robust system, which could have beneficial effects even in adverse circumstances" (p. 87).

While it is easy to measure quantifiable gains it is more difficult to assess attitudes and perceptions of children. An early effort to design an instrument to address this challenge was created by McKenna and Kear (1990) and was used to detail and assess the affective domain of reader perception. The measure, the Elementary Reading Attitude

Survey (ERAS), gauged elementary students' attitudes toward both school-based and recreational reading and used the comic-strip character Garfield in a friendly and inviting format. The measure was a valuable and reliable instrument for teachers and administrators because of its extensive norming but left a gap in how readers felt about themselves as readers.

Henk's 1992 Reader Self-Perception Scale was a response to the calls for the development of an instrument which effectively assessed how readers appraised themselves. The measure went beyond attitudes about reading as a recreational or curricular task and addressed the reader's appraisal of their own ability. The discussion which flowed from these developments, and which included Valencia's (1990) concept of the *perception of self as reader,* provided a new tangent to previous studies (Henk & Melnick, 1995).

Earlier studies largely surveyed ideas of a more general nature and did not focus directly on the self-perception of the reader as a reader. Realizing the limitations of other instruments which incompletely measured reader characteristics or academic achievement, Henk and Melnick's (1995) iteration of the Reader Self-Perception Scale (RSPS) was a refinement of the first instrument and included additional norming and validity measures. The scale is founded primarily on elements of Bandura's Social Learning Theory of perceived self-efficacy (1977; 1986; 1997). Citing Zimmerman and Ringle (1981) and Schunk (1982; 1983a; 1983b) the researchers argued that self-perceptions are likely to either inhibit or motivate the student thereby directly impacting their ability to learn and progress.

Judgments related to self-efficacy were thought to affect students' selection of tasks and activities, engagement with or avoidance of learning, the amount of effort expended, or the persistence needed to accomplish a goal. The researchers stated that students who had a greater sense of self-efficacy were more likely to engage in academic tasks and find success therein. In my study, the ability to measure self-perception was central in determining if change had occurred and the RSPS provided a means to compare pre- and post-intervention data in four dimensions: Progress, Observational Comparison, Social Feedback, and Physiological States.

Pershey (2010) found that as students progressed through the academic system, their self-perceptions became increasingly less positive as they advanced through elementary and middle school. Her findings substantiated Marchand and Skinner's (2007) research in that concealment and a lack of help-seeking behaviors are influenced by negative perspectives. One reason that I selected third grade subjects was to reach children before feelings of incompetence took deep root. The importance of this is obvious considering researchers continue to identify a direct relationship between self-efficacy and the ability for the student to perform at higher levels of achievement (Pershey, 2010).

Research studies by Newell (1990; 1996) found that tutoring provided enrichment opportunities, feedback, and increased learning time. Her qualitative dissertation focused on the nature of relationships between tutor/tutee in a cross-age tutoring program. She partnered eight fourth-grade students with eight second-grade students during three trainings, three conferences, and ten weekly tutoring sessions which lasted thirty minutes each. As a vehicle for observing interactions Newell used three computer programs: keyboarding, problem solving, and word processing.

Newell found that friendships grew from the tutor/tutee relationships and that both groups expressed enjoyment of their tutoring experience and a desire to continue with the same partner. Tutees' self-perceptions were that, if tested, they would be successful because of the knowledge they had acquired while working with their tutor. She also found that children generated self-evaluations naturally and that tutees' performance was neither influenced by unrelated, non-task conversations nor their tutor's level of knowledge.

Stemming from her earlier work, Newell investigated cross-age tutoring structures designed to increase computer literacy. She reported that the number of computers had increased dramatically in the United States yet they were most frequently used only to add enrichment or variety rather being a source integral to instruction. Newell's findings on computer literacy as a result of cross-age tutoring were insightful. She reported that understanding was accelerated by the tutor/tutee relationship and that tutees could transfer skills and procedures to other, similar situations. Tutees also learned skills which were not explicitly taught but were perceived and then used in appropriate learning settings. While Newell's research overall was optimistic in nature, other studies have unearthed areas of concern.

Donalson and Halsey (2007) documented how negative attitudes and perceptions of the readers' ability not only prevented subjects in a remedial reading class from learning, but reaffirmed their refusal to attempt academic tasks. It is obvious that whether working alone or placed with a tutor in a sociocultural setting, a student who refuses to attempt academic tasks will be unlikely to learn. Self-perception may also inhibit children who feel that the reading material is uninteresting or unrelated to their life and interests

(Donalson & Halsey, 2007). This particularly applies to African-American males who feel disconnected to academic materials presented in reading lessons at school. How to teach core curricula with fidelity while embedding relevant and interesting reading materials becomes a challenge. Heath (1990) and Cavozos-Kettle (2005) observed that students wanted to read text which corresponded to their cultural interactions and interests. Culturally-sensitive text was considered by students as *real reading* because of its authenticity and meaningfulness.

In summarizing the learning environments and tutoring relationships that have a relationship to underperformers' self-perceptions, current literature suggests that it is essential to assign tutors strategically considering their influence on others can be significant. Partnering students who are able to positively influence self-perceptions are preferred to those who exhibit insensitivity or negativity. With the exception of Hannah's study, gains were made in self-perception of underperformers due to the sociocultural environment in which they were placed.

It was an initial concern that by including digital tools into my research design the reader/tutor relationship may have been negatively influenced. My thought was that the cognitively demanding task of reading, coupled with navigating and using digital tools may have been too challenging for readers. What I tried to avoid was having digital tools become a springboard to frustration and lower self-perception because of the readers' inability to effectively use multimedia. Although most children today are technologically savvy, it was vital that opportunities for assisted learning and interaction were designed into the affordances found within digital tools (DeLeeuw & Mayer, 2008; Jonassen et al., 2005; Kirschner, 2002; Mayer, 2005; Prensky, 2010). With this in mind, my study

embarked on a synthesis of Vygotskian-considerate tutoring, observed and measured self-perceptions, and data regarding the use of digital tools in an immersive environment.

Based on the literature it appears that changes in self-perceptions and attitudes are closely tied with subjects' perceived ability to complete learning tasks as well as the quality of their work. Environments which serve to nurture skill development and self-confidence have lasting influences on underperforming students by positively affecting their willingness to attempt tasks which they may have otherwise avoided.

Digital Tools for Learning

Since the invention of the microcomputer school districts have been implementing digital tools into classrooms with varying degrees of success (Cuban, 2000; Cuban, Kirkpatrick, & Peck, 2001). Clark and Feldon (2005) posited that the optimism for technology-infused learning has not been consistently supported by research. This was emphasized by Wijekumar, Meyer, Wagoner and Ferguson (2006) who added, "Recent meta-analyses of research about technology-enhanced learning environments showed minimal, or even negative, effect sizes (Azevedo & Bernard, 1995; Fletcher, Claire & Gravatt, 1995; Lee, 1999; Lou, Abrami & D'Apollonia, 2001)" (p. 191). Furthermore, systematic evaluations of the nature of interactions in immersive environments are not prevalent in current research and, to better understand the nuances and underlying influences on students' emotions, qualitative aspects of learning needed to be explored (Newell, 1996; Gerber & Grote, 2007). It became clear that

understanding how technology is used in educational settings was important particularly when it incorporated interactive peer tutoring constructs.

While the concept of peer tutoring in traditional classroom settings is straightforward, it becomes more complex when peer tutoring is combined with immersive environments where digital tools function as an integral resource for learning. Researchers have found that digital tools continue to be prevalent in educational settings today (Holliman & Scanlon, 2006); however, in instructional settings there is a disparate level of utilizing the affordances that can be leveraged and research continues to focus on quantitative academic gains. Rather than providing opportunities to develop higher-order skills, e-mail and drill and skill tools are routinely used and limit the cognitive development of children (Radecki, 2009; Schrader, 2008). The inclusion and use of digital tools to develop authentic products can provide an opportunity to move away from low-level interactions which require little reasoning or evaluative skills (Radecki, 2009).

Digital tools can provide a wide-range of services and are toolboxes for human use (Crook, 1996); but can digital tools, alone, offer the social interactions Vygotsky (1986) argued are necessary for human cognitive and social development? Rather than looking at digital tools and sociocultural environments in isolation, exploration into an integration of multimedia affordances with the mediating influence of a *more capable other* (tutor) in socially constructed learning environments was justified.

To some educators, having students use digital tools as a means of engagement is often more important than how and why they interact with technology (Radecki, 2009). Various researchers such as Crook (1996), Mayer (2005), and Schrader (2008) have

pointed out reasons why they believe the use of digital tools in schools is valid, while other critics argue the negative effects of the same digital tools. Cuban, Kirkpatrick, and Peck (2001) have addressed the use of digital tools in the classroom, and have challenged research findings which have shown positive benefits. It became apparent from the divergent opinions that, depending on its use, there have been ostensible positive and negative effects of technology implementation (Radecki, 2009).

The larger discussion should focus on how technology can be used within the context of a theoretical framework to enhance student understanding. Rather than lower-level drill and skill practices, how do students interact with digital tools in a manner which promotes higher-order cognitive skills? Technology-Actuated Reading Instruction (TARI) was designed with the target population in mind and provided underperforming readers the structure and support they needed.

Crook (1996) stated that digital tools serve more than human interest: They have the ability to transform the relationships between human beings. Tools which foster interactions through probing questions and activities, analysis, or evaluation create avenues for conversation that are not present in other formats. Coordinating knowledge construction with these affordances, Crook recommended tutoring programs wherein the digital tools were used as *referential anchors* to develop a commonality, joint understanding, and focus. He stated

> Pupils' activity became increasingly coordinated around this point of shared reference: they collaborated more effectively. Developing technology to be supportive of the collaborative experience of learning is partly about developing such ways of resourcing joint activity at the site of some problem. (p. 228-29)

A good example of Crook's argument was found in a recent dissertation by Witt (2008). Witt's study focused specifically on shared cognition through the discourse of language, reasoning, and symbol systems. Student nurses in a postsecondary program were given real-life, high fidelity simulations of emergencies routinely found in hospital situations. In lieu of having opportunities to observe authentic cardiac resuscitation or respiration emergencies in a clinical setting, the goal was to prepare future nurses by having them practice situations using digital tools in a safe environment. Eight scenarios were programmed onto SimMan which replicated the human body and a teacher was present to guide students through learning tasks and to offer support.

Witt reported that students began discussing the simulations with their peers in addition to the teacher who was assigned to assist them. She added that the benefits of collaboration and simulations included, in part, lowering anxiety, providing opportunities for adjusted pacing and active participation, and repeatability features. J. M. Daw (personal communication, August 02, 2011) confirmed that during his nursing program where SimMan was instituted he repeatedly practiced using the simulation and by so doing lessened his stress and increased his confidence to perform life-saving functions. This coincided with my study in that these factors were part of the affordances provided by digital tools and the tutoring framework.

Two questions in her dissertation pertained to my research. The first was about the interaction of students during and after the SimMan simulation and how it contributed to knowledge construction. The second addressed how using the simulation program prepared student nurses for future roles. Witt reported that interaction contributed to knowledge acquisition particularly during problem solving situations. Subjects stated that

after one week of practice they could anticipate potential threats which they had not considered previously and that teamwork was a byproduct of both students' and the teachers' collaboration. One student described his experience this way.

> We were scared to do the *Sim* because we didn't think we had the skills . . . but collectively, with our peers, we all knew we would be OK because we would solve the problem together. During the *Sim* we all had specific tasks but when we needed extra help, others could intervene. (J. M. Daw, personal communication, August 02, 2011)

Answering the question about preparation for future roles, Witt found that personal scaffolds for learning were constructed by participants. She added that the use of digital tools accelerated the nurses' confidence and lessened their likelihood of hesitating during patient care emergencies thereby improving patient outcome.

Further building on the literature, Radecki (2009) found that technology had been limited and was not being used as "a viable tool" for developing higher order thinking skills in educational settings. She advocated integrating technology into the curriculum as "a vehicle for learning, not just a vehicle for delivering the information" (p. 11).

Radecki identified three levels of technology use. Level one involved teachers' use of technology to communicate or perform administrative and instructional tasks (e.g. e-mail, record keeping, PowerPoint). In level two, students used lower-level cognitive processes such as skill building, watching streamed videotapes, or developing word processing skills. Level three identified students' use of higher order thinking skills beyond comprehension and application to include analysis, synthesis, and evaluation. While the purpose of my study was to focus on student interactions in sociocultural settings, it is important to note that the multimedia instructional design was at level three of Radecki's three-tiered model. Most applicable was the use of digital tools for self-regulation and

tailored experiences (Lawless & Brown, 1997). This was illustrated by readers creating authentic oral reading products via leveraged affordances of segmenting, pacing, repeatability, recording, and peer-editing and enabled the reader to actuate the learning process and scaffold information interactively (Kalyuga, Chandler, Tuovinen, & Sweller, 2001; Paas, Renkl, Sweller, 2003; Wink & Putney, 2002).

Immersive environments also allow for discovery and user-control in interactive ways (Lawless & Brown, 1997; Mayer, 2005; Schrader, 2008). Additive information for clarification or contextual purposes can be leveraged through providing advanced organizers that are hyperlinked to information located in additional files or via the Internet. Important vocabulary and concepts can be highlighted which serve to guide the student based on their individual expertise and needs (de Jong, 2005).

Leveraging technology affordances through navigational properties such as replay and record/rerecord enabled readers to work within their zone of proximal development. It was thought that, considering cognitive development is unique, self-directed navigation may have accelerated learning for students with higher expertise while supporting those with greater needs (Betrancourt, 2005; de Jong, 2005; Rouet & Potelle, 2005). Schrader et al. (2003) argued

> Features of these delivery systems enable students to visit and revisit scenes or segments of the lesson quickly and easily . . . [and] the process of repeatedly viewing [information] from multiple perspectives and goals allows for a richer, deeper understanding of the interaction of factors present in any instructional situation. (pp. 321-22)

Instructional design is central to optimizing learning by providing multiple representations and opportunities for understanding. Technology gives instructional designers opportunities to create virtual, active learning through word and pictorial

selection, organization, and connections which are relevant, related, and have varied levels of difficulty (Schnotz, 2005; Schrader, 2008). Research has found that when students engage in activities such as selecting and organizing relevant material, which is then integrated and scaffolded into existing knowledge, more meaningful learning occurs (Moreno, 2005). This is supported by arguments that well-designed multimedia instruction with self-selected and interactive learning tasks, provide additional avenues for encoding information and activating schema (Anderson, 2000; Anderson & Pearson, 1984).

A concern however, is that the design of instruction and actual implementation may not be concurrent. Teachers create electronic learning activities and a month (or more) later students use the digital tools to learn the content often without assistance by the instructor or peers (Morrison & Anglin, 2005). When extraneous cognitive load is excessive, learners are unable to understand content and, if placed in situations that concurrently require learning about using digital tools *and* content, comprehending multiple external representations becomes a complex task. This applied to my study in that readers needed to know how to use TARI *while* performing the complicated job of decoding and comprehending text.

Morrison and Anglin (2005) stated that the design and development of multimedia learning presents the instructional designer with an environment, opportunities, and constraints quite different from those associated with the design of instruction in traditional classrooms. In reviewing and critiquing seven research studies, they identified design heuristics which applied to e-learning. They stated that

- students with few or low level technology skills benefited from initial training prior to content area instruction;

- realistic rather than contrived or artificial materials increased motivation and enhanced effort;
- in the absence of prior knowledge, learners will not efficiently use exploration practice and need worked examples;
- presenting verbal *and* visual representations require less mental effort and result in higher performance;
- constructing meaning through interactivity is more helpful to the learner if it is accomplished prior to receiving feedback;
- the affordance to manipulate animated pictures enhances learning and cognitive processing;
- including term definitions, explanations, *or* links to other ideas with contextual information may improve recall, transfer, and comprehension;
- a variety of mixed annotations may decrease performance;
- "designing deliberate practice strategies to enhance germane cognitive load can lead to the development of expertise" (p. 101);
- motivation improves effectiveness; and
- computer adaptive affordances may result in learning which is more efficient.

Instructional designers are challenged by finding an optimal balance between materials which are too easy and information which is too difficult (Morrison & Anglin, 2005). Helpful in reconciling these concerns was an amalgamation of two models of instructional design and learning tasks: Gagné's (1985) nine conditions of learning and the Four-Component Instructional Design Model posited by van Merriënboer and Kester (2005). Briefly, Gagné's nine conditions of learning include descriptions of both instructional events and the coordinated mental processes. These conditions incorporate a progressive, scaffolded method for leading students through the instructional processes. For underperformers it is particularly important to provide supportive information and

guidance in a way that students can build on their prior knowledge (Kalyuga, Chandler, & Sweller, 2000). Gagné's design was selected because of the psychologically-sensitive approach to instruction. While both the nine conditions of learning and the Four-Component Instructional Design Model are similar, they are also distinctive.

The Four-Component Instructional Design model was designed with an understanding that it would be used in immersive settings. As such, van Merriënboer and Kester addressed specific elements of digital tools and multimedia design. They argued that four elements were needed to realize complex learning: meaningful learning tasks, information which is supportive, procedural information, and part-task practice to scaffold information and build on prior knowledge. Gagné's conditions, on the other hand, were not developed with immersive environments in mind.

In conclusion, the review of literature has supported further investigation of tutoring dyads with digital tools serving as a means to affect learning, and essential components have been identified. These included: (a) the need to select tutors who have demonstrated skill or knowledge in the area in which they will serve as tutors (Allen, 1976; Newell, 1996); (b) organization and assignment of tutors who exhibited the requisite characteristics and attributes amenable to acting as a tutor (CCPT, 2010); (c) tutoring frameworks and instructional design tailored to serve as a tool to support instruction; and (d) facilitating an environment where self-perceptions of incompetence may be changed. Personality traits such as compassion, patience, kindness, friendliness, or willingness to work with others were the characteristics most preferred for tutors (CCPT, 2010).

Research Purpose and Questions

My study focused on understanding the interactions and self-perceptions of underperforming readers as they work to improve oral reading fluency. The threefold purpose involved seven, underperforming, third-grade readers and seven third-grade tutors who attended a charter school in a large, southwestern, urban city.

Three research questions guided my multiple case study:

1. How do underperforming, third-grade readers interact with their peer tutor while using Technology-Actuated Reading Instruction?
2. How does the Technology-Actuated Reading Instruction process influence underperforming readers' self-perceptions as readers?
3. How does the process of same-age peer tutoring influence underperforming readers?

A Vygotsky approach to learning involves the inclusion of a tutor who helps mediate learning. However, Heron, Villareal, Yao, Christianson, and Heron (2006) found that some tutoring programs and incidental tutoring approaches still have not been well-defined in current literature. As such it was important to explore, document, and understand how underperforming readers interact with tutors and digital tools, and how their self-perceptions as readers were influenced during the cognitively demanding process of learning to read (Reinking, 2005).

The purpose of the study was also to investigate the multimedia learning environment which had been created to support Vygotsky's (1978) Sociocultural Theory. With the target population in mind, the digital tools were designed into Technology-Actuated Reading Instruction and used authentic, yet wide-ranging reading texts. The name, Technology-Actuated Reading Instruction (TARI) was selected because it inferred the type of learning that digital tools and tutoring assistance can actuate. The operational

definition of *actuated* in this sense was derived from Wink and Putney's (2002) comparative analysis of Piaget's cognitive constructivist approach and Vygotsky's social constructionist perspective. Applied to my study, actuated learning was stimulated by an antecedent, predominantly the lingual interchange between a tutor and an underperforming reader. Considering interaction is a catalyst for cognitive development (Ismail &Alexander, 2005), the selected term seemed appropriate.

Learning is a cognitively demanding process (Sweller, 2005) and, as the Elementary and Secondary Education Act (ESEA, 2009) continues to drive instruction, educators are increasingly under scrutiny and accountable for their students' success (Henk, Moore, Marinak, Tomasetti, 2000). Achievement data alone cannot provide the descriptive details that a dense, microgenetic approach can offer. Educators must investigate the subtle changes that take place during the learning process to improve their instructional practices. It has also been argued that it is difficult for teachers to provide the tailored assistance needed for a classroom full of varied-ability students (Topping, Peter, Stephen, & Whale, 2004). Technology-Actuated Reading Instruction was intended to address this challenge through an iterative process structured to be within each reader's zone of proximal development (Vygotsky, 1986). Digital tools enabled readers to listen to and read along with adult-modeled reading passages; practice, create, and record reading products; and analyze and evaluative reading products through peer-editing. These and other affordances such as repeatability and pacing are not commonly found in traditional instructional settings and the influence which this environment had on interactions and self-perceptions of readers and their tutors was central to my study.

CHAPTER 3

METHODOLOGY

Implementation

The purpose of my research study was to understand the interactions and self-perceptions of underperforming readers as they used digital tools and worked with a tutor during oral reading fluency activities. The process-oriented, multiple case study used a microgenetic approach to investigate seven, third-grade readers and their third-grade tutors. Both readers and tutors attended a charter school located in a large, urban city in the southwestern part of the United States. Via observations, interviews, video and audio taping, and physical artifacts, the study explored three guiding questions:

1. How do underperforming, third-grade readers interact with their peer tutor while using Technology-Actuated Reading Instruction?
2. How does the Technology-Actuated Reading Instruction process influence underperforming readers' self-perceptions as readers?
3. How does the process of same-age, peer tutoring influence underperforming readers?

A case study is a holistic, site-specific inquiry into phenomena found in a naturalistic setting such as a school. It allows the researcher the freedom to purposefully select the site, participants, and/or situations of interest (Glesne, 2006; Merriam & Associates, 2002; Shaw, 1999). My study took a microgenetic approach to the change processes and

intently studied readers. As such, the changing individual was the unit of analysis in the dynamic assessment model.

To adequately investigate the nuances of change my research design required repeated, in-depth data collection to document the behaviors of individuals as change occurred. Unlike the apotheosis chronicled in the fabled tale of Archimedes shouting "Eureka!" when he understood the relationship between mass and the displacement of water, it is often difficult to pinpoint when change occurs. This was particularly evident while exploring underperforming readers and their changing self-perceptions as readers. Taking a process-oriented approach was the most logical choice to unearth evidence into the readers' experiences and self-perceptions.

My study was prepared and implemented in three phases and was conducted over a four-week period of time for 50-minutes each day (Table 1). Phases ranged from the initial approval by the Institutional Review Board (IRB), through implementation, data collection and analysis, to reporting the findings and making recommendations.

Table 1

Phases of Study

Phase One	Phase Two	Phase Three
▪ IRB approval ▪ Permission to use RSPS ▪ School site selected ▪ Reading proficiency levels reviewed ▪ Informed consent/assent disseminated/returned ▪ Participants selected ▪ Tutoring partnerships (dyads) organized	▪ TARI created and uploaded onto laptop computers ▪ Participants trained to use TARI and Reading Frequency Logs ▪ RSPS pretest administered ▪ Observations, interviews, and/or videotaping begin	▪ Daily observations, interviews, and/or videotaping continue ▪ RSPS posttest administered ▪ Data analyzed ▪ Results identified ▪ Findings reported ▪ Recommendations for future research

In Phase One, I received approval from the Institutional Review board and permission to use Henk and Melnick's (1995) Reader Self-Perception Scale (Appendix A). The Reader Self-Perception Scale (RSPS) was the most widely-accepted pre- and posttest tool to measure readers' self-perceptions in four areas: Progress, Comparative Observations, Social Feedback, and Physiological States.

The school site was chosen and, after meeting with the principal, the exact room, dates, and times were determined. One of the benefits of selecting a charter school was the ability to schedule morning and afternoon research sessions. This flexibility provided increased opportunities for readers and tutors to participate without missing core instructional classes.

Reading proficiency levels were reviewed and it was found that sufficient numbers of third graders who demonstrated below grade level reading ability were available from which to draw a representative sample. A sufficient number of students whose proficiency in reading and personal characteristics allowed them to be considered as tutors were available, as well. Informed consent/assent forms were disseminated to all third grade students and their parents, a requirement of the Institutional Review Board. From the respondents, groups of readers and tutors were identified and tutoring partnerships (dyads) were organized.

A key component of my study involved leveraging digital tools to optimize reading activities through multimedia instructional design which I entitled Technology-Actuated Reading Instruction (TARI). I created TARI by procuring seven laptop computers and preparing each with Microsoft Windows 2007 PowerPoint presentations. While multi-step recording tools were available in other programs, the PowerPoint

application afforded readers simplified recording and playback features with minimal cognitive demands. For the purposes of my study the PowerPoints are referred to as simply *presentations.*

The presentations consisted of stories which were retyped from a purchased allotment of leveled books (Appendix B). The font was between 36-to-40 point in an effort to design slides that did not overwhelm readers due to the amount of text on each page. Stories were categorized and placed in two folders on the Desktop: Listen and Read/Record. A narrated version of each story was created for dyads to listen to, and placed in the Listen folder. Narrations were performed by an adult male and care was given to accentuate appropriate story elements and enunciate the words correctly. The narrations served as a model for readers to listen to and attempt to replicate.

The second presentation folder, Read/Record, utilized text from the same stories but did not include narrations. Readers used this folder to record and replay their reading products. The process enabled readers to leverage digital tools to become actualized and I hypothesized that by using TARI with the support of a tutor, readers' self-perceptions as readers would improve. The TARI activities were iterative in that readers could repeatedly listen to modeled narrations or read/record their own performances; the choice was theirs (Figure 1). By leveraging digital tools in this way, readers were able to scaffold new information as they engaged in reading tasks. Specifically, with the assistance of their tutor, readers

- interacted with and manipulated digital tools in order to listen to repeatable narrative reading passages modeled by an adult male;
- practiced, (repeatedly, if necessary), their own reading passages;
- recorded, (repeatedly, if necessary), their own reading passages;

- used self- or peer-editing to reflect upon, analyze, and evaluate reading products; and
- finalized reading products which represented their best work.

Figure 1. Technology-Actuated Reading Instruction (TARI)

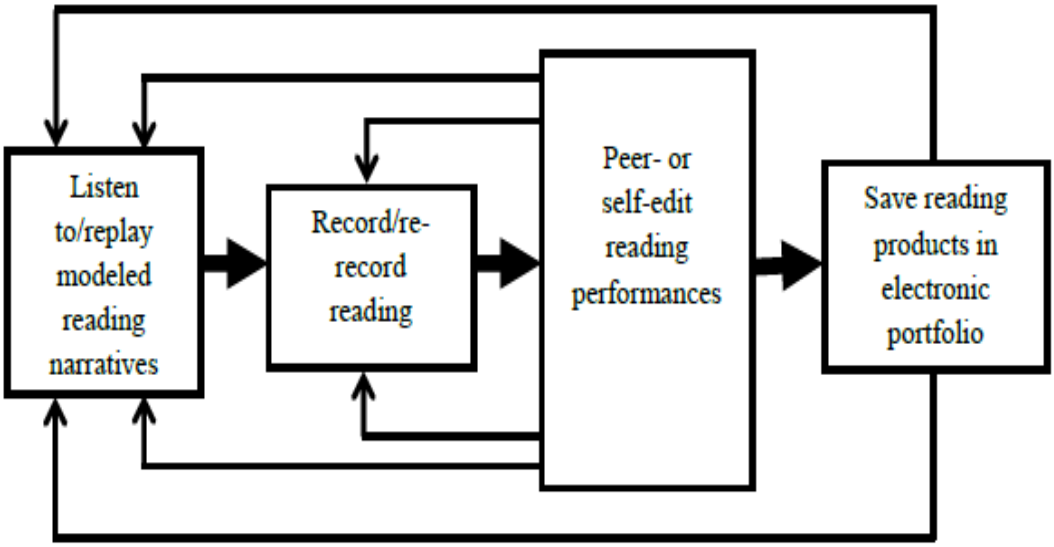


Figure 1. Technology-Actuated Reading Instruction (TARI) is an iterative process for scaffolding information; creating authentic oral reading performances; peer- or self-editing through analysis, evaluation; and refinement of oral reading products.

The books used in the study were selected based on their Lexile reading level. Morrison and Anglin (2005) reported that it is challenging to find an optimal balance between materials that are challenging but do not frustrate learners and Lexile measures were created to address these issues (Honig, Diamond, & Gutlohn, 2008; MetaMetrics, 2011). A Lexile (L) framework for text measures two elements of reading: sentence length and repetition of words. The higher the Lexile the more difficulty a reader may have in comprehending the text.

Latitude was provided in matching the Lexile of text with readers since readers' comfort zones can vary between 100 points above or below their targeted Lexile ability level (MetaMetrics, 2011). Of the stories that were available in the Listen and Read/Record folders, Lexile measures ranged from 100L to 440L with an approximate grade level equivalency from first grade, fifth month (1.5) to third grade, fifth month (3.5).

Neither Lexile measures nor Criterion Reference Test data were available to strategically match readers with the stories on their laptop. To mitigate this problem I provided a variety of stories and topics from which readers could select. This became a surprisingly important part of the research because I was able to document how readers' selections changed over time based on their own selections and changing self-perceptions. A further explanation will be given on how the readers approached the differing levels of difficulty in individual case studies.

Once the technical aspect of preparing each laptop was completed I trained participants on how to navigate the Technology-Actuated Reading Instruction (TARI), use the PowerPoint presentation applications, and record information on their daily Reading Frequency Log. A set of procedures and steps for action were structured, as recommended by Jonassen et al. (2005) and the Four-Component Instructional Design Model (van Merriënboer & Kester, 2005). However, readers could choose the sequence which worked best for them. All participants had previously accessed computers either at school or at home and were familiar with their use. Training therefore focused on the specific PowerPoint applications of play, replay, record, and rerecord. A formative evaluation was conducted which required readers to demonstrate their ability to navigate

applications, listen to modeled reading examples, and read, record, and playback their own voice. By training and assessing participants' proficiency at the beginning of the study the validity of my data increased since it was not skewed by the subjects' inability to use the digital tools. After the first day, all of the participants had met proficiency standards and were able to use TARI and their Reading Frequency Logs correctly.

Also during Phase Two, readers and tutors were administered the Reader Self-Perception Scale (Henk & Melnick, 1995) as a pre-assessment tool to gauge if self-perceptions changed over time. Data from tutors were gathered to add descriptive detail and lay the groundwork for future research.

Formal implementation of TARI and documenting the participants' interactions and behaviors began in Phase Three. This involved daily observations and field notes, semi-structured interviews, and/or videotaping. Videotapes were not transcribed in entirety but relevant incidents have been embedded in the rich, thick narrative of the case studies. A posttest of the Reader Self-Perception Scale (RSPS) was administered during the final week and served as the primary framework for determining self-perceptions of readers and tutors. From the information that was gathered, data were analyzed, results were identified, findings were reported, and recommendations for future research were offered.

Site of Research

The selection of the school was based on three dimensions: (a) administrative approval of the research study, (b) the availability of underperforming readers and tutors, and (c) environmental considerations. The environment was pivotal to the study in that readers and tutors needed an area where they could efficiently listen to story narratives and record reading products. I also considered which type of school would be most

conductive to the study: a traditional elementary or a charter school. Beyond simple availability of potential participants, selection of the school hinged on a population that afforded a sample with a variety of races and ethnicities. Race in this sense was defined as a physical distinction between peoples and ethnicity extended this definition by including culture, traditions, and shared social traits.

Traditional elementary school schedules are often inflexible and conducting the study either before or after the regular school day would have excluded participants who did not have transportation. After-school studies may have also influenced the data because students might have been tired after attending a full day of school and their performances may have been affected. The charter school was the better choice because it offered flexible scheduling. Sessions were conducted in both the morning and afternoon and participants could be released from their classrooms without missing core instruction. Once a site was selected, I met with the principal to discuss my research study and gather additional information on potential readers and tutors.

It was beyond the scope of my study to design TARI as a web-based program. However, future research may explore how TARI activities may be extended in an asynchronous environment which affords learning beyond the confines of the school. A web-based TARI application would have also provided a central, easily accessible repository of student portfolios for students, parents, and teachers.

The charter school was racially and ethnically diverse and was located in a large, urban school district in the southwestern part of United States. The aging facility had been refurbished and previously served as a Jewish Temple. While the building was unique in iconography and architecture, the facility posed a challenge because it did not

have a formal computer lab. To address this problem, each day I set up, took down, and stored the laptops on which readers and tutors accessed TARI activities. Other than the increased time this required, the issue of location did not impede the progress of the study or the ability of readers and tutors to use digital tools.

The classroom was a small, basement room which was shared in the morning by the Physical Education teacher and in the afternoon by the Global Studies teacher. Both teachers were amenable to the study and graciously accommodated being displaced for four weeks. After two days of escorting readers and tutors from three different classrooms to the "research study room," the children were able to transport themselves without assistance. This simple change in procedure proved important because, beginning on the sixth day of the study, readers and tutors routinely arrived early to the study and accessed TARI rather than visiting with their friends.

Participants and Selection

From first semester grades I determined that the third grade had a sufficient amount of both underperforming and proficient readers from which an information-oriented sampling could be drawn. Third grade is a pivotal time for children and it is at this point that proficient readers are advancing to chapter books and developing the academic vocabulary which is embedded into more rigorous daily curriculum (Honig, Diamond, & Gutlohn, 2008). As proficient readers progress, the divide between them and underperforming readers widens (Guthrie et al., 2004).

Third grade readers were of particular interest to me for four reasons. First, as an educator and administrator I continually seek ways to help teachers become more adept at using effective instructional strategies. By assisting teachers I vicariously provide

opportunities for children to become empowered both academically and psychologically. Second, the National Assessment of Educational Progress (NAEP) found that 68 percent of fourth graders scored beneath proficiency levels in overall reading skills (Honig, Diamond, Gutlohn, 2008). Third, there is a decline in help-seeking behaviors exhibited by underperforming students during early adolescence and Marchand and Skinner (2007) reported that "a sense of incompetence predicted increases in concealment" (p. 65). Fourth, third graders are at Concrete Operations in their cognitive development and the digital tools designed in TARI activities were appropriate for their developmental stage.

Following submission and approval from the Institutional Review Board, informed consent/assent forms were disseminated to all third-grade students and their parents. This was a requirement of the Institutional Review Board to ensure all third graders had an equal opportunity to participate. From the respondents, a stratified, purposeful convenience sample of seven underperforming readers and seven proficient readers was created. The former became "readers" and the later became their "tutors." Selection was made without consideration of gender, race, socio-economic status, or religion but data were collected for possible future research and to add descriptive details to the narrative.

Readers were selected based on first semester reading scores which indicated that they were reading below a third-grade level. Another dimension was considered before tutors were selected: essential characteristics of a more capable other (CCTP, 2010). To be cognizant of and incorporate Vygotsky's theory into the reader/tutor partnerships, I accessed the potential tutors' first semester reading grades and spoke with the principal to identify participants whose reading ability was moderately above the underperforming readers' levels. I further interviewed the principal to ensure that potential tutors'

characteristics were amenable to tutoring: friendly, patient, and able to communicate. Once tutors were identified and selected, dyads were organized. By the second week of my study it became apparent that one dyad had to be changed because the characteristics of the tutor were incompatible with the reader. The tutor had little patience with the reader and it was hypothesized that the incompatibility was due to widely disparate reading abilities. Moving one tutor caused other dyad changes to occur. In one case the reader and new tutor were appropriately placed but occasional personality conflicts influenced the degree to which they communicated. No other problems were encountered in the dyads after the changes were made.

To protect the identities of readers and tutors an alphanumeric code was used. Readers were coded as "R" with a number from one-to-seven, and tutors were assigned the letter "T" with a number from one-to-seven. Reader one (R1) was partnered with tutor one (T1), and so forth.

The races, ethnicities, and genders of the readers and tutors were particularly diverse although this was not a condition of participation. One commonality that all participants shared was that they each spoke, read, and wrote in English (Table 2). The readers included

- two African-American females;
- one African-American male;
- one African-American/Hispanic male;
- one Caucasian female;
- one Hispanic/Filipino female; and
- one Hispanic male.

Table 2

Reader/Tutor, Gender, Race/Ethnicity, and Language(s)

Reader (R) Tutor (T)	Gender	Race and/or Ethnicity	First Language	Language(s) Spoken	Language(s) Read or Written
R1	F	African-American	English	English	English
R2	M	African-American	English	English	English
R3	M	African-American/ Hispanic	English	English	English
R4	F	Caucasian	English	English	English
R5	F	Hispanic/Filipino	Spanish	Spanish; Tagalog; English	English
R6	M	Hispanic	Spanish	Spanish; English	English
R7	F	African-American	English	English	English
T1	F	Caucasian	English	English	English
T2	F	Hispanic	Spanish	Spanish; English	English
T3	F	Asian/Vietnamese	Vietnamese	Vietnamese; Cantonese; Tagalog; English	English
T4	F	Caucasian	English	English	English
T5	F	Caucasian	English	English	English
T6	M	African-American	English	English	English
T7	F	Caucasian	English	English	English

Note. Descriptive data of *all* participants' gender, race, ethnicity, and languages spoken, read, and/or written. R = Reader; T = Tutor.

The African-Americans and Caucasian readers spoke only English and no other languages were spoken in their homes. The Hispanic/Filipino female's first language was Spanish but she also spoke Tagalog with her parents and siblings. She was orally fluent in Spanish and Tagalog but could neither read nor write in either language. The Hispanic male also spoke fluent Spanish but could neither read nor write in Spanish. He stated that his parents spoke Spanish and English in their home and that he spoke both languages with his siblings.

Race and ethnicities of the tutors were also diverse but to a lesser degree than were the readers. The group of tutors included the following participants:

- one African-American male;
- one Asian/Vietnamese female;
- four Caucasian females; and
- one Hispanic female.

The African-American, Caucasian, and Hispanic tutors spoke only English at school and in their homes. The Asian/Vietnamese female's first language was Vietnamese but she also spoke Cantonese and Tagalog with her parents and siblings. Of the tutors, she had the highest reading ability and her skills were substantially above the first reader to whom she was assigned. During the second week she was reassigned to a different dyad which was more aligned with the new readers' zone of proximal development and the role of a more capable other.

Researcher Role

As the researcher, my initial role was to explain how readers would use the digital tools and how they would be assisted by their tutors. Participants were told that neither rewards nor grades would be given and that they could choose the sequence and pace of activities and how often they listened to story narrations or read/recorded story passages. I explained that they would complete the Reader Self-Perception Scale (RSPS): a tool to measure their self-perceptions. All participants were amenable to participating and the study proceeded as designed. I administered the RSPS on the first day (pretest) and during the last week (posttest). Each item was read aloud to reconcile the problem of the vocabulary being too difficult for some readers or tutors. Posters of emoticons were also

used to help clarify the range of choices from which participants could select: strongly agree, agree, neutral, disagree, and strongly disagree.

As aforementioned, on the initial day of implementation training was provided to ensure participants' effective use of digital tools. Navigation required accessing two Desktop folders from individual laptops: the Listen folder and the Read/Record folder. When readers wanted to listen to a narration they would select a story from the Listen folder and click on the *Slide Show/From Beginning or From Current Slide* options. Readers would then track the text while the digitized voice (narrator) read the story aloud. Giving the reader the opportunity to see and hear the text prior to their own reading attempts was an instructional design strategy intended to boost confidence.

A natural progression from the listening task was for readers to try reading/recording stories themselves. In the Read/Record folder, readers opened the presentation of their choice, clicked on *Record,* set the microphone level, and began reading into their headset/microphone appliance. Readers and tutors exhibited adequate levels of proficiency in using the digital tools by the end of the first day and I was confident that their abilities were adept enough to enable them to use TARI effectively.

Minimal direction was given to tutors on how they should interact with readers: Specific instructional skills were not recommended. This was done to promote authentic interactions rather than having them based on a pre-determined structure of questions, responses, or feedback. I did explain however that the process could be related to learning how to ride a bike. For instance, parents may demonstrated how to ride a bike when teaching a child but they also let the child eventually ride on their own. At some point the child becomes able to ride well enough to do so independently without assistance.

Wink and Putney (2002) described that the role of a tutor was to guide by using leading questions or prompts. While dyads could decide how TARI was used, typically tutors assisted by listening to readers' read and helped them create an oral reading product. Most often tutors and readers worked together to peer-edit, analyze, and evaluate the oral reading products but on some occasions readers performed these tasks alone. Without the use of the playback function, readers would not have been able to self-edit their reading products. Neither guiding questions nor a reading rubric were used to influence interactions between reader and tutor and this design decision was made to increase the validity of how dyads engaged with each other and with TARI.

After editing was completed, a determination was made regarding whether the performance should be improved or whether the reader should save their work to their electronic reading portfolio. Electronic portfolios are an easy and effective way to archive oral reading products, making them available to share with parents and educators. Digital tools can be a powerful benefit to literally "show" the progress each student makes over time.

My role as a researcher evolved after the initial training and I became a moderate participant-observer. A moderate participant-observer takes broad, descriptive notes, writes thoughts without parameters, and does not intervene unless necessary (Glesne, 2006; Spradley, 1980). I chronicled events, gestures, utterances, statements, interactions, and behaviors in a natural, educational setting. The observations became more selective and narrow as I drilled down to individual behaviors and interactions and investigated the uniqueness of each reader. Considering the room was long and narrow, it was unrealistic to sit at one end of the room to make observations and take field notes since I may have

missed essential information at the other end. Therefore I moved from one end of the room to the other taking notes and/or videotaping dyads.

Videotaping was beneficial because behaviors that may have been easily missed were caught in a digital format which I could review repeatedly during data analysis. At times readers were asked to explain how words or sentences were decoded and/or how digital tools were used but this was kept to a minimum in order to promote continuous engagement with TARI and the tutor. Semi-structured interviews were conducted and questions sprang from either the conversations and behaviors participants exhibited or their responses on the RSPS (Appendix Q: Appendix R).

Risks and Benefits

The ability to read is a complex cognitive skill and it has been suggested that the first stages of reading involved learning *how* to read (Reinking, 2005). Once accomplished, a transition toward reading-to-learn evolves (Honig, Diamond, Gutlohn, 2008). It was somewhat daunting when assessing the possible risks to children in a research study that may influence their self-perceptions as readers. To reconcile my concerns with the potential benefits I designed the study based on the theoretical construct that peer-tutoring may assist underperforming readers and that digital tools may provide opportunities which are unavailable in traditional classrooms.

Readers listened to narrated stories and then recorded their own reading products of the same story by using TARI. They were able to replay, correct, and rerecord as often as needed which ensured that there was a minimal level of discomfort during the iterative process and the probability of harm was not likely, severe, or irreversible. One of the activities the dyads performed was peer-editing of the readers' reading products which is

a common classroom practice and one with which the participants were familiar. If body language had inferred or if participants had made statements which implied distress, the session for the dyad would have been stopped and participants would be asked if they wanted to continue or be excluded. At no time did the reader or tutor verbalize or exhibit discomfort and the research study was able to proceed as designed. In fact, it appeared that using a laptop was motivating for readers and tutors as evidenced by their early arrival to class.

The importance of reading ability cannot be minimized. Reinking (2005) stated that discussions regarding reading instruction were "sometimes controversial, often raising issues about . . . the causes of reading difficulties and how to ameliorate them" (pp. 355-56). Benefits of my study included findings which indicated that all but one reader and one tutor made positive gains in self-perception as evidenced by the RSPS, interviews, and observations. Furthermore, literature into computer-based reading programs documented quantitative achievement which left a gap in understanding the qualitative aspects of reading. My study provides qualitative findings that narrow the gap in the literature by informing multimedia instructional designers and educators, and by offering implications, recommendations, and direction for future research in immersive environments.

Data Collection

My research used a multiple case study design which incorporated a process-oriented, microgenetic approach. It investigated underperforming readers' interactions with digital tools, their tutors, and how (and at what point) self-perceptions of

underperforming readers became *actualized*. Actuated in this sense was the realization by the underperforming reader that their potential as a reader had changed. It further investigated the interactions readers and tutors exhibited while using TARI and the influence peer tutors had on underperforming readers.

It was imperative that multiple sources of data were gathered simultaneously to ensure a wide array and comprehensive collection of information which could then be triangulated. These data sources included my direct observations, interviews, videotaping, and physical artifacts such as the readers' Reading Frequency Log and the RSPS.

Each reader's interactions, self-perceptions, behaviors, and attitudes served as the primary unit of analysis. In reducing the limitations of the study a second unit of analysis was also employed by considering groups of readers and groups of tutors collectively. This was done in an effort to increase the possibility of generalizing the findings to larger populations. Both the first and second units of analyses addressed the research questions:

1. How do underperforming, third-grade readers interact with their peer tutor while using Technology-Actuated Reading Instruction?
2. How does the Technology-Actuated Reading Instruction process influence underperforming readers' self-perceptions as readers?
3. How does the process of same-age, peer tutoring influence underperforming readers?

Process-Oriented, Microgenetic Approach

Lavelli, Pantoja, Hsu, Messinger, and Fogel (2004) posited that traditional research designs have been cross-sectional or longitudinal studies which documented the *product* of change (e.g. achievement data), rather than the *process* of change. This distinguishes my research from quantitative measures that often use few observations at widely spaced

intervals. While longitudinal studies can unearth patterns, the research fails to capture the subtle nuances that occur during the process of change. Lavelli et al. refer to this as a snap-shot rather than an on-going movie reel. Conversely, by intensely studying short-term occurrences during days, weeks, or months, microgenetic studies make available a continuous flow of information and descriptive details. Studies of this sort explore the salient conditions and mechanisms that promoted the emergence of change.

Microgenetic designs are founded upon two premises. First, the design focuses on microgenetic details regarding subjects and their behavior within a specific context such as interactive peer tutoring. Without a fine-grained data collection process, the processes of change may be overlooked. The second premise is that we cannot understand macro-level developmental processes without first understanding micro-level, real time changes (Kuhn, 1995; Lavelli et al., 2004). A microgenetic approach seemed most likely to provide the dense and detailed information needed to address my research questions.

My approach was guided by Vygotsky's Sociocultural Theory and included four specific characteristics (Lavelli et al., 2004). First, the fundamental unit of analysis was the changing individual over an observed period of time. Time in a microgenetic study is usually measured in days, weeks, or months and in my study, the length of time was four consecutive weeks. Second, during the period of change observations were conducted. Third, observation density was elevated since small details were neither ignored nor overlooked. Fourth, the subjects' behaviors were analyzed intensely using both qualitative and quantitative methods which enabled me to identify the processes that influenced developmental changes. To add descriptive details the dyads were encouraged to maintain their Reading Frequency Logs.

A complement to the microgenetic approach posited by Lavelli et al. was Bronfenbrenner and Morris' (1998) *bioecological model.* Bronfenbrenner criticized earlier research that focused primarily on the environment and neglected the individual's characteristics and dispositions which generate or disrupt development. Attributes were rarely examined or considered precursors to the *proximal processes* of the developing individual. "The characteristics of the Person most likely to influence future development would be active behavioral dispositions that can set proximal processes in motion and sustain their operation, or –conversely—actively interfere with, retard, or even prevent their occurrence" (p. 1009). The researchers defined proximal processes as forms of interaction that occurred regularly over time and considered them the "primary engines of development" (p. 996). *Development* was defined as the changes and stability in characteristics of individuals over their lifetime and across successive generations.

To address deficiencies in research, Bronfenbrenner and Morris (1998) developed their model to attend to the factors which shaped development. Their complex structure suggested four components which are dynamic and interrelated. *Process* involves the types of interactions that occur between the individual and the environment. Variations within this framework occur due to

- the qualities of the *person* and their nested systems (family, friends, teachers, close associates);
- *environmental contexts*; and
- *time.*

Although a microsystem includes interaction with family, friends, and associates, the bioecological model broadened the paradigm and emphasized the contribution of symbols or objects as well as their relationship to concepts and criteria. Collectively, these

intricate elements influence development and assess the processes rather than simply the environment.

Distinctive properties are evident in bioecological research and individual development. Subjects must be engaged in regularly scheduled activities over an extended time period. This allows activities to develop a level of complexity which, otherwise, cannot transpire with simple repetition. Proximal processes are multidirectional, rather than linear, and have varying levels of reciprocity. As children age they are better able to perform tasks which they have previously found challenging and their circle of friends, family, and associates continues to grow and influence actions. Content must meet these growing changes through activities which are progressive and more complex. Research must also consider the changing relationships and increasing interrelationships. Lastly, interactions are not limited to other humans but may involve objects and symbols. This was the case with my subjects who used TARI as a means to expand their reading skills.

Time is organized into three successive categories and was the fourth property in this model. Microtime is the ongoing, continuous episodes involved in proximal processes. Mesotime is periodic and occurs at broader intervals such as days or weeks. Macrotime addresses the multigenerational changes in society which affect an individual (and future generations) over their lifetime. My study was considered Mesotime since data were collected over four weeks, absent weekends.

In their working model the researchers cautioned against using only statistical approaches due to the independent variables found in bioecological structures. For instance, children coming from what the authors consider disorganized or disadvantaged

homes are more likely to have *developmental dysfunction* which may negatively affect their development. Conversely, students with *developmental competence* had exhibited knowledge acquisition and skill development in various categories: physical, intellectual, socioemotional.

There are limitations to Bronfenbrenner and Morris' work. The most significant was that, at the time of writing, the theory did not have scientific power. They justified their position and stated that their theory was still evolving and the opportunity to assess the framework had not been realized. They published their model to offer it as an extension to standard research practices and to expedite and promote a move beyond the qualitative paradigms of the day.

Measures

The Reader Self-Perception Scale (Henk & Melnick, 1995) measures four quadrants of self-efficacy and identifies and categorizes dimensions of readers' self-perceptions: Progress; Observational Comparison; Social Feedback; and Psychological State. In context with my study, Progress entailed the readers' self-perceptions regarding their own reading improvement from the first day to the last week of the study. Observational Comparison gauged readers' own skills to other readers of the same age. Social feedback related to direct or indirect feedback received from teachers, classmates, or family members. Physiological States referred to internal feelings which the subject experienced while reading and addressed the emotional aspects such as anxiety or happiness.

The Reading Frequency Log is a simple checkerboard table which is numbered from one-to-50 (Appendix D). Each time reading was either listened to or practiced, the subject or tutor were to color or mark an "X" in one square on the table. No reward was

associated with the number of squares colored or X-ed. It was anticipated that this measure would add descriptive statistics to better understand the actions of subjects and document changes in behavior.

Observations, field notes, interviews, and/or videotaping were conducted daily. Videotapes were only transcribed if they evidenced interactions or changes in behavior that may have influenced self-perceptions. Quotes were embedded into individual case studies and added to the rich, thick narratives. It was anticipated that with the use of a variety of measurements and collection strategies more data could be triangulated to ensure the validity of my research.

Instructional Design

Designing a research study for a virtual environment brings with it the challenges of using technology to provide beneficial actions while being mindful of possible limitations of the multimedia. Considering my study explored what happened during and after TARI, to better ensure validity, subjects were pre-trained and acquainted with the navigational properties of the tool before they were allowed to perform tasks independently or with tutors' assistance. I also followed the qualitative procedures which have been found to improve validity. Referencing Creswell (1998) and Lincoln and Guba (1985), Glesne (2006) described these as

- sharing data with subjects to ensure ideas are represented accurately (member checking);
- auditing transcripts, field notes, or journals by including an outside observer;
- writing rich, thick descriptions to give the reader a clear vision of the research context;

- triangulating multiple data sources, investigators, or perspectives;
- designing a longitudinal study to build trust and understanding between the researcher and the subjects; and
- reflecting upon ones' own biases and monitor possible subjectivity.

As aforementioned, my study incorporated these elements into a synthesis of two instructional design models and learning tasks. These included Gagné's (1985) nine conditions of learning (instructional events and mental processes), and the Four-Component Instructional Design Model (4C/ID-M) posited by van Merriënboer and Kester (2005). For students of low-level ability, it is particularly important to provide supportive information and guidance in a way that students can build on their prior knowledge (Kalyuga, Chandler, & Sweller, 2000). Cognitive development and cognitive load was addressed through schema activation (Anderson & Pearson, 1984; Bransford & Johnson, 1972; Carrell & Eisterhold, 1983) and scaffolding by providing

- pre-training digital tool use;
- modeled examples;
- authentic part- and whole-task learning activities;
- guidance and assistance through a tutor; and
- digital affordances such as repeatability, recording, and playback.

The first of Gagné's instructional events, *gaining attention,* aligned with the TARI framework and was addressed by garnering interest through a variety of stories from which readers could select. It was thought that by giving readers a choice in their learning, they would be more apt to engage in reading activities. Second, subjects were *informed of the objectives* and the details related to creating oral reading products. Third

and fourth, *activation of schema and content presentation* was accomplished through modeled narrations. Examples were narrated by an adult male in order to maintain consistency and avoid dissonance due to unfamiliar tonal or reading patterns. Again, it was anticipated that the enjoyment of listening to stories and using a laptop would entice subjects to attend to essential learning activities.

Gagné's fifth through eighth instructional events involved the assistance of tutors to guide the learning experience through mediated *assistance, guided questioning, and feedback*. The strategies served as a vehicle to reduce the cognitive demands of semantic and procedural encoding and storage into long term memory for readers. The study did not examine extended phenomena and less applicable was the ninth instructional event: *transfer of knowledge and generalization* to new situations. This leaves room for future research in this area.

The developmental stages of Piaget (1972) were appropriately embedded within the structure of the learning activities, considering the subjects ranged in age from nine-to-eleven. During this period of time, pre-adolescents and adolescents manifest transitional cognitive processes from *Concrete Operations* to *Formal Operations.* Instruction for children of this age group requires concrete examples, as well as abstract reasoning and correlates with van Merriënboer and Kester's (2005) 4C/ID-M who recommended authentic, easy-to-difficult learning tasks; supportive, explanatory, and procedural information; and semi-structured examples to assist students in practicing, understanding, and transferring knowledge.

Data Analysis

The qualitative nature of my study used data collected and analyzed from specific sources which included daily observations and field notes, semi-structured interviews, artifacts, and attitudinal instruments such as the Reader Self-Perception Scale (RSPS). The data were then color-coded and triangulated in an attempt to unearth patterns of behavior and member checking was conducted in order to increase the validity of the research findings upon which conclusions were drawn.

Of primary focus were measures related to the qualitative and quantitative interactions students demonstrated and their behaviors, attitudes, and beliefs. Analyses of the interactions were based upon the following dimensions: (1) readers' interactions with their tutor while using TARI; (2) the influences of the TARI process on readers' self-perceptions as readers; and (3) the influence of peer tutoring on readers during interactive formulation and reformulation of content knowledge. The aim was to document what happened with readers when a multimedia learning environment is considerate of Vygotsky's sociocultural framework.

Discussion and Potential Contributions

Legislative requirements regarding performance standards and rising academic achievement levels have been central to education-related conversations in the recent past (Elementary and Secondary Education Act, ESEA, 2009). Coupled with mandates to increase student achievement, teachers in the United States are, at times, hindered by overcrowded classrooms, time constraints, lack of expertise, and attitude in integrating

multimedia learning environments into their classroom practices (Kolodner, 2008; Schrader, 2008; UCLA/IDEA, 2003). It is evident that a discussion of these factors must take forefront for students to become empowered in their own learning. Immersive and tutoring environments must also be included in this discussion. Jonassen et al. (2005) stated that "We must learn more about the nature of collaboration. What kinds of collaborative groups are most effective in multimedia environments" (p. 264)? Incorporating technology such as TARI into classroom practices may help assuage some of these issues as well as provide insight into the ecological and social impact learning environments have on underperforming readers (Bebell, Russell, & O'Dwyer, 2004; Mishra & Koehler, 2006; Stewart, Hong, & Strudler, 2004).

Reinking (2005) disclosed that discussions regarding the content of reading instruction are often controversial and attempt to address reading difficulties and the methods to improve them. While my study used reading only as a vehicle to observe social interaction and exhibited behaviors, the information derived may serve to create learning environments that support low-level readers.

It is further anticipated that my study will inform multimedia design decisions and provide implications, recommendations, and direction for future research in immersive environments.

Computer-based reading programs are pervasive at school sites and the collection of data in these environments are typically limited to quantitative achievement rather than the qualitative interactions of students. Therefore the educational area will also benefit because of an increased understanding regarding

- how underperforming readers interacted with their peer tutor while using digital tools;

- how the process of peer tutoring influenced underperforming readers;
- at what point underperforming readers' self-perceptions as readers changed during the iterative process of using digital tools with the assistance of a peer tutor; and
- the learning environments which supported underperforming readers and enabled them to develop improved self-perception as readers.

Researcher Bias

In an effort to reduce bias, multiple data sources were triangulated to unearth patterns of behavior and change. As recommended by Glesne (2006), I shared information with participants to ensure their ideas were represented accurately, included an outside observer when possible, and reflected on my own biases and monitored possible subjectivity. In some instances I debriefed with the outside observer as a means to interpret the actions, statements, and utterances I had documented in my field notes during observations.

When selecting tutors I also worked with the site principal to determine the best reader/tutor partnerships. The principal was more cognizant of potential tutors' abilities to participate effectively in a tutoring relationship and making the right decisions regarding dyad assignments were essential. The most-able students do not necessarily make the best tutors and, regardless of attempts to avoid problems, one dyad had to be changed during the second week (Chabot College Tutoring Program, 2010). I discuss the conditions and interactions of their relationship in detail in Maria's case study located in the subsequent chapter.

Lastly, given that Technology-Actuated Reading Instruction (TARI) was a design of my own creation, the conclusions which have been drawn from my research findings may

be overly subjective with regard to my argument that TARI can serve as a more capable other in lieu of human counterparts when partnerships fail to collaborate or lack interaction. Nevertheless, while a contrastive comparison was not conducted the experiences of two readers (Bailey and Juan) may serve as *telling cases* in that they do not empirically measure changes but the subjects' behaviors are an *indication* of change (Putney, 1997). Conducting a study and offering one possible method for using digital tools to scaffold and differentiate instruction for diverse populations was, therefore, justified and I will leave it to other researchers to challenge, contradict, or substantiate my work. This was a logical conclusion to draw based on evidence that several readers made gains despite low-level (distal) interactions with their tutors.

CHAPTER 4

FINDINGS OF STUDY

Overall Context

The overall context and individual results gleaned from the data collected and analyzed for underperforming third-grade readers and their tutors are offered in this chapter. Case studies of the seven readers are included, one of which is considered an outlier because of declining scores in three of four dimensions and only a minimal increase in one dimension on the RSPS. Some case studies are more exemplary than others but all seven are included to provide a broader scope of the interactions that occurred between readers and tutors and the subsequent relationship to their self-perception as readers.

Addressing question one, an analysis of field notes, daily observations, physical artifacts, interviews, and videotapes are provided. These data document the interactions between readers and tutors while using Technology Actuated Reading Instruction (TARI) and results from the RSPS are correlated with the aforementioned data sources to answer questions two and three. Following the results, themes unearthed from these data and findings are reported. Substantiation or contradictions of studies from the related literature reviewed are compared to my study.

Technology Actuated Reading Instruction (TARI) was designed to provide underperforming readers the ability to leverage various digital tools to enable reading. In classrooms across the United States teachers rarely have time to provide individual assistance to struggling students. One of the purposes of TARI was to ameliorate this issue and serve as a catalyst for readers to become self-actualized through individualized materials and resources. Underperforming readers were given the opportunity of listening to modeled narrations, read/record text using their own voices, playback performances for peer- or self-editing, and save final reading products. Given that TARI neither included an application that evaluated reading through digital means nor provided probing questions to assist in critiquing or editing reading performances, the learning environment included a tutor (more capable other) who could perform these functions.

Interactions were observed as readers worked with their tutors and used TARI which had been uploaded onto individual laptop computers. The philosophy of coordinating a tutor to assist an underperforming reader within the reader's zone of proximal development (ZPD) was central to my study and sprang from the work by Lev Vygotsky (1986). Reader and tutor partnerships, or *dyads,* were determined based on reading ability levels which were not too disparate and on tutor's personal characteristics that fostered positive relationships.

Building on Vygotsky's theory, TARI activities afforded a range of stories that were challenging but not overwhelming from which readers could self-select (Morrison & Anglin, 2005). Books ranged from below third-grade level to more challenging, chapter books at grade level. The multimedia instructional design had four main components. The first, *listening,* provided narrated stories which were articulate, clear, and were repeatable

through the playback function. Laptops were available for each dyad and because they were placed on each reader's desk, they were primarily controlled by readers. Folders had been created on the laptops and were labeled either *Listen* or *Read/Record.* For the first week the Listen folder contained only eight PowerPoints (presentations) of text and narrated stories. This was done intentionally to reduce the cognitive demands or anxiety readers may have felt considering the first week of the study involved many multi-faceted learning experiences (e.g. navigating TARI, reading, and understanding roles). The amount of narrative and reading material was increased to 61 presentations after the first week. Lengthy, multiple-chapter books were segmented into manageable chunks by creating a presentation for each chapter. The number of slides in each PowerPoint ranged from eight to 87 (Appendix B). All of the stories were narrated by an adult, male whose articulation, accuracy, and prosody were essential in modeling correct reading fluency.

The second component of TARI involved opportunities to read/record entire stories (or story passages) via the recording application. The *Read/Record* folder located on each laptop held the same stories as found in the Listen folder but did not include narrations. Readers accessed these files to read text and record their own voices using headsets with a built in microphone. To use the recording tool participants clicked on *Slide Show* and double-clicked on the *Record Narration* option.

The Record Narration option opened a new screen and readers would select *Set Microphone Level* and repeat the alphabet aloud. The computer automatically set the microphone level before readers recorded. A visual red, yellow, and green scale was embedded in the application which indicated the volume of the reader's voice. Recording of text began automatically following these procedures.

Third, readers and tutors were able to replay readers' performances and peer- or self-edit reading performances. During this process, tutors were able to offer examples or suggestions to assist readers in correcting mispronunciations or other errors. Readers were then able to reread/rerecord complete stories or individual passages to improve and finalize a digitized reading product. Dyads could choose either the *From Beginning* or *From Current Slide* option depending on whether they needed to repeat single or multiple slides. Slides were advanced by pressing the down arrow or pressing the *Enter* key.

The fourth and final step of TARI was to save the reader's best reading effort for future use. These were neither graded nor played back to the entire class but were simply the final work products of each specific reader.

The value of this entire iterative process was substantiated by Witt (2008) who reported that students learn through the use of digital tools and examples. Although her subjects were adult nursing students who used a human simulator which depicted eight different scenarios common in patient emergency situations, her research is applicable. She reported that personal scaffolds for learning were constructed by participants and that the use of the digital tools "accelerated their confidence . . . and lessened hesitancy in acting" (p. iv).

The dyads functioned in an environment quite unlike most traditional classrooms. In traditional settings, teachers monitor the length of each lesson and segment or chunk information into smaller learning experiences, checking for comprehension before allowing students to engage in independent practice. My study was substantially different in that I allowed the selection of reading materials and pacing of learning tasks to be determined by each dyad with minimal adult intervention. This intentional design

decision was made to increase the validity of interactions and changes in self-perceptions. Participants were excited to have this affordance and one commented, "In our regular class we only get to read a paragraph, in here we read a whole book." Over the course of the four weeks this freedom to self-select learning tasks motivated readers to attempt more challenging books and spend more time practicing reading (Appendices D, E, F, G, H, I, J, and K).

Another aspect of my study which differed from traditional educational practices was the opportunity readers had to create reading products and save them in an electronic portfolio. In traditional settings students' best work is either sent home, stored at school in hardcopy form, or destroyed after grading. Digital portfolios are an efficient method of documenting improvement over time and can be saved indefinitely. If students move, data demonstrating students' ability can be sent electronically and affordably via the Internet. Using digital tools, the dyads were able to easily store and access their work.

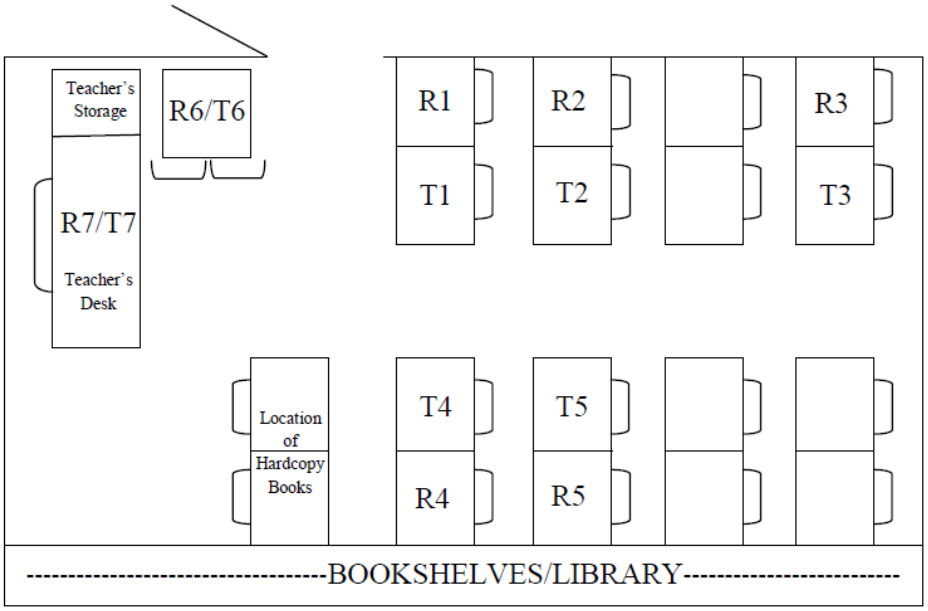
In order for the readers and tutors to function in an environment which would give them the liberty to interact independently, specific reading assignments were *not* given. Rather, each day the room and laptops were prepared and available for immediate use. It was a brief process for dyads to select from the list of uploaded, digital books and begin. Standard pre-reading pedagogical practices such as vocabulary development, predicting, grammar or context clues, and comprehension activities were not used unless they were initiated by the tutor or reader. The TARI process allowed dyads to function independently in a Vygotskian setting with the tutor guiding and assisting as they determined.

The roles of readers and tutors were explained on the first day of the study and clarified intermittently thereafter and a rubric or other structure for peer- or self-editing and evaluation was not included. This decision conflicted somewhat with the Four-Component Instructional Design Model (van Merriënboer & Kester, 2005) which advocated the inclusion of procedural information in multimedia instructional design. Although I had recommended steps for using digital tools, dyads had the latitude of selecting the sequence the reader would follow. One of the questions asked in my study was how underperforming readers and their tutors interacted while using TARI. Had I provided a rubric or explicit steps for editing, the interactions of readers and tutors may not have been the authentic work products of third graders. Participants were able to interact independently and uninterrupted for a 50-minute period each day and were aware that grades, rewards, or punishments would not be given. This was necessary for, if change were to occur, I would not have known whether it was due to motivational or other factors.

The location of the study was in a small, narrow room with seating for no more than 20 students (Figure 2). The room was used flexibly as a classroom, library, and testing room throughout the day. Five dyads were located on the left-side of the entry door in two main rows. Seating for the additional two dyads was farther removed to one end of the room on the right-side of the entry door. Located between these groups was a table where hardcopy books from my study were displayed for easy reference and access. The hardcopies were used for selection purposes and to provide visual and contextual clues for readers since TARI did not include illustrations from selected books. Desks were placed side-by-side to ensure close proximity of the reader to their tutor. Chairs were

unattached which allowed readers and tutors to move closer to, or away from each other and the laptop.

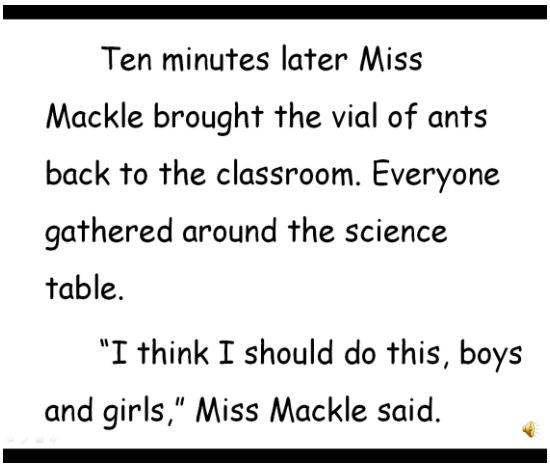
Figure 2. Floor Plan



Font size of the story texts on the monitors ranged from 36-to-40 point which enabled both readers and tutors the ability to view the text, simultaneously (Figure 3). This was an important affordance available through digital tools and data showed that tutors frequently tracked the text for readers and pointed to specific words and/or sentences on the monitor when offering decoding or pronunciation strategies. Without the use of larger fonts, this would not have been possible. I was also able to determine the amount of text on each slide. Unlike picture books which may only have one sentence on each page, or chapter books which have multiple sentences on one page, I could keep the number of

words on the slides fairly consistent regardless of the story. Figure five contains a sample scree-shot of what the dyads saw on their monitors.

Figure 3. Text Size



Dyads used the Reading Frequency Log to document the number of slides readers either listened to or read/recorded during each 50-minute period (Appendix D). At times readers marked the log in lieu of their tutor's assistance and, on a few occasions when dyads were deeply engaged in a reading activity the reading log was ignored or completed at the end of stories. When this occurred the readers or tutors had to return to the beginning of the presentations and count each slide to mark the log.

Case Studies

For the purposes of this and the following chapter, and in an effort to protect the identity of the participants, I have used pseudonyms to replace the alphanumeric designations identifying readers and tutors in my observation notes and physical artifacts

(Table 3). The alphanumeric system used a letter to represent the role of the participant and a number represented their location. For instance, "Kanishah" was *Reader One* and sat in the first seat. She was coded *R1* and, at an adjoining desk her tutor, *T1,* was seated. The alphanumeric system continued through seven readers and seven tutors. To simplify the narrative, tutors in the case studies were not given pseudonyms but were referred to as either *tutor* or their alphanumeric code.

Table 3

Pseudonyms and Coding

Pseudonym	Reader/Subject/Participant	Tutor/Participant
Kanishah	Reader One (R1)	Tutor One (T1)
Rashawn	Reader Two (R2)	Tutor Two (T2)
Jamal	Reader Three (R3)	Tutor Three (T3)
Bailey	Reader Four (R4)	Tutor Four (T4)
Maria	Reader Five (R5)	Tutor Five (T5)
Juan	Reader Six (R6)	Tutor Six (T6)
Toquanda	Reader Seven (R7)	Tutor Seven (T7)

Kanishah

On the first day of the study Kanishah (R1) entered the research room accompanied by her female friend, Maria (R5). Both Kanishah and Maria's reading levels were very low as indicated by their reading grades. Kanishah did not want to be separated from Maria and placed into a dyad with someone of higher ability level. She furrowed her brows, rolled her eyes, and puffed out her cheeks indicating that she was exasperated and unhappy to be placed with a tutor (T1). She grasped Maria's hands and acted as if she would not let go. Verbal comments by Maria regarding this incident are recorded in

Maria's case study, but only body language and expression were indicative of Kanishah's discontent.

Once placed in her dyad T1 reminded Kanishah how to navigate the presentations and pointed to the Desktop, the down arrow on the keyboard, and the PowerPoint options. She paid close attention, looked down at the keyboard, and then tried the arrow key on her own. Her use of TARI was mercurial and it was noted during the first week that she simply advanced, rather than read, each slide. She often avoided navigating, listening, or reading by drawing on her folder and used the excuse that she wanted to have it decorated.

On the second day of the study, Kanishah pointed to T1 and, referring to navigation told me, "She can do it." Her tutor reached across the keyboard and used the down arrow to advance each slide. Together they listened to the narration of *Clifford the Small Red Puppy* which had been selected by Kanishah because she had recently read the same book in class and she was also very familiar with a simpler book, *Clifford the Big Red Dog*. While listening to the story, T1 accurately marked the Reading Frequency Log indicating how many slides had been completed. The log documented that they had listened to 46 slides.

Kanishah did not attempt to read/record any passages until the third day when she recorded 20 slides from the *Clifford the Small Red Puppy*. At first she neither read aloud nor silently mouthed words. Her eyes would roam over the monitor, to the hardcopy book at her side, or around the room. If navigating, she would advance the slides without reading them aloud. Her head was often resting on her hand or on the wall next to her. This behavior continued throughout the four weeks of the study.

The roles of the reader and tutor appeared to be more defined and distinct as the first week progressed. Her tutor began pointing to words on the monitor and tracking them with the eraser-end of a pencil. She was overheard saying to Kanishah, "Can you read that again for me please?" to which Kanishah would roll her eyes, but *would* read the slide again. When she interacted in this manner, T1 would offer a compliment and a prompt to advance to the next slide but Kanishah would not respond, relegating T1 to perform these tasks.

Kanishah continued to read haltingly and typically read the same story she had read the preceding day. In trying to assist and guide her, T1 devised a reading strategy which had neither been employed previously nor observed subsequently. The strategy involved T1 slowly reading the text out loud with Kanishah repeating the words immediately thereafter. The delay between T1's words and Kanishah's repetition was approximately two seconds. This strategy, referred to as *shadow reading* for the purposes of this study, was used only one other time by this dyad, during the second week. No other tutor was observed assisting in this manner.

Kanishah's reading continued to be very robotic and lacked expression. She told me, "I don't like to read" which prompted me to ask if she wanted to stop being part of the study. She answered that she wanted to continue, but that she simply did not want to read. Prompted by T1, she reluctantly began but continued to have difficulty when sounding out words. In one instance Kanishah struggled with the word *different.* Her tutor broke the syllables apart but did not combine the sounds. Kanishah repeatedly looked at T1 as if expecting her to provide the correct pronunciation. When it was not provided, she avoided the word and moved on to the following text.

Kanishah was absent on the fourth day and later reported that she was not sick but that she just did not come to school. No further explanation was provided. In her absence, T1 quickly accessed TARI and began reading/recording one of the stories. This became a consistent practice, not only by Kanishah's tutor but by all tutors. When a reader was absent the tutors would select a story and read/record their own voices for the entire period. Tutors would then listen to their recording but seldom listened to story narrations.

Kanishah returned on the fifth day and began by sitting at her desk humming. She did not access TARI or any of the hardcopy books. She waited, unengaged, until T1 opened the read/record file and selected a presentation. Her tutor reminded Kanishah of the steps to access the Record Narration option and demonstrated how to set the microphone level by repeating the alphabet aloud. Kanishah then recorded the alphabet and made a pained expression on her face when she heard her own voice emitted from the headset. She then read quietly while T1 pointed to and tracked words on the monitor. She demonstrated poor fluency, frowned, and pursed her lips intermittently. Whenever Kanishah made a mistake she laughed out loud and looked around the room but did not attempt to sound out words or use the strategies T1 suggested. Rather, she guessed at words with which she was unfamiliar. At the end of the session I asked her how she felt about reading and she answered that she did not get help from her parents and that she did not like to read "especially out loud."

The second week began with Kanishah continuing the behaviors I had observed previously. Of her own volition she switched T1 with another reader's tutor, T6. I observed her behaviors and interactions in the new dyad and noted that, as Kanishah reread/rerecorded the low-level story she had completed the previous week, she still

struggled with terminology. Her new tutor advanced and navigated TARI, provided decoding cues by covering up the last letters, or prompting, “It’s a silent letter.” She was encouraged to sound out words but, regardless of the assistance, did not respond and placed her head on the wall, making no attempt to decode. Her new tutor would pause to give Kanishah ample time to decode words, but Kanishah did not engage. Rather, she would begin reading from a new point on the slide and ignored the unrecognized word with which her new tutor had assisted.

Kanishah’s original tutor returned to work with her the following day and Kanishah again selected *Clifford the Small Red Puppy*. Her lack of confidence was apparent considering her dependence on familiar text and her unwillingness to navigate. Most often, her practice was to gaze around the room while T1 selected stories and navigated TARI.

One reason Kanishah may have been less apt to navigate was because of an incident that occurred during the second week. Kanishah and T1 had changed roles temporarily and T1 began reading aloud and tracking words with the cursor. Since T1’s reading was fluent, the cursor moved rapidly under the sentences. Neither readers nor tutors had used the cursor in this way before and, more often, defaulted to tracking words by using a finger or the eraser-end of a pencil.

Kanishah’s tutor continued to read for several minutes but when they switched roles back to the original structure, T1 demonstrated how to use the cursor to track words. She took Kanishah’s finger and drew it across the small “mouse pad” on the laptop and then encouraged her to try it by herself. Kanishah was unsuccessful in using her finger to navigate while reading text, simultaneously. This may have been due to the split attention

and/or cognitive demands placed on her working memory to concurrently perform reading tasks while coordinating fine motor skills. Rather than saying that she could not, or did not want to use the cursor, Kanishah moved her hand, shook it, and began to massage her finger. She stated that she couldn't use the cursor anymore and inferred that tracking text via the cursor hurt her finger. Considering it is not painful to use the cursor in this manner, this was another example of the avoidance behaviors Kanishah displayed in an effort to hide perceived inadequacies. Her behavior substantiates research that argues perceived incompetence influences motivation, concealment, and help-seeking behaviors (Ismail & Alexander, 2005; Marchand & Skinner, 2007).

One exception to her practice of having T1 select books and navigate TARI occurred on the fifteenth day when Kanishah selected her own book, plugged in her headset, began reading/recording, and advanced each slide. It was not until this point that it was known whether or not Kanishah remembered how to perform these functions. She pointed to the monitor and asked T1 to tell her the word. The word was provided and Kanishah restated it then continued to read/record. Her Reading Frequency Log on this day indicated that she read/recorded 26 slides and listened to 26 slides, both of which were considerable increases from her previous performance. There was no obvious precursor or catalyst to this change in behavior and when asked what made her want to participate in such a way, Kanishah simply shrugged her shoulders as if to say, "I don't know."

The dyads' interaction continued to develop over the course of the four-week study although Kanishah typically exhibited avoidance behaviors by looking away, not responding to T1, being absent or tardy to class, or asking to be excused to use the restroom. Interactions varied and included encouragement, decoding strategies, and

context clues. For instance, Kanishah was having difficulty understanding a story and T1 asked, “What do you think if it was his own mother?” Kanishah did not respond. Persistently, T1 used the eraser-end of her pencil, pointed to a section of text, and said, “Right here. What do you think?” Kanishah did not respond but, after two minutes elapsed she began expressionlessly reading a subsequent sentence. Again, T1 showed her how to advance slides by using the down arrow key but, instead, Kanishah turned to me and asked to use the restroom. This was permitted and I noted that she walked very slowly down the hallway, stopped to visit with a student, and eventually returned six minutes later. She did not use the restroom during this time.

On her return Kanishah did not want to continue to read. Her tutor accessed the playback function and the dyad listened to Kanishah’s reading performance. At the end of each slide T1 summarized the contents and critiqued Kanishah’s pronunciation of vocabulary or misread sentences. In one case T1 pointed to a sentence where a word had been misstated and said, “You should have said, ‘the’ right here, but you said ‘a.’” Kanishah was semi-engaged during this process but was also observed looking around the room or placing her head on the wall.

On Friday of the third week, Kanishah came to class and again asked to read/record *Clifford the Small Red Puppy.* This was the same book she had used almost exclusively during the preceding weeks. She initially appeared on-task and leveled the audio on the microphone, but her behavior digressed rapidly when she began to read/record. She made faces, puffed her cheeks, and rolled her eyes. Her tutor suggested that they playback a recording Kanishah had completed the day before and she agreed. When mispronunciations were heard, T1 stopped TARI and asked Kanishah to say the word

correctly. Other than this collaboration Kanishah did not participate in peer-editing her reading performances.

There was no pattern as to when Kanishah either would, or would not respond. For instance, she was asked to repeat the /ch/ sound as in *chase* but instead shrugged her shoulders and looked away. For the purposes of this study, a forward slash surrounding a letter or letters indicates the *sound* the subject made. Kanishah then stated that she wanted to read/record *Just Grandpa and Me* because she "like[d] it and [could] read it." Other than her preference for *Clifford the Small Red Puppy,* she had never made a positive comment about reading before this day. Kanishah also noticed a different "*Clifford* book" on the bookshelf across from where she was sitting. The book was entitled *Clifford's First Valentine's Day* and was not one of the books included in my study: It had neither been narrated nor typed with larger text into the Listen or Read/Record presentations. Nevertheless, she borrowed the book and read several pages of the story (Appendix E). Her reading fluency was halting which may have been due to the high Lexile (490) of the book of which she was unaware. Nevertheless, this was the first time she had shown determination and independence as a reader. Her tutor did not assist during this process but sat nearby, quietly observing. This demonstrated how her interest in reading was influenced when she had confidence in her abilities. She had prior knowledge of the text, characters, and theme with *Clifford's First Valentine's Day* resulting in a change in attitude and disposition. It was anticipated that Kanishah would ask to check out the book over the weekend, but this was not the case.

In the final week of the study, she frequently selected her own reading/recording story. She did not, however, advance slides and often appeared disengaged considering

her hand was on her forehead or she was touching items inside the desk. Her tutor would redirect her but, when she did not comply, T1 simply followed along as she read. At one point Kanishah finished one story and T1 encouraged her to read *Mr. Putter and Tabby Stir the Soup.* Kanishah responded, "No! It's too long." Her tutor then stated, "You don't have to read all of it. You can read one page." Exhibiting her independence Kanishah refused and selected a much shorter book, *Danny and the Dinosaur.* Her behavior illustrated the tendency for readers to judge the difficulty of books by their length and not by other, more qualitative measures such as Lexile level. This was particularly evident when subjects, including Kanishah, selected *Just Grandpa and Me* which was 24-pages in length but had a Lexile of 410.

Kanishah was then asked whether she wanted to listen or read/record and she chose listening. The appropriate presentation was accessed and T1 began advancing the slides. Kanishah did not follow along but, instead, picked up *Junie B. Jones is not a Crook* and looked through it while *Danny and the Dinosaur* played aloud. At this point T1 reached over, took *Junie B. Jones is not a Crook* from Kanishah's hand, and redirected her to the presentation. Kanishah was not overly defiant but simply leaned against the wall and looked around the room.

Four-Week Summary: Kanishah.

It was noted that Kanishah was the only reader who, throughout the study, exhibited a reluctance to read or navigate TARI. Her manner may have been influenced by her lack of regular attendance or tardiness to at least one class each week. Her RSPS indicated a minimal increase in all four dimensions but her confidence as a reader was never consistent or readily apparent.

Kanishah's interactions and behaviors demonstrated that she was uncomfortable reading aloud and avoided reading by stalling and acting helpless. Although she was asked if she wanted to stop being part of the study she stated that she wanted to continue. It was clear that she preferred to work with someone of her own reading ability level rather than a tutor of greater ability. She was able to navigate the digital tools but wanted T1 to advance slides and open/select presentations.

Kanishah's avoidance behaviors were also evident through her continued requests to use the restroom, her facial expressions, and refusal to respond consistently to prompts. While she did not demonstrate open defiance, she did display passive resistance and would "shut down" when faced with mispronunciations or other errors which had been pointed out by her tutors (T1 and, briefly, T6). It was surprising when she reported at the end of the study that, "working on the computer has been better for me because when I get finished with the book I get to listen to myself read and then it all comes together like a peanut butter sandwich."

Unlike the other readers Kanishah did not display independence or motivation until the last day of the third week when she recorded her voice and asked her tutor for assistance. She listened to the reading performance but did not engage in peer- or self-editing. The only time she demonstrated initiative and self-confidence was when she selected a book from the shelf in the classroom which was not part of the study: *Clifford's First Valentine's Day.* It appeared to have been Kanishah's perception that *Clifford the Small Red Puppy* was one of the easiest books of the study collection although it had a moderately high Lexile (300) of which readers were unaware. Her willingness to read another *"Clifford* book" may have been related to her familiarity with

the characters, setting, sentence structure, text, and themes found in the commonly read *Clifford the Big Red Dog* book which at a 170 Lexile is much easier. The *Clifford the Small Red Puppy* book may also have been interpreted as simple since it was one of the shortest books of the study at 33 pages in length. Her lack of risk taking behaviors, coupled with the pretest scores on her RSPS, reinforced the belief that her self-confidence as a reader was very low.

Kanishah and T1 interacted in a variety of ways. The decoding strategies typically used by T1 were phonics (sounding out letters) and segmenting words into syllables. At times T1 would cover letters so that Kanishah would focus on specific letters and sounds. In the final interview with this dyad T1 reported that she "helped [Kanishah] follow along with my pencil with the words. I helped [Kanishah] sound out the words after she was done listening." Seldom did T1 praise Kanishah for her effort or ability.

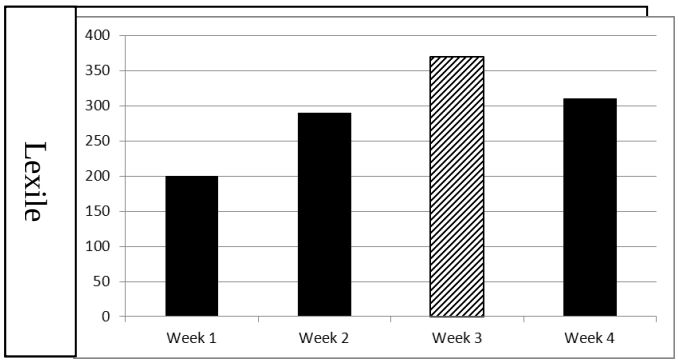
Besides assistance with navigating TARI, the other reading strategies used in this dyad were summarizing information and critiquing Kanishah after each slide, offering context clues and, most unique, creating and using a *shadow reading* strategy several times. No other dyads used shadow reading nor did tutors consistently summarize information for readers in an effort to increase comprehension.

Her Reading Frequency Log documented that the mean Lexile of the books she read increased through the third week but diminished thereafter leaving her with the lowest overall Lexile mean by the end of the study and the only reader whose data followed this pattern (Figure 4). This may have been due to her choice of *Clifford's First Valentine's Day* (490 Lexile) which was included in the mean score because it was read during the study session unlike books which were read at home and could not be trusted for their

accuracy. It is notable that she only read seven pages from this story and a limitation of determining the Lexile mean was that each title was treated with equal weight.

Kanishah frequently selected familiar titles such as *Clifford the Small Red Puppy, Fox on the Job, The Berenstain Bears and the Missing Honey,* and *Just Grandpa and Me* (Appendix E). Every reader read *Clifford the Small Red Puppy* at least once during the four weeks of the study but only Kanishah and Juan repeatedly returned to the text *every* week and while *Just Grandpa and Me* was more difficult at a 410 Lexile, the title was popular with most readers which was most likely due to the fact that it was the shortest book: 24 pages in length (Appendices E, F, G, H, I, J, K). For the purposes of this study, in each readers' "Lexile Mean by Week" graph, the patterned bar indicates the week that the mean Lexiles were highest.

Figure 4. Lexile Mean by Week: Kanishah



Rashawn

Rashawn (R2) was seated directly behind Kanishah. He was not reluctant to be partnered with his female tutor (T2) and appeared to know her from his regular

classroom. This dyad worked well together from the beginning and continued demonstrating a positive environment throughout the four weeks of the study.

On the first day Rashawn intently watched and listened as I explained the study and the roles of readers and tutors. He moved to the back of the room to complete the self-perception measure but quickly returned to his assigned seat to be with T2 upon completion. During the first session T2 opened the Listen folder and selected a presentation for him. She moved closer to the laptop, positioned her chair and body between the two desks, and forwarded slides. Rashawn was mostly compliant but avoided eye contact and kept his hands folded in his lap. He did not make any verbal or physical indications that he wanted to navigate TARI.

Later in the session Rashawn's interaction and engagement declined. He looked at the keyboard or around the room, tipped back in his chair, drew on the wall with his finger, stood up, and combed his hair with his fingers. He did not respond when T2 asked what story he wanted for the following day. His Reading Frequency Log indicated that he listened to 40 slides, but without ostensible engagement.

On the third day I asked the tutors to raise their hands if they were ready to assist the readers. Rashawn either misunderstood or was not paying attention because, along with the tutors, he raised his hand. His tutor prepared the presentation for him and he began reading very, very quietly. It was unknown if T2 could hear what Rashawn was reading considering the volume of his voice was so low. His tutor waited for him to sound out the word "neighbor" but he made no attempt. Like Kanishah, he simply waited for the word to be provided. When T2 realized he was not making any effort to read the word she gave him a hint and said, "It is the person who lives next to you," then offered the correct

pronunciation. Rashawn repeated *neighbor* and continued reading until he came upon the word *uncle* which he could not decode. At this point T2 covered up the "cle" letters and asked him what sounds the /un/ made. Rashawn gave random words rather than sounding out the letters and T2 demanded, "Stop guessing!" His tutor stated that the word was the name of someone in Rashawn's family. The description was only confusing and he frowned and did not reply. She then prompted, "It is not your mother, father, sister, cousin, or your aunt . . . ." At that prompt Rashawn accurately guessed *uncle.*

It became apparent that T2 embraced and understood her role in guiding and assisting Rashawn. In one instance she looked behind her and listened to the dialog between R3 and T3. Noticing that T3 was leaning back and not engaged in conversation she stated, "You have to help him [R3]!"

On the fourth day of the study I reviewed how to navigate TARI to ensure mastery and understanding. Several tutors, including T2, were able to restate the directions to the whole group and showed their respective readers how to navigate and use the digital tools. Afterwards, T2 quickly accessed the read/record option and Rashawn read continuously throughout the session albeit with great effort. He completed 50 slides which was an increase from the previous day when it was documented on his Reading Frequency Log that he had finished 29 slides. Two different books were read on each day which was different from the reading patterns demonstrated in most other dyads.

On the last day of the first week T2 assisted Rashawn in selecting a presentation and then asked if *she* could read/record. I told her "No" but there would probably be a time that she could use TARI. This may have frustrated T2 considering her behavior changed and the amount of assistance she provided to Rashawn subsequently was very minimal.

Rashawn listened independently to 36 slides which he had recorded the previous day while T2 twisted the string on the materials. Neither peer- nor self-editing occurred at this point. However, after listening to his performance, Rashawn proceeded to reread/rerecord 44 of the 51 slides which he had completed the preceding day. His rereading/rerecording was very low in volume and it was difficult to hear him most of the time but the ability to set the microphone to his voice level served to adequately capture and digitize his recordings. At times Rashawn would stop and look around the room and appeared to be assessing if other readers or tutors were listening to him.

The first day of the second week for Rashawn began with avoidance behaviors. He placed his head down on the desk, leaned back in his chair, looked away when T2 asked him questions, perused the classroom, and watched what tasks were engaging other dyads. It was noted that, rather than submitting a blank Reading Frequency Log, the artifact was not turned in for this day.

His behaviors changed considerably thereafter. Before his tutor arrived, Rashawn began adjusting and setting his microphone level in preparation for reading/recording. It was the first time he took the initiative in his own learning rather than by default when his tutor would not interact. Rashawn gathered a hardcopy of the book he wanted to record so that he could review it for context and visual cues. He recorded quietly, readjusted the microphone level, and began reading and speaking much more loudly and with expression.

Rashawn continued to navigate TARI on his own with minimal assistance from T2 as the days passed. He was absent one day, but was able to return to the tasks at hand seamlessly. If there was a point when Rashawn became actualized it was when he

evidenced complete confidence in checking out a difficult, multi-chapter book which he had found on the bookshelf. The book, *Goosebumps: Night in Werewolf Woods* had a 540 Lexile which indicated a higher grade level than the books included in the study. When he returned after the weekend, Rashawn reported that he had read the book and that his parents had also read the book to him. This was the first time that Rashawn had checked out a book and was a paradigm shift from his prior behavior.

During the weeks that followed Rashawn's self-confidence and self-perception as a reader continued to change. He increased the volume of his voice, particularly when he and T2 were peer-editing. His readings/recordings were, also, much louder and demonstrated improved prosody and fluency. He routinely arrived early to class and accessed TARI before T2 arrived and, by so doing, took more ownership in using TARI and directing T2 as to the tasks that *he* wanted to finish each day. An example of this was when he stated, "No I want to listen first. First, I need to listen and then I can record." He smiled regularly and appeared to enjoy using TARI. When there was an unfamiliar word in a sentence, he would attempt to sound out the word by himself and often did so successfully.

At times T2 provided assistance by using the eraser-end of a pencil to track text on the monitor but, typically, Rashawn worked independently. He frequently referenced hardcopy books to provide visual images which assisted in decoding and understanding. Such was the case with the word *candlestick* which Rashawn could read in context of the sentence after he had seen the picture. During this time, T2 was engaged and carefully followed along. When Rashawn struggled with the word *tough,* T2 covered the letters "gh" and told him that "tou" made the /tahhh/ sound. Although this decoding strategy

was not instructionally correct, Rashawn was able to say *tough* accurately. This substantiates Darrow, Gibbs, and Wedel's (2005) and Vygotsky's (1978; 1986) arguments that terms and concepts may be explained better by an individual's peer whose zone of proximal development is not as disparate as a teachers. This does not, however, negate Portillo Peña's (2008) report of the benefits of cross-generational tutoring dyads.

In another instance Rashawn did not know how to pronounce the author's name. His tutor pointed to the title and said, "You know how to say that word—see it's the same word as this" (pointing to a different location). Rashawn then nodded and said the name correctly. Later in his reading he remembered the sound of the name when he saw it in a different location in the book.

During the final week Rashawn occasionally switched roles with T2 and was heard giving her advice as to how to read a passage or navigate TARI. He continued his normal practice of checking out one or more books that were beyond the third-grade Lexile level. He would often report that he had read parts of the books to his parents the preceding night. It is important to note that his self-reliance when working with T2 and using digital tools did not regress although he had been absent twice during the last weeks of the study.

Four-Week Summary: Rashawn.

Rashawn's first week data indicated that he was initially distracted and exhibited avoidance behaviors, such as leaning back in his chair or using his finger to draw on the wall. This changed rapidly when he became actively engaged with T2. On the fifth day when T2 was less-attentive, Rashawn adeptly navigated slides and used TARI as designed. This practice continued throughout the remainder of the study.

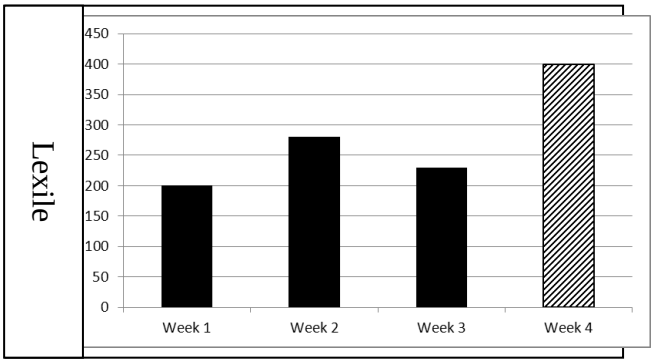
It wasn't until midway through the second week that Rashawn began exhibiting more self-confidence and a change in his self-perception as a reader. He arrived early to the study, prepared and navigated TARI independently, took risks in pronouncing words before his tutor could assist, increased the volume of his voice, read/recorded with expression, checked out numerous books that were above a third-grade reading level, and eventually acted as a tutor for his partner. Although absent three days during the last three weeks of the study, he did not regress in his enthusiasm for or use of TARI.

During the interview with the dyad, Rashawn reported that he thought the digital tools helped him "because some of the words were bigger than the words inside the book, [and my tutor] helped me break up some of the words." His tutor clarified, "I helped him break down words and sound them out. It actually helped him a lot. He started to pick up the pace as soon as he figured out the words. It kinda felt really good to know that he was doing better. The best part has been seeing *everybody* get better on their learning progress for reading." Rashawn added, "It was pretty healthy—I mean good—my tutor helping me."

Rashawn's Reading Frequency Logs indicated that he began the study by reading books with a Lexile of 200 which was identical to two other readers (Figure 5). After four weeks his average Lexile mean had doubled but his fourth week data may be skewed given he was either absent or did not submit a log on two days and the Lexile mean only reflects one use of *Junie B. Jones is Not a Crook* (Appendix F). His efforts increased considerably during the second week and he averaged a 280 Lexile. He may have self-regulated his reading tasks at the end of the second week because in week three his Lexile mean declined to 230. It is important to note that mean scores did not factor in the

challenging books he borrowed overnight beginning in the middle of the second week since there was no way to determine if the books were actually read.

Figure 5. Lexile Mean by Week: Rashawn



Jamal

Jamal's (R3) reading ability was higher than other readers. He entered the room on the first day with a self-confident stance: head held high with his shoulders back. He sat at a desk and attempted to open files located on the laptop without success. He and his first tutor did not immediately access TARI after the study and program had been explained. Instead they each selected two *different* hardcopy books and began reading silently. They continued this behavior until they saw other dyads listening to story narrations. At this point a problem arose: Jamal wanted to listen to one book but his tutor preferred another. I assisted them in accessing Jamal's choice but the dyad was distracted and relied more on the hardcopy book than on the electronic, narrated version. Jamal and T3 kept reading text from the hardcopy book while comparing the presentation slides to page numbers. I had earlier explained that the slides and the page numbers did not

correspond since slides did not include illustrations and the text was larger but this did not dissuade them from their activities. The back-and-forth assessment of slides-to-pages comprised most of the session and a Reading Frequency Log was not submitted.

The following day Jamal used TARI and listened to a narration. His tutor was not following the text on the monitor, but was reading silently from the corresponding hardcopy book. Jamal would stop frequently and ask T3 to show him a particular passage, trying to match the electronic slide with the hardcopy page. I again reminded the dyad that slides and pages did not align due to the size of print and the illustrations which took additional space. I also asked them to mark Jamal's Reading Frequency Log based on the number of slides that were either listened to or read/recorded.

Later in the session, Jamal was observed reading without prompting from T3. He read loudly with expression and the dyad periodically stopped between slides to discuss the content of the story. Jamal was the first reader to record his own voice but he and T3 neither evaluated Jamal's fluency, accuracy, or prosody nor did T3 provide decoding strategies when appropriate. Jamal's tutor marked the "listen" portion of his Reading Frequency Log but did not document his reading/recording. This inaccuracy may have occurred because his tutor was often observed reading silently from a hardcopy book and inconsistently followed the text on the monitor on this particular day. When T3 did check what was being read it was to correspond the slides to the hardcopy pages.

At this point a tutor located in front of T3 turned around and said, "You have to help him." It was unknown why this dyad was driven to compare slides-to-pages considering no external rewards were associated with the amount completed. Their competitive behavior may have stemmed from intrinsic motivation and may have been a by-product

of their familiarity and friendship. While this dyad compared presentation slides to hardcopy books most frequently, the practice was not completely uncommon to other dyads. Tutors who read simultaneously from hardcopy books while readers read from monitors were allowed to continue since my research design explored authentic interactions of the dyad.

On the third day T3 was confused as to how to mark the Reading Fluency Log, consequently I assisted by pointing to two images on the Reading Fluency Log. The first image was the "ear" icon which represented listening and the second icon was a "mouth" which represented reading/recording (Figure 6; Appendix D). I reminded them that the log should reflect the number of slides listened to or read/recorded and not the number of pages in the hardcopy book. Following this discussion Jamal listened to 43 pages of narration and then read 21 slides of the same story. He read rapidly and loudly without mispronunciations or other errors. To ensure T3 was marking the Reading Fluency Log accurately, Jamal used the keyboard's "Esc" (escape) key to identify the exact page from which he was reading. Jamal reported that he did this so that T3 could "catch up" on the log. His use of the "Esc" key demonstrated above-average navigation skills as this technique was only presented a single time on the first day of the study.

Figure 6. Reading Frequency Log Icons

Figure 6. The image of the "HEAR" man with a hand next to his ear represented the area where listening was to be documented and the speaking mouth represented the reading/recording area.

Jamal was absent on the fourth day hence T3 used TARI independently during this time. He returned on the fifth day and started listening attentively while T3 demonstrated how to set the microphone level although he had recorded the previous day and knew how to set the audio. Jamal then began reading/recording the story which he had selected and, while he did so, T3 made encouraging statements such as "Good job" or "Keep going."

Jamal's reading was loud and boisterous to the point that other readers and tutors were observed turning and looking in his direction. This prompted a seat reassignment farther back to the end of the classroom in order to provide more space between Jamal and other dyads (Figure 2). I did not want Jamal's reading skills and enthusiasm to influence other readers' self-perceptions because of an unspoken competition or comparison.

Jamal read from *Fox on the Job* and in the beginning of the story "Fox" crashed his bicycle. Jamal wanted to see what the bike looked like so T3 quickly found the corresponding page in the hardcopy book. This dyad continued to be the partnership which most consistently referred to hardcopy books for story illustrations as a means to better understand the story. Jamal's Reading Frequency Log for the fifth day documented that he listened to 48 slides and read/recorded 50 slides.

He began the second week somewhat reluctantly and neither accessed TARI himself nor removed his headset to allow T3 to hear his recorded reading performances from the preceding week. His tutor prevailed and as slides were advanced T3 was overheard telling Jamal, "You did a good job on that page." When peer-editing his tutor typically

did not provide details about his reading, but on this occasion he corrected Jamal: "You said *crowed* and it was *crowd."*

Later in the session Jamal began reading/recording a new book. He was guided by T3 that he had already read a certain slide and that he should continue forward. "You already read that [slide]" T3 said and, referencing the Reading Frequency Log added, "We're on [slide] 36." At that point Jamal burped into the microphone which recorded the sound. Jamal then used the playback function to listen to and laugh at the burp. Once they were back on task and had completed the entire book, Jamal asked, "How did I do?" His tutor responded, "You did real good." They then began listening to the reading performance again and rapidly forwarded slides until they came upon the "burp" which they listened to repeatedly. The "burp" was the most reviewed slide of the entire reading performance but, considering the possibilities of other off-task behavior, the burp was a minor misuse of TARI. It was evident that the dyad had made the affordances of digital tools their own!

Jamal was absent on the second day of the second week and, needing to rearrange other dyads, I moved his tutor to Juan, Reader Six (Figure 7).

Figure 7. Changed Dyads

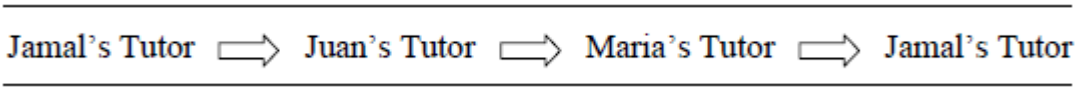


Figure 7. Three dyads were changed during the second week due to disparate degrees of the zone of proximal development between some readers and tutors.

Jamal's new tutor possessed the highest reading skills and it was an appropriate partnership considering Jamal's reading ability was considerably higher than the other

readers. Since she was more aligned with his zone of proximal development she was able to serve as his *more capable other.* Jamal's new tutor became T3 and the tutor who was moved to Juan became T6.

In Jamal's absence, T3 recorded her own reading products and was quick to point out that she spoke English, Vietnamese, Cantonese, and Tagalog and that her mother required her to read each day. Heretofore she had been observed acting off-task (e.g. out of her seat) because of her impatience with either the reading materials or her first reader. After the first week this tutor was reassigned to Jamal. A discussion of appropriately assigned tutors within the readers' zone of proximal development is addressed further in Maria's (R5) case study.

On his return Jamal accessed TARI independently and read expressively. One of the books in the study, *Henry and Mudge and the Wild Wind,* included an episode which described the noises of a thunderstorm. While Jamal confidently read/recorded from the presentation and shouted, "POW, CRASH, BOOM," T3 read silently from a different book and did not offer guidance or prompts at this point. None of the participants surrounding Jamal appeared to be disturbed by the volume of his reading.

The story was a favorite of Jamal's since it had expressive words and had been narrated with prosody. I asked him why he was reading/recording loudly and he stated, "Because that's the way [the narrator] did it when I listened." This indicated that Jamal imitated and modeled his reading from the narrated stories he heard in the Listen folder. Since his voice was typically very loud and several of the dyads could hear him read, it was noted that some of the other readers began to imitate *his* style when *they* read the same story.

Jamal later asked if he could have more books to read with TARI. I assured him that more stories would be uploaded for him and the other readers to access within a day. To this point the dyads had been limited to eight books and it was apparent that Jamal was eager for new material. He also asked to take home the laptop and when I told him that using TARI at home was not possible he asked to check out a book from the classroom shelf. He selected *Star Wars, Phantom Menace* which, at a 710 Lexile, was a grade level equivalent of the eighth month of fourth grade which was well above his reading ability level. He returned the following week and reported that he had read to his family and that he wanted to check out more books after the session. This practice continued throughout the study, typically with Jamal reading a *Star Wars* book. Before this time Jamal had not checked out any books although he and the other participants had been told they could do so.

Each day thereafter Jamal arrived early to class, accessed TARI, and begin reading before his new tutor arrived. Throughout the remainder of the study he read a variety of books and read them with great expression, speed, and accuracy. As this developed his dependence on T3 diminished. The exception to this was when Jamal's reading performance had not been recorded properly. His tutor assisted him in peer-editing and asked him if he wanted to rerecord or listen to another story. Jamal elected to rectify the problem and T3 leveraged the digital tools which enabled him to rerecord several slides. Jamal did not read the entire book at one time but, with the assistance of T3, recorded a few slides and then played them back to check for accuracy and ensure the fidelity was appropriate. At one point after Jamal reread/rerecorded a slide, T3 stopped him and stated he had read well but that he should have said some words louder. She modeled the

correct volume by reading the same sentence aloud. Jamal practiced rereading the sentence and mirrored how T3 had emphasized selected words. Together they listened to and peer-edited his reading performance and, when they had finished, Jamal stated that he thought *his* reading was better than T3's. His tutor responded by sweeping Jamal's Reading Frequency Logs onto the floor with her hand and walking away. Jamal repeated the process of alternating reading tasks. He self-edited and evaluated two or three slides then read two or three more slides until he had finished the entire story. This strategy was not repeated by Jamal and in most instances readers read continuously from the beginning to the end of each presentation.

Out of all of the participants this dyad was the most proficient and tech-savvy partnership. During the last two weeks T3 tutor was heard directing Jamal in using TARI although he routinely declined her attempts to navigate. His self-confidence was evidenced by his lack of hesitancy to navigate and his continued practice of reading loudly and with good inflection. Regardless of his inattention to her suggestions, T3 offered direction such as, "First, click 'Record Narration,' then 'Check Microphone Level.'" Periodically she would ask if she could record a story and Jamal would answer with a resounding, "No!" The only exception to this was on the final day of the study when Jamal allowed T3 to record. They switched seats and she read aloud with Jamal following along and providing advice. She used a high-pitched voice and when the dyad played back her recording they laughed but did not peer-edit her reading performance.

Four-Week Summary: Jamal.

Jamal's first week in the study began with him being more interested in hardcopy books than in TARI. The interactions with his tutor were typically focused on a

comparison of the number of slides in TARI to the number of pages in a corresponding hardcopy book. Jamal's behavior changed on the third day when he started listening to narrations and reading/recording stories. He read fluently and with a great amount of expression. Comparing him to other readers in the study, Jamal appeared the most self-confident and motivated. He frequently navigated TARI by himself, proficiently used other functions on the laptop, and mainly relied on his first tutor for input regarding content and feedback, assistance when comparing slides-to-pages, or finding illustrations in hardcopy books.

Jamal imitated the adult narrations to display varied inflection and explained that he modeled his voice so that it sounded like the narrator. No other readers mimicked the narrator in this way. From interviews, readers most frequently said they used narrations only to help with understanding and pronunciations of words they did not know.

Jamal was one of the few readers who, with his tutor, read/recorded and reviewed reading performances a few slides at a time. This occurred only once but was a unique way to manipulate the digital affordance. More commonly Jamal and his tutors used TARI to read/record an entire book without segmenting the presentations; a practice which was mirrored by most other dyads as well.

At the end of the second week and every day thereafter Jamal checked out books to read at home. His selections were more rigorous, challenging, and higher than a third-grade level. His self-perception did not change substantially as documented on his RSPS but change *did* occur with his behavior in several ways. He had an increased desire to have more books narrated and available on TARI, borrowed higher-level reading books

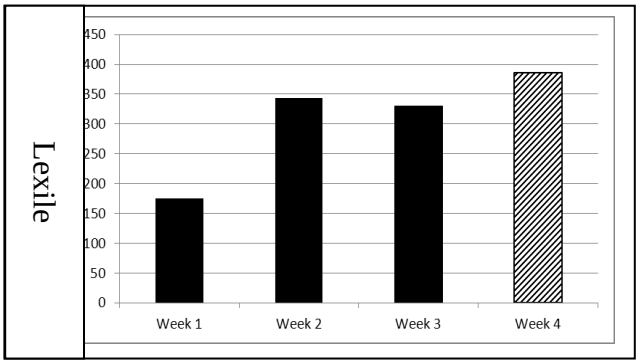
overnight, increased the volume of his voice, read with prosody, and worked independently to navigate TARI.

Jamal reported that interacting with TARI "helped me by first you can listen to the book and get used to the words then you can try reading it by yourself." He stated that his first tutor helped him sound out words but that his second tutor did not assist him as much. As he was being interviewed in the company of his second tutor she corrected Jamal and stated,

> He was reading too fast and so he couldn't understand. I had him slow down just a little and it was enough to have him understand what he was reading. He was reading so fast he was skipping words that were important. He needed those words so that he would know the meaning. I had to tell him, 'SLOW DOWN.' He needed to stop the rushing.

Based on data from his Reading Frequency Logs, Jamal's Lexile mean for the first week was the lowest of all other readers. This was surprising given he had the highest reading ability of the subjects. His growth between weeks one and the end of week two was sizable: nearly a 100 percent increase in the level of difficulty of the books. He declined 14 points the third week but increased to his highest level of 386 at the end of week four (Figure 8). It was notable that his selections varied widely, a characteristic not seen with other readers. He was the most consistent of any reader in following the iterative TARI process of listening to recordings before reading/recording. This may have been more of a personal compulsion since he also routinely reported his listening or reading/recording in increments of ten slides or pages. As mentioned earlier, he was the one reader who was absorbed with matching slides to text in the initial phases of the study and periodically thereafter.

Figure 8. Lexile Mean by Week: Jamal



Bailey

The fourth reader, Bailey (R4), was partnered with a female tutor (T4) from her regular classroom. They had already developed a positive relationship, acted as though they were good friends, and frequently visited and laughed together. The first day of the study began with a whole group discussion and demonstration of how to use TARI. Bailey and T4 listened attentively, each with their hands on their respective desks and their eyes looking directly at me. As I continued Bailey raised her hand and shared that she would have trouble reading the words, *Emily Elizabeth,* an example I had offered which was taken from *Clifford the Small Red Puppy*. I described how a tutor may help a reader in decoding the name and how readers could use cues found in the syntax (e.g. capitalization of personal nouns). This was explicated in elementary language with multiple examples in an effort to increase understanding.

On the second day Bailey and T4 listened to one story narration and completed 60 slides. Since the Reading Frequency Log contained only 50 squares for listening and 50 squares for reading/recording, T4 asked for a second sheet and continued documenting

Bailey's efforts. Unaided, Bailey silently mouthed words as she followed the narrated text. This was different from the shadow reading when Kanishah read *out loud* with her tutor.

The third day tutors were asked to tell the whole group what their role was in assisting readers. Bailey's tutor answered that tutors could "tell [readers] a word or help them sound it out and you can say good job." Her tutor then asked for clarification regarding how presentations were changed. I again explained the process of accessing new books using the Listen and/or Read/Record folders and T4 demonstrated this procedure on their laptop. Bailey responded with, "I remember now!" and began listening to the narration of *Clifford the Small Red Puppy* while T4 followed along in the hardcopy version of the same. Data from the Reading Frequency Log documented that Bailey listened to 18 and read/recorded 18 slides in each category. The volume of her reading was low but her voice was discernable which enabled T4 to document accurately how Bailey was using TARI. Throughout this process, T4 repeatedly praised her and provided positive, reinforcing statements such as "Good job!" and "You can do it!"

When stymied by the word *dolls* Bailey tried repeatedly to make the correct sounds. She pronounced /d/ correctly but continued making the long /o/ when blending the letters. She incorrectly pronounced the word three times before T4 pronounced the word and Bailey repeated it correctly. Bailey's tutor guided her and said, "That's good, now go back and read it from the start of the sentence." She used the eraser-end of her pencil and pointed to each of the words in the sentence while Bailey read aloud. Bailey later asked if she could read the same story the following day and T4 agreed.

Bailey did not listen to her previous recording as planned and on the fourth day she and T4 quickly accessed the Read/Record folder and selected the *Fox on the Job* presentation. Her tutor followed carefully as Bailey reticently read and advanced each slide by using the *Enter* key on the keyboard. *Wait-time* was employed which provided Bailey with opportunities to decode words or reread sentences at her own pace and assistance was offered only when Bailey appeared to have expended all of her own reading strategies. Once finished, Bailey listened to her own reading product and giggling asked T4, "I don't sound like that, do I?" Her tutor smiled and responded, "Yes, you do!" The dyad continued to track text on the monitor as they listened to and peer-edited Bailey's recording and while this occurred, Bailey again silently mouthed each word simultaneously as her own narration was replayed. Their typical interaction involved decoding words and at times Bailey would smile but tilt her head downward. Her behavior inferred that she had made a careless mistake with a word she should have known. An example of this was when T4 corrected, "Bailey, you said 'a' [and] it's actually 'the.'" Bailey stated she wanted to playback her recording again and pressed the key to increase the volume. She held her hands together and smiled broadly as she heard her reading performance. It was important to note that during this session Bailey and T4 had not been distracted by the tutor seated behind them who had been out of her chair, repeatedly. At the end of the session Bailey told me, "I made a mistake and I went back and said it" to which T4 added, "She rechecked her work. I think I'm a good teacher because she went back."

Similar to other tutors, on the fifth day T4 asked if she could read/record herself. I reiterated that she may be able to use TARI later but that it would be dependent upon

Bailey's use of the program. Bailey then asked when the best time was to record a story and I responded that the decision needed to be made between the dyad. They chose to listen to the narration and stated that it was easier to hear someone else read a story *before* Bailey read. This coincided with data from other dyads which indicated that listening to narrations helped readers because they could hear words and try to remember the pronunciation before having to reproduce them.

Bailey's tutor was absent the entire second week but this did not deter Bailey's active use of TARI. Her self-confidence grew daily as she navigated through the options, selected new and more difficult books, listened to narrations, read/recorded stories, played back performances, and documented her efforts on her Reading Frequency Log.

A tutor who was not assigned to Bailey noticed that she was alone, walked over, and began helping her although assistance had not been requested. Their interchange was exemplary considering the phonological instructional strategies which the substitute tutor (T2) employed had not been used as explicitly with her own reader (R2). Bailey's self-editing had unearthed areas where she wanted to improve and the critique of her own work was an important benchmark in Bailey's actualization. When the opportunity to speak with T2 arose, she confidently pointed to the author's name and admitted, "I keep freezing on the name." Rather than pronouncing *Mercer Mayer*, T2 opened the Listen folder and accessed the story narration. Together they listened to the entire story again and then T2 prompted, "Mayor. It's somebody that is important in a city."

Bailey did not understand the clue so T2 covered *er* in Mayer and added, "Part of it is like a month." Bailey correctly said *May,* and T2 pointed to *er* directing, "Now add this." Bailey responded with /errrrr/ but did not combine the sounds therefore T2 placed her

hands 18-inches apart, brought them back together, and said, “Now put [the sounds] together.” Bailey was still unable to correctly decode the word at which point T2 leaned over and whispered to me, “I could have said it is someone who works at City Hall.” She then helped by navigating back to the Listen folder as she had done previously, accessed the appropriate presentation, and together they listened to the first few slides of the narrated story again. They did not review the entire book but only listened to the beginning which included pronunciation of the author’s name. This required no more than five-minutes and afterward, Bailey reread/rerecorded the story and, when she pronounced *Mercer Mayer* correctly, T2 gave her two thumbs up.

In another example Bailey was unable to read the word *brought.* She was prompted, “Remember /ou/ makes the short ‘o’ sound” to which Bailey slowly sounded out the word. Her pronunciation was correct and T2 affirmed her efforts by smiling and saying, “Good!” Bailey consistently responded positively to peer-editing as evidenced by her continued willingness to record and *rerecord.* The dyad worked collaboratively with T2 providing assistance in decoding words and reading prompts and Bailey evaluating her own reading performances as well. This was illustrated when Bailey pointed to a word and stated, “I didn’t say that very good” and T2 responded, “Yeah, but you said it right the second time.” Bailey then nodded her head, smiled, and advanced the slide for the dyad to listen further.

When they had completed editing and finalized a rerecorded reading product, T2 said, “You did a really good job. You just messed up a few times but then you did really good.” She then navigated back to one slide, pointed to a word and said, “This word is hard—but you started getting it right.” Bailey responded by raising her hand to tell me

that she had made a few mistakes when she recorded but that T2 helped her by telling her to reread the sentence.

During the third week T4 returned from a prolonged illness but still was not consistently present at school. Bailey reminded her how to access TARI and demonstrated the use of digital tools. She reread the book she had had difficulty reading the week before and loudly and accurately read the author's name, *Mercer Mayer,* which she had practiced the preceding week. Bailey's tutor asked her to reread *Fox on the Job* which had a 150 Lexile but Bailey refused and confidently stated that she preferred to read *Henry and Mudge and the Wild Wind* which, at a 400 Lexile was much more challenging.

Bailey read/recorded *Henry and Mudge and the Wild Wind* for the remainder of the session and, although other dyads were turning off their laptops and collecting folders, she continued to read beyond the dismissal time. She was reluctant to leave the room and when I asked if she wanted to take a book home she declined stating, "I might lose it and I don't want to pay for it." She then knit her eyebrows together as if she were thinking, changed her mind, and selected *Awesome Knock Knock Jokes for Kids* from the bookshelf, a book which was substantially beyond what she had previously read. The book was not narrated, had 112 pages, and was described via www.Amazon.com as having a fourth-grade reading level appropriate for nine-to-12 year olds. This was further evidence that her self-perception as a reader was changing as she became actualized.

The remainder of the third week when T4 was present at school Bailey allowed her to assist if a word was unknown. Some words were offered without decoding strategies and at other times T4 used visual clues to assist. For instance, when Bailey could not decode

flashlight T4 balled up her fist as if she were holding the tool and then moved her hand back and forth as if looking for something in the darkness. She did not break up the compound word but her demonstration resulted in Bailey's understanding and correct pronunciation. Later when the word *crawled* was encountered T4 used her fingers to make a crawling spider movement. Bailey understood immediately but when *crawled* was repeated throughout the book she struggled to decode it but did not ask for reiteration. Instead, she closed her eyes to recall the mental representation T4 had provided earlier. This strategy was used successfully and she was able to produce the word during the remainder of this and subsequent sessions.

Bailey did not consistently follow the normal progression of listening to a narrated story, reading/recording the story herself, editing, and saving a reading product. As her familiarity and confidence grew, she frequently read/recorded stories without peer- or self-editing or saving a final reading product. It became evident that her desire to read had increased considerably from the first days of the study. This was further confirmed by data from her RSPS posttest (Appendix O; Appendix P). It was notable that she was the only subject whose self-perception scores increased under the Physiological States item referencing "Enjoyment: Reading Aloud." She also showed gains in Progress on two items described as "Effort."

Bailey's tutor was absent two more times during the fourth week but she continued unimpeded, worked independently, and used TARI appropriately. I asked her if she wanted me to read aloud so that she could be a tutor and correct *my* mistakes but she replied, "Nahh, I'm not good at that. I'm easily confused." Without missing a beat she picked up *Just Grandpa and Me* and said that she wanted to read it because it was "easy

and good." *Just Grandpa and Me* was not an easy book to read at a 410 Lexile but had the fewest pages of all other books.

It was difficult to identify exactly at what point Bailey's self-perception changed regarding her reading ability. Her reading volume was louder after the first week and her confidence in selecting books and navigating TARI was evident beginning with T4's absence. Her ability to reflect and evaluate reading performances and share her critiques with others was insightful in that it implied a self-confidence with and understanding of her own reading abilities. She was neither embarrassed by, nor hesitated to verbalize her deficiencies and was attentive when assistance was offered. If a moment in time was selected that indicated Bailey's self-perception had changed it was on the day when she continued to read after the session ended. This was the same day that she elected to take home a difficult book to share with her family.

Four-Week Summary: Bailey.

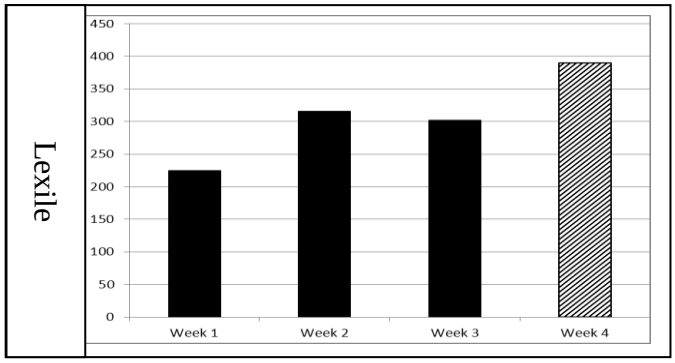
It was apparent that Bailey enjoyed working with T4 although she was routinely absent and could not provide consistent assistance or guidance. In lieu of T4's interaction Bailey used digital tools independently, correctly, and without reluctance. She occasionally struggled with vocabulary but her self-esteem did not appear to be impaired considering she was either smiling or willing to share her challenges with me or others in the classroom. She was willingly communicative and displayed on-task behaviors at all times. The instructional strategies which the tutors provided were varied. Context clues, physical demonstrations of word meanings, phonological awareness, segmenting syllables, listening to narrations repeatedly, peer-editing, and rereading/rerecording

stories were all part of their interactions. In their absence, Bailey transferred new strategies and information to learning situations and applied them appropriately.

Bailey exhibited independence, actualization, and self-confidence when she continued to read more difficult books, read more often, checked books out to share with her family, stayed beyond the end of a session, and used TARI, unaided, during the last three weeks of the study. She carefully listened to reading performances and regularly self-edited her work. An example of this was when she leveraged digital tools to address a specific need. She had been mispronouncing the author's name, *Mercer Mayer,* and self-regulated her learning by replaying the narration in order to remember and reproduce the name correctly at a later time. In lieu of her frequently absent tutor's assistance or guidance, she used TARI as a more capable other and delighted in her ability to read/record stories.

During the first week Bailey selected books which were somewhat challenging but increased the level of difficulty the second week (Figure 9; Appendix H).

Figure 9. Lexile Mean by Week: Bailey



As was seen with a few other readers, she self-regulated her reading and, twice, returned to a book with a 200 Lexile during the third week. This shows a personal assessment and adaptation of her reading abilities during formulation and reformulation of content knowledge. Self-regulated learning is related to the independently-generated thoughts, actions, and feelings that an individual plans and systematically adapts to influence their own motivation and learning (Marchand & Skinner, 2007).The self-selecting, pacing, and sequencing process enabled her to build confidence which was evident when she read more challenging books in the final week of the study. Her Reading Frequency Logs also showed that her pattern of behavior while using iterative TARI processes during weeks two, three, and four did not change a sizeable amount in spite of her tutor's absenteeism. This suggests a level of self-efficacy and motivation regardless of TARI limitations such as an inability to provide corrective feedback.

During an interview which reflected on her research study experience, Bailey stated that she started reading words she had not previously seen. "I got faster and knew more words. It helped me to learn more words." She then pointed to T4 and added, "She would help me and [would] say, 'Can you say that word again?' She [also] does little hand motions like sign language to help me get a clue. I guess I know a little sign language now." Bailey's tutor agreed that, when available, she helped sound out words: "I wouldn't have to just tell her the word." The most important statement Bailey shared was that she was "reading a lot more at home than I used to. I never really used to read at home, but now that I'm reading here it is making reading fun."

Maria

Maria (R5) was the most underperforming reader of the subjects. She was trilingual and spoke Spanish, Tagalog, and English, with Spanish being the primary language spoken in her home. This description is added in an effort to explicate her delayed cognitive processing ability. Frequently she would hesitate before responding and her eye movements would shift upward towards the right and her eyebrows would furrow indicating she was expending her cognitive resources to think. A common instructional practice in many classrooms is the use of *wait-time* which allows second language learners to process in their first language, translate information, then retrieve and produce it in their new language.

Maria entered the room on the first day of the study with another underperforming reader (R1) and they sat side-by-side. As new seating assignments and reader/tutor partnerships were being designated, Maria frowned and expressed her displeasure by making crying noises, balling up her fists, rubbing her eyes (pretending she was crying), tightly clasping her friend's hands, and stating, "Oh, no!" As I discussed the roles of readers and tutors and how to navigate and use TARI, Maria was attentive with good eye contact but did not nod her head affirmatively to infer understanding. At one point Maria shared that she, like a few others, would have difficulty reading the character's name *Emily Elizabeth* from an example I had given.

Maria was the least comfortable of the readers with the laptop and was unfamiliar with the layout of the keyboard and the function and use of digital tools. She attempted to navigate while her tutor (T5) pointed out navigational keys or the Listen and Read/Record folders on the Desktop. She was very hesitant to press a key or access a file

and when she grew tired of waiting, T5 pushed Maria's hand away from the keyboard and navigated herself. Maria acquiesced without argument and appeared comfortable or familiar with having others tell her what to do or how to perform.

When it was time for readers to select the hardcopy books that aligned with the electronic version uploaded to their laptops, Maria and T5 moved out of their chairs and walked to the area where all hardcopy books were located. Her tutor pointed to *Just Grandpa and Me*, picked it up, waved it back and forth, and asked Maria whether it was the book she wanted to read. Maria did not answer but continued to look at other books which were displayed on two desks. This took an exceptionally long time because, besides looking at each book, Maria began rearranging her folder, other books, and her Reading Frequency Log (which she did not submit). This was unnecessary and was ostensibly an avoidance behavior to postpone reading or reading activities.

On the second day T5 asked to use the headphones and read/record rather than having Maria read. I told the dyad that they could not switch and, after some hesitation T5 accessed the *Clifford the Small Red Puppy* narration. The dyad neglected to record Maria's efforts on her Reading Frequency Log and it was unknown how many narrated slides were completed.

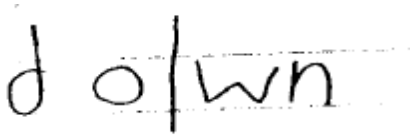
The third day of the study Maria continued to exhibit avoidance behaviors: She reached for things on the floor and made her shoes come off of her feet. Maria would drag her heals across the carpet and after her shoes came off would put them on again. This process was repeated for three minutes during which time her shoes came off and were replaced seven times. Her tutor was also somewhat distracted but eventually accessed the Listen folder and it is important to note that Maria made no attempt to

perform these tasks. Her Reading Frequency Log reflected that Maria listened to only two slides although the presentation contained 20 slides and there was ample time to listen to the full narration. The Read/Record folder was then accessed and, after T5 navigated between the files and assisted in setting the microphone level, Maria began silently mouthing words from each slide. Approximately four minutes thereafter T5 became disengaged, tilted her desk on two legs, slid down in her chair, and then moved out of her seat. As a result T5 missed Maria's initial attempts at reading aloud which may have occurred *because* she thought no one was watching or listening. Maria continued to quietly read out loud but found many words difficult to pronounce. Her tutor returned and stated, "This is way too easy," and appeared frustrated and impatient which distracted Maria from reading for several minutes. My observations coincided with Maria's Reading Frequency Log which indicated that she had only read/recorded three slides.

Tutors brought their own unique academic success, communication skills, and understanding to each dyad and with T5's reading abilities being very high, the interaction between her and Maria was especially interesting. Maria attempted to sound out the word *down* for several minutes but continued to read the word as /duuwahn/. She did not have the requisite background knowledge regarding /ow/ sounds to decode the word. The word was not immediately provided but, instead, T5 pointed to the letters on the monitor and covered *wn* with her hand. Maria tried unsuccessfully to make the /do/ sound since she was only able to see those letters but the decoding strategy employed was not appropriate. Frustrated, Maria's disengagement began to increase therefore T5 reached for paper and a pencil, wrote *down*, covered up the *wn*, and asked, "What does this say?" Maria again said "do." Her tutor then drew a line dividing *o* and *w* and asked

Maria to read the word by dividing it into syllables (Figure13). Maria responded with an unintelligible utterance.

Figure 10. Decoding Strategy—*Down* Segmented

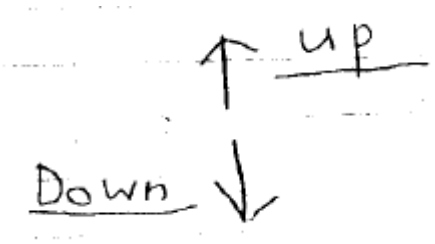


Down was written again but was divided spatially and a square was drawn around the *do* letters (Figure 11).

Figure 11. Decoding Strategy—*Down* Spatially Segmented with Square

Maria stared but did not respond or attempt to read the word. In a final attempt T5 drew two arrows, one of which pointed up and the other arrow pointed down (Figure 12). Pointing to the arrow going up she asked, "What way is that going?" and Maria responded, "up." Indicating the down arrow T5 then asked, "Now what is this arrow doing?" Maria stated, "It's going down" to which T5 replied, "Yes, that's the word—DOWN." Maria restated, "down" and reread the sentence, albeit, haltingly. In all of the interactions it was noted that T5 never smiled and rarely complimented Maria.

Figure 12. Context Clue—Arrow Images

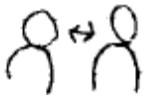


This exchange lasted approximately ten minutes and when it concluded, T5 rose from her chair and began walking around the room. She walked over to assist the seventh dyad but neither offered Maria further guidance nor engaged in TARI activities with her. Maria attempted to keep reading on her own but soon became exasperated, folded her arms, stopped reading, and looked around the room. She did not seek help from anyone nor did she return to TARI activities for the remainder of the session. These findings substantiate research which posits that a lack of effort, persistence, and/or help-seeking behaviors are evident in children who perceive themselves as incompetent (Ismail & Alexander, 2005; Marchand & Skinner, 2007). It also implies a distal tutoring relationship where T5's ability level was possibly too far above Maria's ability (Gunn, 2008).

On the fourth day both Maria and T5 began listening to the narrated version of a new story. They did not access the recording Maria had made the previous day but selected a new book and, after listening to the narration, Maria began to haltingly read/record while T5 documented the number of slides on her Reading Frequency Log. Similar to the preceding day, T5 assisted by writing down and dividing words, covering up letters, and offering verbal clues. In one instance Maria struggled with the word *swords* and attempted to make the sounds phonetically but was unsuccessful since she included the

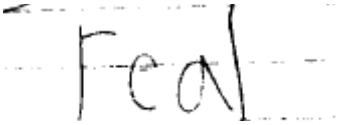
/w/. Her tutor then drew a picture of a stick figure with a head attached and another stick figure with the head somewhat off-set. She offered a verbal clue by stating "You use it to cut someone's neck off—like a knight" (Figure 13). Maria exhibited obvious confusion: Her eyes were wide and she gave her head a gentle shake but made no utterances.

Figure 13. Context Clue—Knight Images



Maria's tutor provided the word and navigated to the next slide. When they came upon *false*, T5 pointed and prompted, "If it's non-real it's . . . ?" Maria frowned and shrugged her shoulders up and down indicating that she did not know. Again she made no verbal responses therefore T5 stated the word and the dyad continued on until Maria became stymied by *real:* a word that was often repeated in the text. *Real* was written down and Maria was given a clue: "If it's not living it's . . . ?" She did not respond hence T5 covered the *al* letters and asked her to sound out *re* (Figure 14). Maria made a groaning/whining sound and looked away from the laptop and paper.

Figure 14. Context Clue—Antonym



Maria's behavior indicated that she had "shut down" and she did not return to reading until much later in the session at which time she asked if *like* was the correct pronunciation of a word in a sentence she was attempting to read. Her tutor only nodded affirmatively without compliment or verbal affirmation. During this interchange T5 was standing closer in proximity than she would have had she remained seated. She then turned away from Maria, looked around the room, gave a sigh, and loudly stated, "There are so many pronouncings!" She then began reading silently from a hardcopy book and did not offer guidance or assistance thereafter except for once when she sounded out *sis—ter; sister.*

Maria asked how many slides she had read but T5 was unsure since she had not been marking the Reading Fluency Log. Frequently dyads would forget to mark the log because of their high level of engagement with TARI activities but this was not the case. Here was an instance where the log was forgotten because of T5's lack of interaction or attention.

The fifth day began with the dyad listening to Maria's recording from the previous day. Neither comments nor peer-editing were used although numerous errors in pronunciation, prosody, and fluency were heard. Maria listened to her recording a second time and, again, T5 did not offer suggestions or guidance. Nevertheless, after completing the listening activity, Maria chose to read/record a new story. With the assistance of T4, (not T5), she set the microphone level by saying the ABCs out loud, and began reading/recording. The attention T4 provided Maria either motivated or challenged T5 to be more participatory and, for the first time, T5 offered one word of encouragement in lieu of reading strategies. She said, "Good—now go on to the next page." When Maria

struggled with site words or pronunciation, T5 began by sounding out the words but then stated, "I think this book is too hard for you." To this Maria shrugged her shoulders and looked away. Her tutor then asked, "What book do you want—*Clifford*?" Maria responded that she wanted to read *Fox on the Job.* Her tutor accessed the file and set the microphone level. Maria rarely used the digital tools although she had demonstrated proficiency but she did attentively read each slide while T5 remained seated and watched the monitor, offering no guidance. Her Reading Fluency Log documented that Maria listened to 21 slides and recorded 18.

Maria began the second week by listening to her reading performance recorded the previous Friday. She giggled and smiled broadly when she heard her voice and it was apparent that she was enjoying the activity. Her tutor was moderately engaged in listening but neither marked her Reading Frequency Log nor offered suggestions: The dyad did not seize the opportunity to peer-edit during the playback function of TARI. After Maria's recording had ended she pointed to *Clifford the Small Red Puppy* and asked, "Is this one good?" Her tutor responded, "[It] is so simple." In spite of the negative response, Maria began reading the story aloud and it was the first time she showed any initiative which may have been prompted by the pleasure of listening to herself via TARI. She did not access the story narration to listen to the modeled reading and struggled with many words. Again, T5 did not provide guidance or assistance.

I interviewed Maria since I was concerned about the dynamics of the dyad and was considering a reassignment of T5 to a reader of higher ability. I asked, "How is it working with you and [your tutor], Maria?" She shrugged her shoulders, turned her head away, and did not answer. I then told her that it was OK to quit and followed by asking if

that was what she wanted to do to which she quietly replied, "No." Her head and chin were tilted down and she did not make eye contact. I added, "It's OK. No one will be mad or anything." She looked up, increased the volume of her voice, and strongly stated that she wanted to stay because she liked "doing that stuff to hear my sounds." This was affirmation that TARI had motivated her in spite of the emotionally negative relationship she had with her tutor. For the remainder of the day I moved T5 away from Maria and had her assist another reader. The following day I announced the reassignment of three tutors to new dyads. Maria's tutor was partnered with Jamal (R3), Jamal's tutor was assigned to assist Juan (R6), and Juan's tutor moved to Maria (R5) (Figure 7).

Maria appeared happy to work with someone new and kept smiling and visiting with her newly-designated tutor during the session. Their conversations centered on non-TARI topics but their friendship was apparent in that they kept eye contact and periodically touched each other on the arm or hands.

The following day the new tutor (T5) was tardy but, in her absence, Maria did not access TARI or demonstrate independence. She kept "losing" her pencil in an apparent effort to avoid, stall, or postpone reading. This continued for eight minutes until T5 arrived, opened a presentation, and directed Maria to begin reading. Her new tutor was very overt and explicit in her assistance. When Maria stumbled on the word *crash,* T5 clapped her hands together and made a crashing sound. She then picked up a pencil, slapped her hands together and told Maria, "I *crashed* the pencil." Maria did not understand the imagery hence T5 picked up the pencil and slammed it down onto the desk. Maria responded, "Ohhh," indicating tacit comprehension.

The new tutor was much more patient, interactive, and responsive with Maria and the dyad continued to work productively through the second, third and fourth weeks. She assisted by offering words, phonological clues, and demonstrations or gestures to descriptively act-out segments of sentences, words, or concepts. This strategy was particularly helpful for Maria since she consistently needed approximately six-to-nine seconds of *wait-time* to process information due to her cultural and linguistic diversity.

Maria was compliant in selecting books and depended heavily on T5 throughout most of the second week. She appeared to lack confidence in every reading situation until the last day of the second week when she overheard a request to borrow a library book and asked if she, too, could check out a book to read over the weekend. I said, "Of course!" She selected the book she had worked on during the week, *Amelia Bedelia and the Surprise Shower,* and on her return the following week reported that she had tried to read the story but that it was too hard. She then walked to the location of the hardcopy books and selected *Junie B. Jones is Not a Crook* which was much longer and more difficult (Appendix C). I helped Maria access the narration since T5 was absent and, as she listened, her eyes tracked the words on the monitor and she advanced each slide adeptly without aide. She was engaged and attentive to these tasks and when other participants walked near her desk she was undisturbed.

Maria smiled and frequently giggled during parts of the narration. Once finished she returned to *Amelia Bedelia and the Surprise Shower* but, before completing the story, she stopped the presentation and asked to read/record *Junie B. Jones is Not a Crook* herself. At a 400 Lexile, the book was cognitively demanding and understanding the story nuances and main character's antics was challenging. Nevertheless, Maria persevered. At

times she asked me to navigate between the narrative and read/record presentations since she wanted to hear how words and sentences were pronounced in order to replicate them when she read/recorded herself. She had not demonstrated reflective reading practices previously and her independence and self-confidence appeared to be directly related to her interest in the book and engagement with TARI. She was intrinsically motivated and her willingness to take risks and read was partially attributed to the research design which allowed her to select books she found interesting. This was unlike traditional reading programs where the curriculum, scope, and sequence are predetermined and invariable. Furthermore, TARI was non-judgmental and enabled Maria to sequence, pace, and self-direct reading activities. In the Four-Component Instructional Design Model it was argued that these affordances enable learners more time to process information and facilitate elaboration and transfer (van Merriënboer & Kester, 2005).

Maria waited to speak with me after the session had ended and, waving the hardcopy of *Junie B. Jones is Not a Crook*, enthusiastically stated, "This is the best book EVER!" Previously her voice and mannerism could have been described as shy and she was very self-conscious. Maria asked if she could take the book home and I answered, "Yes." She then noticed another book on the shelf, *The Babysitter's Club,* which had well over 200 pages and queried if she could borrow it, as well. I said, "Absolutely." This was enlightening in that her behaviors demonstrated a change in self-perception, empowerment, and self-confidence in her reading ability. I attributed the *Junie B. Jones is Not a Crook* book as the primary catalyst for Maria's new attitude and disposition. This occurred on the last day of the second week.

On the first day of the third week I was anxious to observe Maria's behavior considering the positive conversation we shared after the previous session. She arrived at the classroom early, entered energetically, showed me the hardcopy *Junie B. Jones is Not a Crook* and said, "I tried to read it. It was over 100 pages!" She then paged through the book showing me its length but made no reference to the 200+ page book she had also borrowed. Following this exchange Maria walked directly to her laptop, set the audio level, and began reading/recording.

The text of *Junie B. Jones is Not a Crook* continued to prove too challenging therefore she stopped, selected what she thought to be an easier book, *Mr. Putter and Tabby Stir the Soup,* and listened to the narration then read/recorded. She exhibited much greater confidence and independently navigated, advanced slides, and read audibly. She smiled frequently and completed all of the TARI activities without assistance since T5 was being interviewed at the time. When T5 returned, the dyad listened to Maria's reading performance together and immediately began peer-editing. Besides correcting pronunciations, T5 was very encouraging as evidenced by one of her positive statements, "See how you got that word right?" At this, Maria nodded and smiled.

The dyad continued peer-editing Maria's reading performance pausing at each slide. Grammar rules were pointed out and explicated: "You need to stop after a period and breathe a little. A period means stop and an exclamation means you have to be excited when you read the sentence." Maria did not make a verbal response but smiled and nodded attentively. Maria was then prompted to reread the sentence with more prosody and she complied. She moved her chair closer to the monitor and read enthusiastically, "We'll be right over!"

The last day of the third week Maria and T5 switched roles. When I asked why they had done so, Maria replied that she had read all of the stories and wanted a chance to be the tutor. She did not have the requisite reading skills that would have enabled her to guide T5 but, nevertheless, tracked the text as T5 read aloud, nodded affirmatively, and occasionally said, "Good."

Maria's self-efficacy continued to grow through the remainder of the study and her daily practice of taking *Junie B. Jones is Not a Crook* home was notable. Another example of her empowered behavior occurred during the last week when T5 was again tardy and did not arrive until 23 minutes after the session had started. This did not impede Maria's use of TARI. She looked through the hardcopy books, selected a relatively short book, and listened to it in entirety while marking her own Reading Frequency Log. She was very independent and performed TARI activities without hesitation indicating a much higher degree of self-confidence. She also listened to two chapters of *Junie B. Jones is Not a Crook* then navigated to the Read/Record folder, opened the appropriate presentation, again set the audio level on the microphone, and began reading/recording the story. Her fluency and inflection were much improved due to her repeated use of the narration and practice.

Four-Week Summary: Maria.

It was obvious during the first week that Maria's reading skills were substantially below other underperforming readers in the study. She was initially reluctant to participant since she wanted to remain with her friend, Kanishah (R1), rather than being partnered with a tutor. Maria allowed her first tutor to navigate TARI each day and avoided reading/recording by rearranging papers, playing with her shoes, and looking

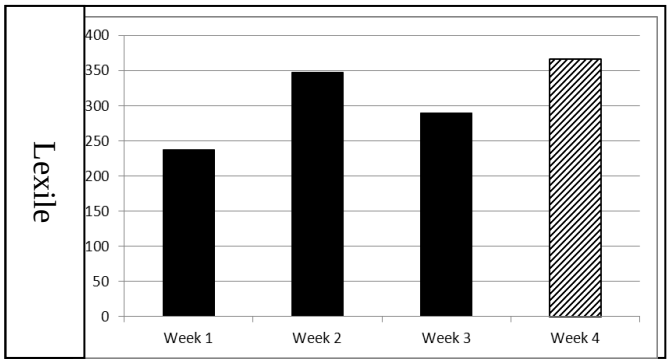
around the room. Neither she nor T5 followed the recommended progression for TARI by listening to narrations and reading/recording stories. The strategies T5 employed included phonemic awareness strategies, verbal clues, drawings, and physical demonstrations. When her first tutor was interviewed she stated that Maria had difficulty with most words. Elaborating she said, "I helped her. I let her read the word first then I said, 'Stop for a minute,' and I would get a sheet of paper and I would write down the word and have her sound it out."

During the first week it was undecided whether or not the originally assigned tutor should have been changed to a different reader. I wanted to observe more of their interactions before determining that their reading abilities were so disparate that a change was necessary. Vygotsky advocated that a more capable other should be one whose expertise was not significantly above the person who was being assisted and guided (Wink & Putney, 2002) which was substantiated by Gunn's (2008) research on Proximal Mentoring. I collected data for six days before deciding that it was in Maria's best interest to reassign her initial tutor to a reader of higher ability.

Maria's experience was very rewarding because at the beginning of the study she exhibited low self-esteem which changed to exuberance about reading after four weeks of TARI activities and tutoring assistance. Her RSPS indicated positive growth of her self-perception as a reader, particularly in the Progress, Social Feedback, and Physiological States dimensions. It was remarkable when she moved from a score interpretation of low to average/high in the Progress dimension and details of her growth are addressed further in the Discussion of Findings (Appendices L, M, N, O, and P).

Her Reading Frequency Logs indicated a sizeable increase from week one to week two in the level of difficulty of the books she read (Figure 15). This was an important finding considering she had the lowest reading level of the subjects and demonstrated reluctance and insecurity with her reading ability. It appears that she self-regulated her learning tasks and selected easier stories during week three and frequently read and reread the same stories (Appendix I). She became highly motivated to read a more difficult book (400 Lexile) when her interest was piqued by the main character in *Junie B. Jones is Not a Crook*. As her independence and confidence grew she became more comfortable reading/recording stories, self- and peer-editing reading performances, navigating TARI, and checking out books overnight. She demonstrated similar patterns of effort and self-confidence related to Lexile means as did Bailey, a reader of higher ability, and her disposition changed from apprehensive and timid to alert and happy.

Figure 15. Lexile Mean by Week: Maria



Juan

Juan (R6) was the most active and wiggly of the readers and, from the beginning he was unable to sit quietly for any length of time. He often nudged his tutor (T6) and had to be redirected and shown how to practice and use the digital tools. Although his RSPS pretest indicated a relative high self-perception of his reading abilities, his actual skills were very low and he was reticent to engage in reading activities.

It was apparent that T6 had used a laptop before and he demonstrated how to smoothly navigate through the narrative presentations. Once this was done Juan exhibited much more interest in TARI but, due to their attention to the narration they neither documented Juan's Reading Frequency Log nor returned to the beginning of the presentation to count slides.

On the second day Juan swung and kicked his feet under his chair but to a lesser degree than he had done the previous day. Unlike his initial response to TARI he did not follow the text or listen to the narration. He shouted out to other readers and tutors in an attempt to avoid reading tasks. His tutor engaged him somewhat successfully by pointing to and advancing slides. Juan mouthed words and imitated the narrator but did not attempt to navigate on his own.

His Reading Frequency Log indicated that he listened to 50 slides but did not read/record any stories. Juan's tutor then asked for an additional reading log and documented that four more slides had been heard. While T6 attended to this task Juan sat with his hands behind his head, fingers intertwined, leaning back on his chair. A few minutes later Juan put books in his folder and rearranged its contents, again, stalling or avoiding reading activities. Occasionally he used the down arrow on the keyboard to

advance slides but he neither listened to nor read/recorded. Notwithstanding this practice, it was surprising when he told me that he liked using computers to which T6 agreed and added that computers were "Cool."

On the third day I started a discussion about how tutors could assist and guide readers. Juan's tutor shared one strategy with the whole group and said that "If you know the word 'conjunction—c-o-n-j-u-n-c-t-i-o-n' you can put those letters together to sound out the word." I added that if tutors always read the text readers would not be able to learn and improve. I analogized that being a tutor was similar to teaching someone to ride a bicycle: A teacher can demonstrate and discuss *how* a bicycle is balanced, pedaled, and steered but, if they want someone to learn they cannot ride the bike without giving the learner a chance to practice. During this discussion T6 nodded her head but Juan played with his pencil and appeared distracted.

Later during the session Juan listened to *Clifford the Small Red Puppy* followed by *Danny and the Dinosaur* which he read/recorded. His tutor assisted in this process, navigated to the appropriate folders, and set the microphone audio level. Juan's reading was fairly fluent but was error-prone. On one occasion when he struggled, a tutor from a different dyad walked away from her reader and offered the correct pronunciation. Juan did not reproduce the corrected word but simply said, "Oh." His tutor watched while this occurred but did not engage in the discussion.

It was not until the fourth session that Juan listened to and peer-edited the reading performance he had repeatedly read/recorded: *Danny and the Dinosaur*. His tutor was very positive and encouraging but had to refocus Juan when he was off-task. She corrected his mispronunciations although he did not repeat the offered words: He simply

nodded and quickly asked her to advance to the next slide indicating that he enjoyed hearing himself read. I watched the dyad interact to the end of the story at which point T6 turned to me and said, "I thought he was messing up on a lot of words." She then looked at Juan and added, "This was good for the first time. You were really good but I think you can do better." Juan responded, "That was AWESOME!"

The story which Juan had read, recorded, and listened to contained 44 slides. When he was finished he was very motivated and asked me, "Can we do it again?" I responded, "Do you want to rerecord the whole story or only a page or two?" He was intently looking at TARI and was somewhat oblivious to my question. Misunderstanding, he again uttered to no one in particular, "That was AWESOME!"

The dyad listened to his reading performance a second time and then Juan reread/rerecorded six slides. He was very engaged but had difficulty keeping his body still. He twisted around in his chair with his arm behind his back, moving back and forth, yet was not distracted from the task at hand. This was evidenced by his eyes remaining on the monitor, reading loudly into the microphone, and advancing each slide independently while T6 mouthed the words silently. Upon completion Juan told T6 that he needed help to read/record a new story and she assisted by opening the correct folder and presentation. The interactions and engagements which occurred on this day were important because it was the first time Juan demonstrated any degree of self-motivation or self-reliance.

On the fifth day Juan continued to read/record while T6 documented the number of slides on his Reading Frequency Log. If errors were made T6 pointed to the words and corrected him but neither offered decoding strategies nor context clues which was

interesting since she had done so before and clearly had background knowledge and phonological awareness as demonstrated by her example of "conjunction." Juan wiped his eyes and shook his head repeatedly when challenged by difficult vocabulary but had no other affect. He did not follow T6's prompts, repeat corrected words, or continue to read/record until T6 advanced the slides for him. He swung his legs back and forth under his chair and I was unsure if Juan's behavior was due to distress, boredom, defiance, or uncontrollable hyperactivity. Undeterred, T6 provided words when Juan could not decode them alone but was somewhat uncommunicative and periodically looked around the room herself. This impatience may have been due to the fact that it was late in the day on Friday afternoon and she may have been tired or distracted.

Later in the session Juan and T6 listened carefully to his reading performance and both attentively peer-edited, appeared engaged, smiled, and occasionally looked at each other and laughed together as they progressed through the slides. Juan then asked for more stories to read/record and chose to bypass listening to the narration as an initial step in the process. It was another indication that hearing his reading performances was motivating.

While Juan was still often wiggly and distracted, he began the second week with more on-task behavior and immediately accessed the read/record option. His tutor advanced slides temporarily but when she left to assist another reader Juan continued without her guidance. He completed one story quickly and did not hesitate to read/record another story without guidance.

Intermittently Juan recorded a "beat song" rather than the text on a slide. His tutor became angry when this occurred and recommended his suspension from school! I

changed the dyad the following day and Juan was assigned a tutor who had previously worked with Jamal (R3). Juan was not pleased with this change nor was his new tutor and, as their relationship evolved the dyad was uncommunicative for much of the time. No verbal interactions were noted for the last three days of the second week. His new tutor only watched while Juan used TARI but neither tracked words on the monitor nor offered feedback.

Juan was one of the readers who typically arrived early to each session and this pattern continued throughout the remaining weeks. He rapidly and adeptly accessed TARI activities and routinely read/recorded stories with minimal guidance from T6. The only observed interaction between this dyad was when T6 offered Juan a book and stated, "This one should be relaxing." The synergy which had grown between other dyads never materialized with this partnership. On a few occasions T6 made encouraging comments but Juan did not engage with him and would inhibit any interactions by saying, "I don't know how to read." This contradicted Juan's demonstrated behaviors considering he was independent and able to finish reading activities therefore his reluctance to converse with T6 was more likely due to a personality conflict than incongruence in ability level. Similar to Bailey (R4), Juan relied on the digital tools which served as a *more capable other* in lieu of T6.

On the first day of the third week a notable change occurred: Juan began reading with increased expression. He whistled or sang the "Star Spangled Banner" and "Happy Birthday" at appropriate times as he read about these songs. This was particularly interesting since neither the narration nor text included singing prompts; the prosodic lyrics were initiated through Juan's own creativity which substantiates the findings of

John-Steiner and Meehan (2000). While other behaviors such as arriving early to class and using TARI independently were foreshadowing, demonstrable affectations of his self-perception as a reader did not vary considerably until the second day of the third week. During the session Juan independently walked to the hardcopy books to preview and select something new. He had previously been very cognizant of the number of pages in each story and avoided books which he deemed lengthy. Juan picked up a book, paged through the story, and loudly exclaimed, "40 pages!" I reminded him that he could choose however many pages to listen to or read/record and this appeased him. He took the book back to his desk where he listened to it in entirety. Surprisingly, he then read/recorded the same story without external prompts or encouragement. Whether consciously or subconsciously Juan's self-confidence changed and he perceived that he was able to read a book with what he previously considered an inordinate amount of pages. Stemming from the experience Juan began selecting *Goosebumps* stories to take home nightly. This practice continued for the remainder of the study although *Goosebumps,* generally written at a 450 Lexile, are appropriate for ages eight-to-12, and contain well-over 100 pages (MetaMetrics, 2011).

Juan's self-efficacy was also evident during an exchange with T6 on the same day. Juan was rereading the hardcopy of *Henry and Mudge and the Wild Wind* but he could not remember how to pronounce *spangled.* His tutor refused to assist him since, as T6 related, Juan had not followed the TARI sequence of listening to the narration, reading/recording, peer-editing, and saving reading products. His tutor argued, "I think listening is important and [Juan] has to listen first. [Juan] is getting into trouble on the words and I think listening is better."

Juan ignored these comments and continued to read silently while this exchange with me occurred. His tutor then turned and, noticing Juan was reading from the hardcopy book stated, “I’m not doing it for you. I think you should listen to it first.” Juan confidently replied, “I listened to it yesterday.” Juan would not relent from his position and finished the session independently engaged in the TARI activities that *he,* not T6, preferred. Rising from his chair and disregarding T6’s comments, Juan again walked to the bookshelf and selected a *Goosebumps, Captain Underpants,* or *Star Wars* story to check out overnight.

On a subsequent day during the third week Juan listened to *Danny and the Dinosaur* three times and then read/recorded the same. He played back his reading performances, leaned his body closer to the monitor, and smiled frequently. His enjoyment of listening to his own voice was apparent and he repeatedly replayed his recordings. Considering Juan was marking his own Reading Frequency Log in lieu of his tutor’s assistance, the artifact did not accurately reflect the entire number of times he listened to himself or read/recorded. His tutor’s disengagement was evident by his turned chair and lack of communication.

The self-perception score of his reading ability on the RSPS pretest was initially high but incongruous to his observable skills. However, as the days passed his actual reading fluency began to increase. He still wiggled or slumped in his chair, played with his pant leg, or looked around the room but these behaviors became fleeting and he consistently returned to TARI activities.

Four-Week Summary: Juan.

Juan avoided reading by shouting out to other participants, nudging his tutor, rearranging items in his folder, and kicking his feet. His mind easily wandered and it was difficult to hold his attention without redirection. He was capable of advancing slides but, initially, preferred T6 to perform that and other functions. On the fourth day his manner changed in that he became very engaged in hearing the TARI recording of his own voice. He thought that the playback function provided by the digital tools was absolutely "Awesome!"

During her interview Juan's first tutor stated that she helped by offering "hard words" and "finding words" and elaborated that "[Juan] would sound out the words with me. I helped him with the words. I helped him to sound them out. I would point with my finger so he wouldn't skip the words."

Juan worked with a reassigned, second tutor in the weeks that followed and their partnership was not collaborative. The extent of the offered guidance was minimal and the periodic assistance was typically limited to advancing slides or simple navigation. The few times mispronunciations were emphasized Juan became disengaged and ignored the input. In lieu of their interaction Juan relied heavily on TARI activities and consistently read/recorded stories repeatedly. When Juan demonstrated these types of behaviors his second tutor began turning his chair away from Juan and acted disinterested and uncommunicative.

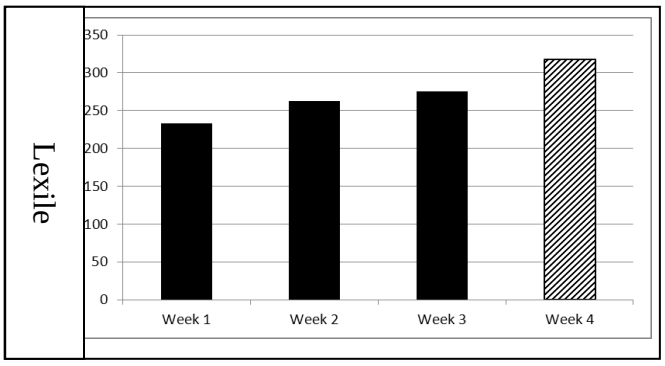
By the third week Juan began showing more initiative and independence as evidenced by arriving early to each session, increasing the prosody of his reading, demonstrating independence and determination with TARI activities, and daily borrowing books that

were more challenging than the books from the study. His interaction with his second tutor neither increased nor improved but this did not hinder his use of the digital tools or negatively influence his self-perception as a reader.

Juan had the second lowest Lexile mean gain over the course of the study as indicated by his Reading Frequency Log data and it is important to note that two of the subjects who demonstrated continual avoidance behaviors also had the lowest gains (Figure 4; Figure 16). Although he consistently took higher level Lexile *Goosebumps* stories home he failed to return the logs to document how many times he either read to his family or they read to him (Appendix J). From this behavior it may be inferred that no reading was done outside of the study sessions.

During the first week his overall mean was higher than any other reader which aligned with his pre-study self-perceptions and pretest scores on the Reader Self-Perception Scale which indicated that he considered his reading ability as average/high or high in three of four dimensions (Figure 16; Appendix P).

Figure 16. Lexile Mean by Week: Juan



It appears that he initially attempted to read books at a level above his ability and did not advance to more challenging books at a rapid rate as was seen with other readers. He typically read and reread familiar books and only tried two books which were over a 400 Lexile with the exception of the *Goosebumps* stories he took home.

Toquanda

Toquanda (R8) was the only reader whose self-perception scores declined in three of four dimensions on the RSPS. Detailed data are provided subsequently but it is important to explore the interactions, behaviors, and learning environment that may have influenced this change. The day preceding the beginning of the study Toquanda's tutor (T7) broke her elbow and was not present on the first day. I assisted Toquanda in T7's absence and found her to be energetic, attentive to directions, and anxious to engage in TARI activities. She listened to narrations and practiced navigation and by the end of the session was able to use the digital tools appropriately.

Toquanda's tutor arrived on the second day and the dyad spent much of the time talking about the T7's broken elbow. Noticing that they were not participating, Maria's tutor walked to their laptop and, without invitation, demonstrated how TARI was used. This prompted Toquanda to begin listening to 40 slides of a story narration which was documented on her Reading Frequency Log.

While her attendance and use of TARI was consistently good T7's engagement and activity varied from day-to-day. Her tutor often cried or was uncommunicative and it became clear that the physical discomfort, fatigue, or emotional fluctuations stemming from the injury influenced T7's behavior and interaction. On the third day the dyad was somewhat engaged as they critiqued Toquanda's reading/recording efforts but their peer-

editing was only through body language rather than verbal guidance. Her tutor would either shake her head "no" (indicating there was a problem) or nod "yes" (inferring the reading was correct or acceptable). On rare instances when Toquanda made a mistake T7 pointed to the beginning of the sentence and said, "Wait. Can you start off right here?" Correct word pronunciations or decoding strategies were seldom offered. Toquanda's Reading Frequency Log documented that she listened to narrations and read/recorded her own voice for 19 and 20 slides, respectively.

Although she had created reading performances which were saved in digital format it was not until the fourth day that Toquanda listened to her own recorded voice. She was very excited to hear herself and giggled as she played back her recordings. Neither self- nor peer-editing occurred during this process and, like Juan, when she was finished she read/recorded another story but did so without listening to the modeled narration beforehand. Her decisions and actions were independent of T7's interactions or interventions since T7 had her back turned and appeared indifferent.

Toquanda read loudly, made one mistake, and wanted to begin again but could not remember how to navigate back to the Record Narration application. Therefore, she continued to read unaided. She put her chin on the laptop and said to me, "I was trying to read. I think I did good. I liked it." When Toquanda made these comments T7 was initially looking at a hardcopy book but shortly thereafter began following the text as Toquanda continued to read aloud. They listened to her reading performance and T7 encouragingly stated, "You are really doing good. You are trying to sound out the words and that's a good thing." Toquanda responded, "I stuttered doing it" but then made an important observation about the nature of the study. She said, "It's much funner (sic) here

than in our class because in our class we only do a paragraph but here you do a book." Elaborating, T7 added that in their regular class they "don't get to help each other [and] here she is getting better." Looking directly at Toquanda, T7 advised that to improve she should "Read more books—that will help." This brief interaction was the extent of their conversations for the day.

On the fifth day the dyad began immediately with *Fox on the Job* but their interaction was not sustained. Soon T7 leaned away from Toquanda and did not track her reading progress. Toquanda was undeterred, self-reliant, and did not wait for T7 to interact or peer-edit. She continually read with expression and it was easy to hear her read "Oh no!" and other words although I was 15-feet away.

Her tutor may have become disengaged possibly due to the lateness of the day and/or her physical discomfort. At one point T7 turned in the chair, winced, and began to cry. I asked if she wanted to go to the nurse and she said that she did not: She preferred to stay with Toquanda. While this conversation occurred Toquanda focused on her reading/recording tasks undisturbed. This was evident when reviewing her Reading Frequency Log which documented that she had been able to listen to 41 slides and read/recorded 100. Later in the session T7 again started listening to Toquanda read but her interaction was superficial. Without looking at the monitor she advanced the remainder of the slides whenever Toquanda prompted her to do so.

The second week began with Toquanda accessing TARI activities as soon as she was seated and, using two different books she read/recorded 51 slides. She then listened to her performance of *Fox on the Job* and *Clifford the Small Red Puppy* and, while she was completing these activities T7 was minimally attentive. In one instance T7 walked away

to speak to Juan's tutor and to her twin sister, Kanishah's tutor. There was no reasonable explanation why T7 would move away considering assistance was not needed elsewhere.

On the second day of the second week some dyads were reassigned but this did not apply to Toquanda and T7. Although they did not consistently communicate *on topic*, their friendship was evident and Toquanda often tended to T7's physical needs: She switched seats to provide T7 with the more comfortable, teacher's chair; re-braided her hair; and frequently asked how she was feeling. Toquanda's attention to T7 was momentarily distracting but she consistently returned to reading activities within three minutes after each incident.

I had been reminding participants that they could borrow a book at the end of each session to share with their family but, to date none had taken me up on the offer. On this particular day Toquanda was very anxious to check out a book overnight and was the first participant to ask to read more. She selected four books, two of which were from the study with texts that she had already listened to or read/recorded: *Mr. Putter and Tabby Stir the Soup* and *Danny and the Dinosaur*. The Lexile for these books were low, 270 and 200, respectively; however, the other two books which were not part of the study did not have narrations and were much more challenging. These books were entitled *Best Friends Forever* and *Kristy's Big Day* with 288 pages and 176 pages, respectively. Her selection of more difficult books indicated a level of self-confidence that was not observed with other readers at this point and her interest in borrowing books did not wane after this incident. Rather, she frequently checked out one-to-three books after each session and reported that neither she nor her sister would read the stories but that she liked taking them home nonetheless.

The dyad worked cooperatively and interactively. The following day Toquanda's tutor placed her finger, then the eraser-end of a pencil on the monitor to track text and occasionally offered pronunciation strategies mainly with compound words. Her proximity to Toquanda and the monitor, coupled with her body language (one quick nod of the head), indicated that Toquanda was doing well and should proceed.

Toquanda's self-reliance increased during the last two weeks as she self-edited her reading performances. During this time T7 was frequently withdrawn or uncommunicative. Toquanda would often forget to mark her Reading Frequency Log because of her intense engagement with TARI activities. When this occurred she had to return to the beginning and count slides after the fact. Toquanda often mispronounced words and self-corrected but pressed forward without aide. The few times T7 interacted it was by offering encouragement, affirmation, or by providing correct pronunciation.

An example of their variable interaction was during the third week when Toquanda listened to her reading performance while T7 kept her head on the back of the chair and, initially, did not move forward to hear or peer-edit. I asked, "How did [Toquanda] do?" and there was no reply from T7 but Toquanda reported, "[T7's] not feeling well." To answer my question Toquanda added that she had read "really, really good." Five minutes later I returned to the dyad and observed Toquanda loudly singing a tune which she felt went well with the story. At first I thought the dyad was simply singing a song rather than the text from a book but I was incorrect in this assumption. They repeatedly sang the words to *Just Grandpa and Me* and shared the microphone to record and listen to their singing performances together. Her tutor said, "I like to listen to that one" but Toquanda responded, "Let's do another one—we kept messing up."

Toquanda was reflective in evaluating her singing products, corrected mispronunciations, and also edited T7's singing. This was typically one-sided without substantial input from T7. They continued to read/sing/record loudly or listened to/critiqued their musical performances throughout the remainder of the session. Their interaction was an exception to the behaviors which had been observed on preceding days. Toquanda bubbled at the end of the session and stated, "That was fun and fast today. When we have so much fun the time just runs out." Before leaving, she checked out the *Babysitter's Club Adventure* to take home and, like other off-the-shelf books, the reading level was high and the book contained over 100 pages.

The following day Toquanda entered the classroom energetically. Her tutor was with her but she was crying and stated, "My mom is going to get really, really mad at me because my hair is down and she doesn't like to have my hair down." I assured T7 that her Mom was not going to get mad because a few wisps of hair had fallen out her ponytail but she was inconsolable. Neither Toquanda nor T7's twin could calm her and she continued to cry intermittently throughout the session. I frequently asked if T7 needed to go to the nurse or call home and she repeatedly declined. Surprisingly, T7's behavior did not impede Toquanda's initiative and engagement with TARI and without assistance she routinely selected a narrated presentation, listened to the narration, and advanced slides. She stopped momentarily to readjust T7's hair but when the styling attempts proved unsuccessful Toquanda returned to the reading activities and paid no heed to T7. It was notable that on this particular day Toquanda took time to listen to narrations before reading/recording: a practice she routinely avoided.

She exhibited independence and resolve when using TARI for the remainder of the week and consistently arrived to the session happy and ready to work, preferring to read/record stories rather than listen to narrations. She often forgot to mark her Reading Frequency Log due to her engagement and had to return to the presentations to count the number of slides she had completed. Other dyads were also observed making similar errors in their logs when they were intently involved with the recording/playback tasks they were performing.

The dyad began singing the text of stories again on the last day of the third week. They sang loudly and, after finishing, listened to their performances. They read and sang to such an extent that they needed two Reading Frequency Logs in order to mark the 147 slides that they completed. Toquanda selected two, relatively easy books to take home at the end of the session and later documented on additional Reading Frequency Logs that she read over the weekend to two of her siblings. The logs indicated that she read 100 pages to Daniel and 40 pages to Gabèl.

During the final week of the study Toquanda's practice of reading/recording and playing back her performances continued. She selected a more difficult book from the study, *Junie B. Jones is Not a Crook,* but again did not listen to the narration first. Her tutor followed along in the hardcopy book that corresponded to the slides but did not sing with Toquanda. The only interactions were affirmative statements such as "Good job!" or "Good one!" which were made by T7 at the end of each slide regardless of Toquanda's reading proficiency and fluency. When Toquanda self-edited a mispronunciation she typically caught the error and made the corrections before T7 intervened.

Four-Week Summary: Toquanda.

During Toquanda's first week it was clear that she was motivated by hearing her own voice recordings. She easily navigated digital tools and read loudly with expression. She was aware of her own errors in pronunciation but that knowledge did not impede her desire to engage in reading activities. Self-regulating her performances through the read/record and playback functions motivated her to use TARI consistently in spite of T7's lack of interaction. Her tutor's elbow was broken the day preceding the study and she (T7) was often tired, emotional, or uncomfortable. As a consequence T7's minimal interactions took the form of body language, compliments, asking Toquanda to reread words or sentences, or advising Toquanda to read more books. This last recommendation may have influenced Toquanda's practice of routinely checking out books overnight. Phonemic cues were rarely offered by T7 and tracking text only occurred on one occasion. Inconsistent with their typical interactions, the dyad used TARI uniquely: Toquanda made up tunes and sang/recorded stories with T7. They listened to their performances but did not consistently collaborate during the editing process. It was clear by her manipulation of reading activities that Toquanda had made TARI her own!

In the weeks that followed Toquanda developed more independence and self-reliance and it was somewhat stunning when her RSPS posttest indicated a decline in her self-perception as a reader. She had been the first to check out more difficult and lengthy books and share them with her family, a practice which continued to the end of the study. She did not always read, or have someone else read to her, but reported that she simply enjoyed taking the books home.

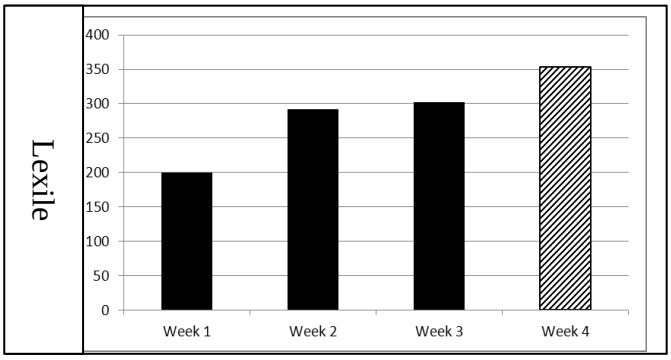
Her tutor's behavior was mercurial, emotionally distant, and at times she behaved erratically by crying or sitting sullenly. Toquanda's sensitivity to the situation was evident and she often tried to mediate T7's emotions by asking how she was feeling, grooming her hair, and attempting to make her more physically comfortable. When T7 could not be consoled, Toquanda used TARI independently. She preferred using the read/record and playback functions and self-regulated and self-edited her reading performances. She systematically skipped listening to the narrations before reading/recording and therefore struggled with decoding some text. Her engagement with TARI caused her to forget to mark her Reading Frequency Log and she routinely had to return to the presentations to count slides.

As an outlier, several conditions may have contributed to Toquanda's diminishing self-perception as a reader and her Reading Frequency Log data were insightful and clearly documented her typical interactions with the digital tools. Her initial Lexile mean was 200 and, comparing her average to other readers, was slightly over mid-range (Figure 17).

Overall Toquanda did not use the iterative processes available through TARI as a scaffold to learning before forging ahead with reading/recording (Appendix K). Of the 18 instances where she read during the study session she only listened to modeled reading six times. Readers had the latitude to sequence TARI activities to fit their own needs and preferences and it was anticipated that they would use the narrations to build accuracy, prosody, fluency, and vocabulary prior to their own reading performances during formulation and reformulation of content knowledge. Additionally, while Toquanda only read at home on two different occasions (one date on which she read to two different

family members), she had no access to the narrations. Her neglect of using TARI as an electronic more capable other may have been a factor in her resulting lower self-perception as a reader.

Figure 17. Lexile Mean by Week: Toquanda



The final day of the study Toquanda stated that using TARI helped her because she was able to see words "a little bit brighter." She was referring to the size of the font and the black lettering on the white background of each slide and was the only participant who mentioned this affordance. She stated that recording was especially fun and that, as an extension beyond the study, she was planning on writing a story with the assistance of her cousin. She had already determined the topic for the first chapter—boys were chasing her—and wanted to record her story on TARI when it was finished.

Referencing the physical learning environment of the study Toquanda offered an interesting perspective. "It's a quiet place to get out of my class [and] it feels like being in a little class and we can concentrate better." She suggested how the study could have

been improved and added, “Don’t put this down, but not having food [wasn’t good because] I’m a bottomless pit!”

Reader Self-Perception Scale and Influence of Tutors

The Reader Self-Perception Scale (Henk & Melnick, 1995) is a tool to measure the self-perception of children as it relates to their reading ability. The scale has four dimensions of self-efficacy that are explored through 33 items: Progress, Observational Comparison, Social Feedback, and Physiological States. Permission to use the Reader Self-Perception Scale (RSPS) was obtained from the authors in January 2011; however, at their request the scale has not been included herein and items have been described rather than stated verbatim during item analysis (Appendices L, M, N, and O).

The scale measures how strongly children agree or disagree with a statement and utilizes a five-point range from Strongly Agree = 5 to Strongly Disagree = 1 (Table 4). Numeric values are summed to determine the child’s raw score in each dimension and then data are interpreted as high, average, or low. The sums derived from scores are not equated. For instance, a score of 39 in Progress is interpreted as *average* while a score of 39 in Social Feedback is interpreted as *high.*

Table 4

Reader Self-Perception Scale Raw Score Point Value

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Point Value	5	4	3	2	1

The total possible score for each dimension varies. There are nine items which relate to Progress with the highest possible total score of 45 (9 x 5 = 45). Highest scores for the other dimensions are Observational Comparison = 30 (six items), Social Feedback = 45 (nine items), and Physiological States = 40 (eight items). In each dimension the scale is interpreted in relation to the total possible raw score (Table 5).

Table 5

Reader Self-Perception Scale Raw Score Interpretation

Score Interpretation	Progress (45)	Observational Comparison (30)	Social Feedback (45)	Physiological States (40)
High	44+	26+	38+	37+
Average	39	21	33	31
Low	34	16	27	25

Note. The RSPS measures self-perception in four dimensions. Raw scores are categorized as high, average, or low.

Offered herein is a combination (e.g. low/average) of the Score Interpretation in order to provide a clearer picture when readers' raw data indicated small increases or small declines. Pretest scores were compared with posttest results. The pretest was administered on the first day and participants completed the posttest on the second day of the last week. This was done in order to have time to conduct interviews to substantiate *why* participants thought change, if any, occurred.

The Reader Self-Perception Scale (RSPS) was normed on students in fourth, fifth, and sixth grades and a limitation of my study was that the participants did not replicate

the norming sample. My readers and tutors were second semester, third grade students but their age and grade level was not far distant from the RSPS subjects. Nevertheless, to improve the reliability of the measurement I intervened in several ways.

Emoticons were downloaded from public domain Internet images and were enlarged onto posters to ensure participants could view them easily. I referred to the emoticon posters when explaining the scale and verbally described how participants may feel at each level of agreement or disagreement (Figure 18).

Figure 18. Emoticons

				
Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

A person who agreed with the statement, "I really love eating pepperoni pizza" would probably look like the *Strongly Agree* emoticon but, if they only liked pepperoni pizza, their face may look like the *Agree* emoticon. If a person did not agree or disagree, their face might look like the *Neutral* emoticon and so forth down to *Strongly Disagree* for those who really do not like pepperoni pizza at all. I also mediated the age/grade differential by reading aloud each item and did so without further explication. Administration of the scale was given, as designed, in a whole group setting and

additional time or verbatim reiteration was provided to those who did not complete the scale as rapidly as others participants.

Results from individual RSPSs include a discussion of readers' raw scores, item analysis when differences were found, and score interpretation. Tutors were also administered the scale to add more descriptive detail and set the groundwork for further research. In the majority of the cases, improved self-perception of reading ability occurred regardless of the participants' role. The data table divides the four dimensions of the RSPS into raw scores and score interpretation and indicates the maximum point value and positive, negative, and neutral changes. The RSPS pretest (RSPS 1) was administered on the first day of the study and the posttest (RSPS 2) was taken on the second day of the last week. Increases are highlighted in bold print and decreases are italicized (Appendix P).

At the conclusion of the study it was notable that of the 28 possible changes in readers' scores, 21 increased, two remained the same, and only five declined. Three of the scores which declined were from Toquanda, the reader whose tutor had the broken elbow. All readers increased in the Observational Comparison dimension and all but Toquanda increased in Progress. In Physiological States two readers' raw scores declined: Toquanda's by five-points and Jamal's by two-points.

The dimension which most closely addressed the sociocultural influence was Social Feedback in that the perceived opinions of three groups of people swayed readers' self-perceptions. These groups were the readers' peers, teachers, and family members. Two of the three readers who had the least productive relationships or interactions with their tutors had losses in this dimension: Toquanda declined by ten-points and Juan by one-

point. Conversely, Bailey's scores increased by seven-points in spite of the limited interactions due to her tutor's absences.

Tutors showed changes in their self-perception as well (Appendix P). With the exception of Toquanda's tutor (T7), all made gains in Observational Comparison which was expected considering they tutored peers of lower reading ability. In other dimensions changes were varied: Some tutors showed considerable improvement in the perception of their own reading ability level while others remained the same or declined. It is important to note that both Toquanda and T7 declined in the same three dimensions, Progress, Social Feedback, and Physiological States, although they differed in the item selections to which the changes were attributed. Where Toquanda's scores indicated a two-point gain in Observational Comparison, T7's remained unchanged and further research is warranted to examine the conditions of tutoring in immersive environments and their relationship to readers' and tutors' self-perceptions of reading ability.

Reader Self-Perception Scale: Kanishah

Kanishah had small increases in each dimension of her Reader Self-Perception Scale (RSPS). Her gains were unexpected considering she was often absent or tardy and strongly opposed reading aloud (Table 6). As documented in her case study, she used avoidance behaviors and did not want to be partnered with someone of greater reading ability. In her initial interview she was asked if she thought she was a good reader and she answered, "Hmmmmm, I'm starting to read a little better. I've got the hick-ups. Do you have an extra bottle of water?" This was one example of her propensity to divert attention or avoid discussions about reading. After refocusing her, she elaborated:

> I don't pronounce words good. I don't know if I'm a good reader because I don't like to read books. I'm shy when I read and I'm shy because I really don't know it. But if I had *Green Eggs and Ham* I would know it.

By the end of the study she said that her reading had improved because she had read a large quantity of books. Her perception was inaccurate considering she typically read and reread the *same* books.

Table 6

RSPS Raw Scores and Score Interpretation: Kanishah

Kanishah (R1)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	33	**36**	9	**10**	38	**39**	30	**31**
Score Interpretation	low	low/avg.	Low	low	high	high	low/avg.	average

Kanishah's overall raw score in Progress increased by three points which was her greatest gain and two of her selections changed dramatically in a positive direction. The first referenced whether she felt her reading was easier than it had been previously. She marked Strongly Disagree on the pretest and selected Undecided on the posttest. She explained that her selection was lower to begin with because she was in intermediate school and expectations for reading were higher. There had been weeks when she never read a book and she was concerned that she would be required to read chapter books. She passionately stated, "I hate chapter books." When asked to compare her pre- to posttest choices she explained that she moved from Strongly Disagree to Undecided "Because

I'm getting gooder (sic) at reading and getting bigger and I can read what everybody else reads. I'm getting better at reading . . . because I'm starting to read a little more books but not that much books."

The second two-point item change was related to the improvement of her reading comprehension. She strongly agreed that her ability to understand text had increased from her initial Undecided selection. During her posttest interview she stated that she could read more difficult books and, pointing to Arthur Miller's *The Crucible* confidently added, "I think I could probably read that."

She declined one point on her reading speed which moved from Strongly Agree to Agree. Referencing the simple book, *Green Eggs and Ham,* she explained that her mother had read to her while she was a toddler and she was very familiar with the text, theme, and sentence structure. After accounting for gains and losses, the summative interpretation score indicated that her self-perception improved from low to low/average.

There was a one-point gain in the Observational Comparison dimension yet her self-perception remained low. The item on which she increased from Strongly Disagree to Disagree referenced the quantity of books she read as compared to other students. Again she referred to *Green Eggs and Ham* and said that she could read it well and liked to read it often. It was more likely that Kanishah memorized the book rather than read the text. Her perception was that, if she knew a book well, she could read it well. She stated, "I read a lot of books now but at the same time other kids can read more books." She pointed to a book on the shelf and said, "Like that says, '*Gone with the Wind'* and *'Cong Rat'*—oh that's a 'K' it's KING." Her assessment of her reading speed was low and she stated that, during regular class, other students would read farther ahead in books while

she remained on the first page. She did not change in opinion on items related to her ability to decode or comprehend information as compared to classmates.

Kanishah increased one point in the dimension of Social Feedback and, with raw scores of 38 and 39, her self-perception remained high. She made conflicting selections on whether or not her teacher thought she was a good reader: In one case she gained one point and on another she declined one point. She selected Disagree on her pretest but Undecided on her posttest regarding her classmates' interest in listening to her read. Other items remained unchanged.

In her posttest interview she explained that people generally thought she read well because they saw her reading more often. "D'Arria thinks I'm a good reader. She said I'm a good reader because I'm getting good at reading and she sees me reading a lot." She added that her parents thought she read well and that if *they* thought so, "then other kids they probably think I'm a good reader but some kind of bullies probably wouldn't."

Kanishah was the one reader who consistently exhibited avoidance behaviors and reluctance to read throughout the study and the comments she made during her pretest interview were insightful. Associated with her physiological state, Kanishah described her feelings when she read and stated

> Well sometimes if I have a little stomachache [and] I'll just read one page and then save the other one [for] later. But then if my stomach feels awesome, then I will read the whole book. But if it's a chapter book, I'm not going to read it. And sometimes my mom has to tell me the word. Yepa, yepa, yepa."

It was gratifying when, on her posttest in the Physiological States dimension, her raw score increased by one point which moved her self-perception from low/average to average self-perception. She gained two points each on calmness and comfort but

declined three points on her enjoyment to read. The item on which she felt strongest was related to whether or not she liked to read aloud. She selected Strongly Disagree on both the pre- and posttest and explained, "I'm embarrassed. I don't pronounce the word right and I'm scared that somebody might laugh at me, [but] if I read the whole page I would think to myself, [Kanishah] you did a good job."

Kanishah's posttest interview confirmed that she liked to read with her tutor because it made learning easier and allowed her to read better. This was somewhat surprising considering her reluctance to leave her friend on the first day of the study. She added that using digital tools was both easy and difficult. "When I listen to my reading it makes it easier for me because it's reading it for me and I just have to follow along." She did not explain why using digital tools caused reading to be more difficult. However she may have had difficulty splitting her attention between the cognitively demanding tasks of reading while navigating Technology-Actuated Reading Instruction (TARI) activities. Her tutor was also interviewed and stated that tutoring helped because larger vocabulary words could be sounded out and that "the computer made helping easy because [tutors] can listen and read and help [their] partner learn new words."

Reader Self-Perception Scale: Rashawn

Rashawn showed minimal increases in three of four dimensions. He increased one point in the Progress dimension which was on the item addressing his current versus previous reading speed. Rashawn explained, "I've been practicing more and I've got better at reading. I read some of the books that I borrowed from the library." Score interpretation in this dimension remained high.

Rashawn's largest gains, five points, were in the Observational Comparison dimension. Unlike the minimal changes in Progress, Rashawn's Observational Comparison showed that three items had a one point each gain and one item increased by two points. Respectively, these referenced his ability to decode words, understand text, read better, and read faster than other students. The last score should not be confused with the item in Progress which compared his reading speed with *himself* rather than his classmates (Table 7). Rashawn explained that he could read better for three reasons: other students had to sound out more words, he read more often, and he was able to read more difficult vocabulary words.

Table 7

RSPS Raw Scores and Score Interpretation: Rashawn

Rashawn (R2)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	44	**45**	24	**29**	42	**45**	36	36
Score Interpretation	high	high	avg./high	high	high	high	avg./high	avg./high

Rashawn's Social Feedback dimension increased three points, but this was not sufficient to change the self-perception score interpretation which remained high. His choices on all three items moved from Agree to Strongly Agree and were in relation to how his teacher, classmates, and family thought he read. He added that his teachers thought he had developed a more extensive vocabulary and that his classmates thought he

was reading better because he did not "have to try as hard as I used to. When I try a word for the first time I just try again and then I get it." His opinion was that his family, also, considered him an improved reader because they enjoyed listening to him read.

Rashawn's item choices changed in the Physiological States dimension but his overall raw score remained unchanged. A two-point gain was made on the item related to reading as a relaxing activity. His initial choice was Undecided but on the posttest Rashawn selected Strongly Agree and he explained that reading had become relaxing because he knew more words than he had previously. I asked how that made reading more relaxing and he said, "Because it is fun sometimes . . . [now] I can read *Goosebumps* or *Captain Underpants."*

The two items which declined one point each (from Strongly Agree to Agree) referenced his comfortableness while reading and whether or not he enjoyed reading. He stated, "I don't feel like nothing when I read. I just read." He may not have understood what the word, *comfortable* meant considering he gained two points on a related concept, relaxation.

During his posttest interview Rashawn disclosed that he thought he was a good reader because he "got even better at reading because [my tutor] helped me sound out some of the words" and elaborated that T2 had assisted with "big words" enabling him to read faster. He felt that TARI was helpful and allowed him to read a large number of books, provided modeled narrations, and gave him the opportunity to practice reading more often. He stated, "I practiced and practiced on the computer." When I asked him to explain how he practiced on the computer he said, "Because first I heard [the narrator] say the words. I listened to it and then I remembered the words."

Reader Self-Perception Scale: Jamal

One unique aspect of TARI was that it accommodated participants of varied reading levels by differentiating and scaffolding instruction through narrations and iterative processes for refinement. This was particularly important for Jamal since his skills were the highest of the readers and his initial RSPS reflected confidence with overall average/high or high perception in each dimension (Table 8). This left little room for additional, positive growth.

Table 8

RSPS Raw Scores and Score Interpretation: Jamal

Jamal (R3)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	43	**44**	23	**28**	42	42	38	*36*
Score Interpretation	avg./high	high	avg./high	high	high	high	high	avg./high

Raw scores increased one point in Progress and five points in Observational Comparison which changed his self-perception to high in each. Social Feedback remained unchanged but in Physiological States he showed an unexpected decline by two points which moved his self-perception from high to average/high. Jamal did not explain why this occurred but the two items which showed losses referenced feelings about reading and comfort while reading. Considering he was the loudest, seemingly most

confident reader, his selections may have been an anomaly: On the day of the posttest he simply agreed rather than *strongly* agreed with the two aforementioned statements.

Referencing the Progress dimension, Jamal explained that his increase was due to changes in how he practiced reading: He read the same books *repeatedly* until he reached mastery and did not move on to new books until he met his own personal standard of proficiency. He reported that he did not expend as much effort reading since he was familiar with the text, he needed less help from his family and, when he had difficulty with words, he sounded them out by himself. He stated that he was able to decode because he "read [words] over and over again."

Jamal moved from agreeing to strongly agreeing on the item related to comprehension which resulted in a one-point gain. He attributed this to friends who explained stories he was reading at the time. This finding is further explained in the Observational Comparison discussion. Jamal believed that reading was enjoyable and added that he read almost every day. When asked about word recognition he stated that he understood more words at the end of the study because he had read "books two or three times before I switch to another book so I can understand the words."

In the Observational Comparison dimension Jamal's raw score increased by five points and his self-perception changed from average/high to high. His largest gain was on the items referencing his rapidity in reading which moved from Undecided to Strongly Agree. This dimension focuses on a comparison of skills related to classmates and, in Jamal's case, may have been influenced by what he heard from other dyads. He reported that in the beginning of the study he "started off slow and then started going faster and

faster." However, his tutor later shared that she was concerned with how fast Jamal tried to read and elaborated that, without her assistance, he struggled with text comprehension.

> I had him slow down just a little and it was enough to have him understand what he was reading. He was reading so fast he was skipping words that were important. He needed those words so that he would know the meaning. I had to tell him, 'SLOW DOWN.' With [Jamal] he had a good time reading but he needed to stop the rushing.

Jamal also moved from Agree to Strongly Agree on three other items in the Observational Comparison dimension. The first item referenced his ability to decode words. The second evaluated how many words he knew as compared to other readers and the third rated his understanding of what he read. In his posttest interview Jamal stated that other students have helped him understand stories, especially if they had already read the book and could summarize the information as he read. This may have influenced the one-point change in reading comprehension aforementioned in the Progress dimension.

Jamal's scores on Social Feedback were unchanged and remained high. His perception was that his teacher and classmates liked listening to him read because his teacher encouraged him to read more and his classmates "give me high fives and they cheer me on, and they help me when I get stuck on some words." He added that his parents were very encouraging and made positive statements while listening to him read.

During his posttest interview Jamal was asked how he felt about reading with his tutor and he answered that it was good to have a partner *if* he needed help. Referencing TARI, he initially stated that there was not a difference between reading a book and using digital tools. He then frowned, looked pensive, and added that TARI *was* different

because it was a book without pictures and it helped him because he could record his voice.

> It helped me by first you can listen to the book and get used to the words then you can try reading it by yourself. [My tutor] would help me sound it out [and] if I don't know the words [she] would pronounce it for me.

Reader Self-Perception Scale: Bailey

Bailey's raw scores and self-perception increased in every dimension which was unexpected considering the interactions she had with her tutor were limited due to the tutor's frequent absenteeism (Table 9). In Progress she increased by two points changing her self-perception from low to low/average. Observational Comparison reflected the greatest increase, 11-points, moving her from a low to average score interpretation. Social Feedback had a modest, two-point gain but, again, the score interpretation of her self-perception improved and moved from average to average/high. Her second highest increase was in the dimension of Physiological States, a seven-point gain, which changed from a low interpretation on the pretest to an average self-perception on the posttest.

Table 9

RSPS Raw Scores and Score Interpretation: Bailey

Bailey (R4)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	34	**36**	10	**21**	33	**35**	24	**31**
Score Interpretation	low	low/avg.	low	average	average	avg./high	low	average

As documented in her case study, Bailey was most concerned with reading speed as it applied to the regular classroom reading group in which she had been placed. This remained an issue for Bailey on her posttest considering she declined two points, from Strongly Agree to Undecided on the item referencing her reading rapidity. Other selections on the pre- and posttests appeared inconsistent. She declined two points on the item regarding comprehension and one point addressing whether or not she was improving but gained three points on two items regarding the effort she expended while reading and the degree to which she needed help. Her increases on these items were most likely due to her tutor's frequent absences which, as an unanticipated consequence, gave Bailey the opportunity to try TARI activities without perceived expectations or pressure. She strongly agreed and gained one point on the item referencing whether or not it was easier for her to read than it had been previously. She explained that she knew more words and that she used blending strategies to decode words such as the "/oo/ sound."

In her posttest interview she reported that she had been "really slow at reading and if it was ten pages it would take a half hour or so." She added that by the end of the study the same ten pages would take her approximately ten minutes. She was undecided if she recognized more words than she had been able to recognize previously and explained, "Some words I forget. I'm a very easy forgetter."

It was within the Observational Comparison dimension that Bailey had her largest gains: On every item she increased one or more points. She was extremely cognizant of other readers' abilities and, on at least four different occasions, discussed the levels of reading groups in her regular classroom. She negatively compared herself most often to the *Shooting Stars* who had the highest reading ability but added that even the *Asteroids*

read better than she since she was in the lowest, *Moon* group. It was not until this point that as a researcher I realized the importance of Technology-Actuated Reading Instruction because of its neutral design which neither elevated nor discriminated against children of varied reading levels. It was clear that the *Moon* label strongly and negatively influenced Bailey's self-perception of her reading ability. She stated that, at first, she did not think she was a good reader since she did not understand compound words but that her opinion changed during the study. "I think I'm a pretty good reader because I'm reading a couple more hard books." Her raw scores evidence this improved self-perception in reading ability which resulted in a score interpretation from low to average.

Bailey's pretest item selections were most often Strongly Disagree or Disagree. On two separate items regarding fluency and comprehension she moved one-point and her pretest selections on items addressing her ability to decode words, the amount of words she knew, and whether or not she read more books than other students increased by two points each. Her most considerable gain, a change from Strongly Disagree to Agree, occurred on the item regarding her ability to read better than her classmates. Bailey's RSPS showed an overall 11-point gain in the Observational Comparison dimension which was more than any other reader.

Bailey's Social Feedback dimension increased moderately and her self-perception increased from average to average/high but, similar to her responses in the Progress dimension, her selections were irregular. She increased one point on the item referencing her classmates' opinion that she read fairly well but declined one point on the item addressing whether or not other students thought she was a good reader. She gained one

point on her families' impression that she read well but lost one point when selecting to what degree her family liked to listen to her read.

Her selections also conflicted somewhat with her posttest interview when she stated that her mother was beginning to think she was becoming a better reader and often complimented her when she read books at home. As mentioned previously, initially Bailey was very reticent to check out books and rarely took books home overnight prior to the study. Her mother's comments may have been related to Bailey's newly established practice of reading at home rather than the mother's enjoyment of listening to Bailey read. She had a two point increase regarding her classmates' interest in listening to her read and in cross-referencing Bailey's observations and scores with the posttest interview of her tutor it was noted that Bailey's tutor spoke of the importance of listening. She stated, "When you work with a partner, listen to what they say."

Bailey's Physiological States dimension increased seven points which indicated a change in self-perception from low to average. The two items on which she declined one point each accounted for her feeling of calmness and degree of comfort. She increased one point each on whether or not she liked to read aloud, felt good inside, and was happy and relaxed while reading. Her most sizeable gains were on items referencing her enjoyment of reading and whether or not she felt good while reading. Her scores on these two items were, respectively from Undecided to Strongly Agree (two-point gain) and from Strongly Disagree to Agree (three-point gain). Considering on her pretest she had rated herself at the lowest level (Strongly Disagree), I asked her to describe how she felt when reading. She explained, "I always get shy when I read." However, in her posttest interview she modified her initial response and said that she most enjoyed the opportunity

to select her own books and that they took her to different places and helped develop her reading skills.

> Your mind gets in this world . . . like I was thinking I was riding on Clifford! I like reading with a partner because if I say the wrong word . . . [my tutor] says, 'Can you say that word again?' and then I get it right. She does little hand movements like sign language to help me get a clue. I guess I know a little sign language now.

Bailey's tutor (T4) was also interviewed after the posttest and stated that being in a partnership was helpful because, when Bailey was having difficulty decoding words, T4 sounded out rather than offered the entire word. At times she had Bailey reread a sentence and when this occurred Bailey usually improved.

Reader Self-Perception Scale: Maria

Maria's reading skills were the lowest of all readers and TARI gave her the ability to scaffold information and build on her own strengths without judgment. On the first day of the study she wanted to remain with another underperforming reader but adapted when partnered with a tutor she knew. She increased in every dimension on the RSPS with the greatest changes occurring in Progress, a difference of 16 points, and Physiological States, an increase of 13 points. More importantly the score interpretation of her self-perception as a reader moved from low to average/high in Progress. While her raw scores moved in a positive direction the other dimensions on the RSPS remained interpreted as low and are attributed to her initial scores which were at the bottom of the scale (Table 10).

Table 10

RSPS Raw Scores and Score Interpretation: Maria

Maria (R5)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	26	**42**	10	**12**	19	**26**	11	**24**
Score Interpretation	low	avg./high	low	low	low	low	low	low

In her pretest interview she explained, “I’m not a good reader because I try but I just don’t get the words. I try as hard as I can, but I just don’t get it.” Her posttest interview was somewhat more encouraging and stated that she had become undecided as to whether or not she was a good reader.

Her second largest gain was found in the degree of help she needed. On her pretest she selected Disagree but changed to Strongly Agree on her posttest indicating a three-point gain. Scores regarding her effort to read and comprehension increased two points on each. Two items were left unchanged and were related to her word recognition ability and whether she could read better than she had previously. The only item which showed a loss was the effort she expended while reading, a decline of three points. This may have been due to the book she was currently reading, *Junie B. Jones is Not a Crook*, which had a higher reading level than those she had read earlier in the study. In her posttest interview she said, “I still have to try really, really hard, [and when] I don’t get the words, I don’t know why.”

Maria's Observational Comparison dimension increased by two points but her self-perception score interpretation remained low. She was undecided on the pretest whether or not she could understand text as well as other students but changed to Strongly Disagree on the posttest, a decline of two points. She explained, "Like they know what they're reading and like I can't read so I don't know what I'm reading."

Items related to her ability to decode words or ability level did not change but she rated herself two points higher on the quantity of books she read. In her initial interview Maria stated that she read once a week and then skipped every other week. Her pattern of reading books changed after the second week of the study when she checked out books daily. She also gained one point on each of the items referencing her word knowledge and speed.

> It's because I get stuck on a word and [my classmates are] ahead of me and that's why. They're always ahead of me, and I'm like the last one that finishes anything about reading. I'm always the last one to finish. Last time I couldn't even read one word and now I can read a few words. Yeah, like right now. I can read faster but not fast, fast, fast.

Under the dimension of Social Feedback Maria's self-perception increased by seven points, from a pretest score of 19 to 26 on her posttest. The most dramatic change was related to her families' willingness to listen to her read. She first stated that her family did not consider her a good reader: "[They] don't like to listen to me read. They don't say nothing. They just leave or say 'Hurry up.' My mom and dad say that you have to learn how to read and that I have to try on my own."

She also increased on her classmates' feelings regarding her reading ability and their interest in listening to her read. She explained that she had selected Undecided on the latter because "I don't know [how] to explain it to you. I'm ahhh, sometimes they don't

want to be my partner, but sometimes they don't care." Two items related to her families' and classmates perceptions of her ability remained unchanged.

The scores regarding her teacher's opinion were somewhat conflicting. On two items she indicated that her teacher neither thought she was a good reader nor wanted to listen to her read. However, she increased by one point on the item which addressed that her teacher thought her reading was fine.

Maria's Physiological States raw score increased by 13 points but, as was the case with Observational Comparison and Social Feedback, her self-perception interpretation remained low. Of the eight items in this dimension, five scores increased, one item remained the same, and two items declined one point. This was a dramatic improvement considering, during her pretest interview, she stated

> I feel bad to read because like my stomach gets like, ahhh I don't know why. I just don't like to read. Like I don't feel good because like I get stuck on words and like I just don't feel good reading. Like my stomach starts feeling like something nervous. Like something in my stomach makes me feel bad.

Maria's greatest increases were in selections regarding whether or not reading was relaxing and her enjoyment of reading. In both instances she moved from Strongly Disagree to Strongly Agree, four-point gains each. Referencing the degree to which she was calm while reading, her selection moved from Disagree to Strongly Agree, a three-point gain. On two items regarding her happiness and whether she felt good while reading she increased by two points each. She remained unchanged on her enjoyment of reading aloud which was consistent with every other reader except Bailey (R4). She declined by one point each on two items referencing her comfort and inner feelings which resulted in an overall raw score gain of 13.

In her posttest interview Maria said that she liked working with a tutor and stated that her tutor helped her sound out words. She added that she knew more words because of her tutor's assistance and was particularly interested in the options found in TARI. She said that she enjoyed using the digital tools because "You can record and you can listen to it. It's fun." She was also the subject who, when asked if she wanted to quit the study, responded that she wanted to stay because she enjoyed "doing that stuff to hear my sounds."

Maria had two tutors during the study and in the posttest interview her first tutor stated, "I let her read the word first then I said 'Stop for a minute.' I would get a sheet of paper and I would write down the word and have it sounded out." Her first tutor often drew pictures, provided decoding strategies, and context clues to assist and guide Maria. Instructionally, this may have benefited Maria but due to the disparity in their reading ability levels and the lack of patience this tutor had for Maria the dyad was changed midway through the study.

Her second tutor was not as phonemically aware as the first but brought her own background knowledge and skills to guide and assist Maria. She patiently demonstrated and explained the meaning of words, used decoding and grammar strategies, provided context clues, complimented Maria, and offered encouraging verbal support. This substantiates Gunn's (2008) research on proximal tutoring in that appropriately assigned tutors (Proximal Mentors) accelerate students' knowledge base through caring and sharing relationships and extends Portillo Peña's (2008) report regarding the benefits and emotional aspects of tutoring.

Maria's second tutor (T5) further stated that she preferred reading *alone* but her interaction with Maria did not suggest any reluctance to the dyad structure. She explained that TARI helped Maria by providing narrations of modeled reading and that she enjoyed the use of digital tools because "they tell you the words in the beginning like you could listen to them telling you the story." This tutor's preference for independence may have been influenced by her desire to use TARI herself since on the few times that Maria was not using the laptop T5 quickly accessed TARI activities independently. It was notable and unanticipated that T5's self-perception as a reader increased in all dimensions on the RSPS (Appendix P). This warrants further research to explore tutors' self-perceptions as they assist readers while using digital tools.

Reader Self-Perception Scale: Juan

Juan's scores increased minimally in three of four dimensions (Table 11).

Table 11

RSPS Raw Scores and Score Interpretation: Juan

Juan (R6)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	38	**40**	24	**26**	40	*39*	33	**36**
Score Interpretation	low/avg.	avg./high	avg./high	high	high	high	avg./high	avg./high

He moved from low/average to average/high with a two-point increase in Progress, from average/high to high by two points in Observational Comparison, and made a three-point

increase in Physiological States with a score interpretation which remained unchanged at average/high. Although, there was a one-point decline in Social Feedback, the score interpretations in this dimension for both the pre- and posttests were high.

Only three selections changed from the pre- to the posttest in the Progress dimension. Selections moved from Undecided to Strongly Agree, a two-point gain, on the amount of effort he expended while reading and increased one point from Agree to Strongly Agree on his need for assistance. These gains were mediated by Juan's one point loss on how he perceived his current reading ability. Juan stated that he needed less help because he looked at words, saw the number of syllables, and enunciated each, independent sound. His practice was to utter the final syllable then repeat each sound and combine them together. In discussing why he thought he was not currently reading better than he had at the beginning of the study Juan explained, "Now I get lazy and I don't want to read . . . and I just mess up words because I read them fast."

Juan's self-perception indicated improvement due to his two-point increase in Observational Comparison. Gains were shown on items regarding his ability to decode, the quantity of books he read, and his ability to read. On the decoding item his selection changed from Agree to Strongly Agree and on both the ability and quantity items he moved from Undecided to Agree. He said that he currently read much better than other students and, when I asked him how he knew he was better, he stated, "I read to my mom and dad and my brother and they say I read better. My friends read to us and they mess up on more words than me." Referencing the quantity of books he read in relation to his classmates Juan added, "I used to want to be a normal kid but now I want to be a smart kid." His score declined by one point on the comprehension item leaving him with an

overall gain of two points. Clarifying why his comprehension was lower Juan said that occasionally he inverted words and as a result did not understand as deeply as other students.

Juan's Social Feedback dimension declined by one point but his overall score interpretation remained static: high. On all three items related to his classmates, Juan's scores declined and in each instance his selections changed from Strongly Agree to Agree. He stated that his classmates did not like to listen to him read because he routinely made mistakes. These scores were offset by increases on two items related to his family: Selections moved from Agree to Strongly Agree and referenced his quality of reading and whether his family enjoyed listening to him read. In his posttest interview Juan stated that he knew his family thought he read well because they complimented him and no longer simply said, "Ummmmmmm."

Juan was one of the readers reassigned to a new tutor midway through the study and the synergy that was seen in other dyads never developed. Their interactions were minimal and centered on compliments rather than decoding strategies or context clues. Juan's raw scores conflicted with his posttest interview where he reported that his first and second tutor assisted him when he made pronunciation mistakes and he thought learning was made easier because of their interactions.

> They are nice to me not like some other people. When I mess up a word they say, 'That's not the right word.' They help me when I messed up a lot of words and sounded out the words with me.

As seen in two other cases within the Social Feedback dimension, readers whose interactions with their tutors were limited had declines in their self-perception on items related to their classmates. Juan's scores in this area mirrored

Toquanda's but to a lesser degree. Conversely, Bailey had limited interaction due to her tutor's absenteeism but her scores increased on two items and declined in only one. In all three instances the readers substituted TARI activities when their tutors were unresponsive, disinterested, or absent and each *self*-edited reading performances without aide. This prompts the need for further research in exploring the influence of reader/tutor relationships compared to reader/TARI activities and to what extent TARI activities and digital tools can serve as a virtual *more capable other*.

Juan's average/high self-perception score interpretation was not altered in the Physiological States dimension although his raw score increased by three points. The item selections which moved in a positive direction referenced his inner feelings, calmness, and relaxation however the score on his enjoyment of reading fell one point. His self-perception did not change on his preference to read out loud. He especially disliked his Language Arts class because he was required to read multiple sentences in front of other students and explained "I don't like to read out loud. I like to read them in my mind."

During his posttest interview Juan revealed that reading became more relaxing and was calming because he knew more words. "I used to not read so good and it makes me frustrated when I don't know a word but now I know much more words." He added, "Reading is a good thing and people say that." I asked him, "Why?" and he responded, "Because sometimes it makes good endings and happy endings like *Shilo.* When I read nice books that make me happy and then when they are, like, scary at the end, good stuff comes up.*"*

He was asked about his use of digital tools and TARI activities and he enthusiastically said

> I got to hear the words like [the narrator], then I hear the words, then the words I mess up and I try to remember how [the narrator] said it. It's easier to hear it first because every time on the computer I hear it first and then I can pronounce it." Juan added that he liked "headsets and the computer because [with] the headsets I record and with the computer I listen.

Juan's second tutor was also interviewed and stated that he provided assistance by sounding out and pointing out words so that they were not skipped. He expanded that part of his role as a tutor was to help readers discover new words. The second tutor's comments were not in keeping with the observations made during the final weeks of the study.

Reader Self-Perception Scale: Toquanda

The outlier of the study was Toquanda because of her decreases in three of four dimensions and the mercurial interactions with her tutor. She was the sole reader whose item selections decreased on her need for help, decoding ability, reading better than her classmates, and preference for reading aloud. It was only in the Observational Comparison dimension that her raw score increased: a meager two-point gain. While the score interpretation in Progress and Observational Comparison remained static, her self-perception moved from high to low/average and from high to average/low in the dimensions of Social Feedback and Physiological States, respectively (Table 12). This was due to her posttest Social Feedback raw score which showed a ten-point drop and her Physiological States raw score which declined five points.

Table 12

RSPS Raw Scores and Score Interpretation: Toquanda

Toquanda (R7)	Progress (45)		Observational Comparison (30)		Social Feedback (45)		Physiological States (40)	
	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2	RSPS 1	RSPS 2
Raw Scores	35	*34*	12	**14**	40	*30*	40	*35*
Score Interpretation	low	low	low	low	high	low/avg.	high	avg./high

It is important to note that her tutor, the participant whose elbow was broken, declined in all dimensions except Observational Comparison as well (Appendix P). Her tutor's largest decline was 12 points in Physiological States but when their responses were compared it was found that their selections were not identical, ruling out the possibility of copying. This does not negate the possibility of the dyad discussing their feelings outside of the study when observations were unavailable.

Toquanda's Progress raw score declined by one point and her self-perception in this dimension remained low. Of the six items on her scale which changed, three changed in a positive direction and three changed in a negative direction. The items which accounted for gains were related to the degree of effort she expended when reading, how well she understood text, and whether or not she recognized more words than she had previously. On comprehension and word recognition items her selections changed from Agree to Strongly Agree and on the item regarding her effort, she gained three points: a change from Strongly Disagree to Agree. In her posttest interview she explained that reading

became easier because, "I break the word up and I try to sound out the [parts] that I broke up and sound them out before I do the whole thing together."

Declines were from changes related to whether or not she was improving at reading and the amount of help she still required. Her most dramatic loss was with the item regarding a self-assessment of her reading speed. She moved four points from Strongly Agree to Strongly Disagree but was unable to shed light on why she had a change in perception.

Toquanda's perception increased by two-points under Observational Comparison but her score interpretation remained low. She was the only reader whose selections changed on every item on this or any other dimension: Three items improved and three declined. Those reflecting gains were related to her speed as it compared to her classmates (not herself), her knowledge of words, and the quantity of books she read. She changed to Disagree from Strongly Disagree on the "speed" item, to Strongly Agree from an Undecided selection regarding her word knowledge, and to Agree from Disagree on her quantity of reading. She explained, "When I get new books I just start reading and I try to get the books with big words in it so I can learn more of the big words."

The three items on which Toquanda declined referenced her ability to decode words, comprehension, and her ability to read better than her classmates. Her item selections moved from Disagree on her pretest to Strongly Disagree on her posttest, with a loss of one point each. This resulted in an overall increase of two points in this dimension.

Under Social Feedback, the dimension most related to Vygotsky's Sociocultural Theory, Toquanda's scores declined ten-points which changed her initial self-perception interpretation from high to low/average. While four of the item selections did not change

from her pre- to posttest, five of the nine, total items declined. The one-point losses occurred with items referencing her teacher's opinion of her reading and in both cases she moved from Strongly Agree to Agree.

The most sizeable changes related to her classmates' perceptions. She declined two points each on items regarding their interest in listening to her read and their perception of reading quality. She declined four points on the item stating that her classmates thought she was a good reader and later explained, "Sometimes the people who are mad at me or don't hang out with me might cover their ears or read ahead of me. It's not very nice." She added that in her classroom she and other students take turns reading aloud and that her classmates often illuminated and discussed her errors. During this evaluative process her classmates' critiques did *not* include decoding strategies, reading prompts, or encouragement.

The items which remained unchanged in Social Feedback referenced her families' feelings about her reading. In every case she strongly agreed that they enjoyed it when she read to them. In Toquanda's words, "I had to go with my grandma and my cousin and my sister would listen to me [read] and sometimes her cat—she wouldn't really listen but she would stare at the pictures." She added that her father started asking her to read a book to him each day.

Toquanda made an interesting comment during her posttest interview that was related to her physiological state. She said, "Reading makes me feel good because when I read I feel like I'm in a whole new world and I can imagine the characters without looking at the pictures." Her statement however was incongruent with her item selection referencing how she felt internally since she declined one point from Strongly Agree to Agree. Of the

eight statements in this dimension only one other item selection changed: her fondness for reading aloud which showed a four-point decline. This resulted in an overall self-perception score change from high to average/high.

Discussion of Findings

The findings of my study are discussed in terms of the themes which emerged and encompass the readers' experiences regarding changes in their self-perception. A consistent thread running through the findings is the influence Technology-Actuated Reading Instruction (TARI) and tutors had on readers. As such the changing individual was the unit of analysis. Related literature is embedded to establish how my findings either substantiate or contradict results of previous studies.

Data analysis revealed three specific areas of interest: types of interactions between readers and tutors, the use of digital tools, and the development of readers' independence (Figure 19). Interactions were categorized as high (proximal), moderate, or low (distal). Within the low level a sub-theme emerged: the relationship between a tutor's disengagement and the degree to which readers' self-perceptions declined in the dimension of Social Feedback (Figure 20).

Figure 19. Themes

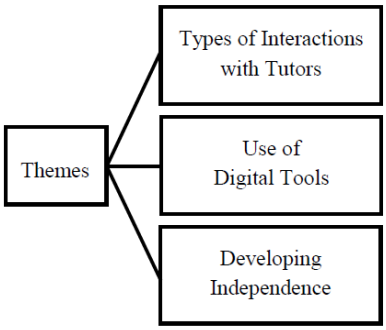
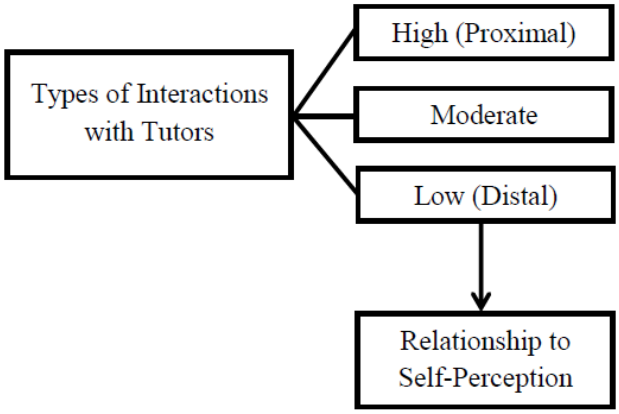


Figure 20. Low Interactions and Social Feedback Dimension



Types of Interactions

Several types of interactions were evident throughout the study. These included how dyads collaborated while using TARI as a vehicle to track text, used corrective strategies, and discussed statements of affirmation or acclamation. Tracking text was the most common method tutors employed and evolved naturally when readers struggled with a word or sentence. All but one tutor used his or her finger or the eraser-end of a pencil to underscore a single word or to drag under sentences seen on the monitor. This would have been the least effective instructional strategy if used in isolation. In one instance a tutor pointed to a word, which had been misread, then prompted the reader to restate the word which he did, incorrectly. Had the tutor ignored his response and continued without feedback an opportunity would have been lost but this was not the case. The tutor slowly pronounced the word correctly and directed the reader to reread the entire sentence. This extended simple tracking of text and incorporated corrective strategies and direction into the guided assistance.

Corrective strategies fell into several categories: phonemic awareness (including decoding), context clues, visual representations, demonstrations, or a combination of

each. Phonemic awareness is the ability to recognize, identify, and manipulate the smallest units of verbal language (phonemes) that make a difference in the meaning of words. For instance, the phonemes /m/ and /c/ are different in that when added to "at" one word becomes *mat* and the other *cat.* It differs from phonics in that phonemic awareness is an understanding of *verbal* language while phonics is the relationship between sounds and *written* language. As such phonemic awareness is the most essential and difficult component of the overarching umbrella of phonological awareness and is "a reliable predictor of later reading achievement and a result of learning to read" (Honig, Diamond, Gutlohn, 2008, p. 116).

Tutors drew upon their own phonemic awareness when interacting with readers. They most often pronounced difficult words in entirety or sounded out individual letters. They blended letters, segmented words or sentences, deleted portions of simple and compound words to find roots, or offered corrections to misread words such as when *crowed* was corrected as *crowd*. Explicit examples of these interactions are detailed in the case studies.

Context clues, visual representations, demonstrations or a combination of the strategies were applied through various approaches and were not used by all tutors. Some tutors made inferences as to what a word might be while others used opposites and comparisons to convey meaning. For instance when briefly assisting Bailey (R4), Tutor Two (T2) offered a context clue which she anticipated would enable Bailey to identify the author's last name (Mayer): "Mayor. It's somebody that is important in a city." Bailey was unable to pronounce the word and had T2 stopped her guidance at this point Bailey would not have been able to decode the word by herself. Extending her explanation T2

covered *er* in Mayer and added, "Part of it is like a month." Bailey correctly said *May,* at which time T2 pointed to *er* and directed, "Now add this." Bailey responded with /errrrr/ but did not combine the sounds therefore T2 placed her hands 18-inches apart, brought them back together, and said, "Now put [the sounds] together."

Similar to Bailey's experience tutors using opposites or comparisons were not always successful with their initial guidance. Maria's tutor first provided inappropriate segmenting and decoding prompts for the word *down* before providing visual representations by drawing arrows going up and down and asking "What way is that going?" Maria responded, "up." Then indicating the down arrow T5 asked, "Now what is this arrow doing?" Maria stated, "It's going down" to which T5 replied, "Yes, that's the word—DOWN." It was interesting to note that during the final interview with Maria, when asked if she had learned the word *down* as being the opposite of up, she replied, "No, I just didn't know how to say *down."* She did not make the connection that the context clue used opposites to convey meaning (Figure 12).

Another instance where opposites and comparisons were used was when a tutor tried to explain the word *uncle* and prompted, "It is the person who lives next to you." When the reader (Rashawn) was unsuccessful in understanding the clue his tutor pronounced the word. Offering correct pronunciation one time was seldom adequate for readers to remember and use words in context. When Rashawn came upon *uncle* and was unable to decode it his tutor covered up the last three letters and asked what the /un/ sound made. Rashawn responded with random words rather than sounding out the letters at which point T2 demanded, "Stop guessing!" His tutor then tried additional context clues and stated that the word was the name of someone in Rashawn's family. To this Rashawn

remained confused and silent. It was not until she prompted, "It is not your mother, father, sister, cousin, or your aunt . . ." that Rashawn accurately guessed *uncle.*

In some cases when readers required further explanations the context clues were extended by demonstrations. Tutor Four (T4) demonstrated the word *flashlight* by balling up her fist and making back and forth motions as if she were looking for something in the dark. Segmenting the compound word was not used in this situation but the demonstration proved sufficient to convey meaning to the reader. Another time when the dyad encountered the word *crawled* T4 used her fingers to make a crawling spider movement and the reader understood immediately. Later during this same session when *crawled* was repeated the reader did not ask for reiteration but rather closed her eyes to recall the mental imagery. This technique was used repeatedly and successfully until the word became more automatized.

As aforementioned, tutors brought their own experiences, background knowledge and skills to the learning environment and, in so doing, provided context clues which were meaningful to them but were not always helpful or obvious to the readers. Illustrating this point was an example T5 used to prompt her reader to identify the word *sword.* Tutor Five drew two stick figures on a piece of paper: one figure's head was offset and an arrow pointing both ways was drawn between the two images (Figure 13). A verbal prompt was given: "You use it to cut someone's neck off—like a knight" which was meant to infer *sword.* The reader did not understand since she had neither the depth of vocabulary nor the background knowledge for schema activation.

Other corrective strategies were used less frequently but merit mention because of their novelty and uniqueness. Dyad One used *shadow reading* twice as a method to teach

the reader (Kanishah) better fluency and word identification. This was accomplished by the tutor reading each slide aloud while Kanishah quietly restated the words approximately two-seconds later. This dyad also used summarizing strategies which were employed by Dyad Three as well. The most entertaining interaction involved Dyad Seven's use of TARI as they made up tunes and sang to the text visible on the monitor. Their interaction is detailed further in the Digital Tools section. The most proficient of the underperforming readers was Jamal and, while he was typically self-sufficient, his tutor would remind him to slow down in order to comprehend what he was reading. No other readers were asked to read slower.

Tutors typically used more corrective strategies when interacting with readers than praise and the profusion of affirmative statements or acclamation varied with dyads. I attribute these interactions to tutor characteristics rather than situational factors. For example, regardless of whom she was assisting T2 found ways to praise readers through meaningful statements. Assisting Rashawn (R2) she affirmed "You know how to say that word—see it's the same word as this" (pointing to a different location) and when Bailey (R4) pointed to a word and stated, "I didn't say that very good" T2 responded, "Yeah, but you said it right the second time."

Other examples used by tutors ranged from two thumbs up to "You are really doing good. You are trying to sound out the words and that's a good thing." More often tutors were overheard making brief, declarative, or directive statements such as "Keep going," "Good job," or "You can do it!" Considering their affirmations and acclamations were infrequent the influence praise had on readers was negligible.

Levels of Interaction

The levels of interaction differed for dyads based on evidence of their conversations, assistance or guidance with reading strategies, peer- or self-editing, absenteeism, and/or engagement (Table 13).

Table 13

Rubric of Interactions

	High Level Interactions (Proximal)	Moderate Level Interactions	Low Level Interactions (Distal)
Description	Proximal ability levels; consistent assistance or guidance using reading strategies; peer-editing of reading performances; reader and tutor are typically attentive and routinely engaged in TARI activities.	Ability levels may be proximal; occasional assistance or guidance with reading strategies; dyads occasionally or intermittently peer-edit or readers may self-edit reading performances.	Ability levels may be distal; infrequent conversations or assistance with reading strategies or guidance due to tutor absenteeism, disinterest, or disengagement; readers may self-edit reading performances; tutors may act as passive observers.

Three overarching categories were identified: high (proximal), moderate, and low (distal) and readers whose interactions were most aligned with a category were placed accordingly (Table 14). Categorizing readers in a specific level was based on interactions rather than results from their Reader Self-Perception Scale. However, it is noteworthy that one reader who interacted at a high level also had the largest increases on her scale. This reader was Maria who had the greatest raw score gains but, due to the extremely low initial scores on her pretest her overall score interpretation in each dimension did not

move uniformly to a higher category. The exception to this was in the Progress dimension where she increased from low to average/high self-perception.

Table 14

Reader Interaction Designation

	High Level Interactions (Proximal)	Moderate Level Interactions	Low Level Interactions (Distal)
Reader	Rashawn (R2) Maria (R5)	Kanishah (R1) Jamal (R3)	Bailey (R4) Juan (R6) Toquanda (R7)

Another important finding was with readers who had moderate and low interactions. Of those designated as moderate interactions, Kanishah's self-perception improved slightly in every dimension while Jamal's improved in three of four dimensions with Physiological States being the only decline (two points). One reader in the low (distal) interaction category had gains in every dimension, but the other two readers' self-perception declined in one or more areas. Most substantially, Toquanda declined in three dimensions (Appendix P). This is discussed under *Reader Self-Perception Scale and Influence of Tutors* and *Low (Distal) Interactions and Self-Perception*.

High (proximal) level interactions.

High levels of engagement with tutors were considered proximal in that the dyad created an environment which promoted and facilitated interactions. This applied to Rashawn (R2), Maria (R5) and their tutors. In this context tutors provided decoding strategies, context clues, demonstrations, or illustrations while readers attentively and

routinely engaged in TARI activities. A characteristic of this degree of engagement was that dyads would either completely forget to mark and submit a Reading Frequency Log because of their intense involvement with reading activities or would wait until the end of the story to complete the task. If the later was the case, dyads typically returned to the presentation, counted slides, and marked the log. It is to be noted however that not only dyads with high level interactions had this situation occur: Some individual readers or dyads also behaved in a similar manner.

Tutors provided context clues by drawing images, asking prompting questions, and acting out the meanings of words. This was particularly evident in the interactions between Maria and her first tutor as they discussed words such as *down, real,* and *swords* or when her second tutor illustrated the word *crash* by slamming her pencil on the desk. Prompting questions were used to assist readers in finding multiple ways to read and comprehend text and tracking words to improve fluency or showing illustrations from hardcopy books to increase understanding were also interactions frequently used by tutors.

Rashawn's infrequent disengagement was not to the degree that would prevent him from being placed in the high level of interaction category. In his case the dyad used an image from the hardcopy book to illustrate *candlestick* and words with which he initially struggled such as *tough* were explicitly explained and later remembered. This finding aligns with Darrow, Gibbs, and Wedel's (2005) and Vygotsky (1978; 1986) in that terms and concepts may be explained better by an individual's peer whose zone of proximal development is not as disparate as a teachers. In another instance Rashawn did not know how to pronounce the author's name and T2 encouraged, "You know how to say that

word—see it's the same word as this" (pointing to a different location). Rashawn again remembered the word and restated it correctly when it was used in different locations throughout the book. Although Rashawn was initially somewhat distracted, his independence developed after the first week and as this occurred his voice increased in volume, he made known his preferences, and occasionally switched roles with T2 enabling *him* the opportunity to provide assistance or guidance. This was also seen with the relationship between Maria and her second tutor. In both dyads the tutors also assisted in peer-editing reading performances.

Moderate level interactions.

Moderate levels of interaction involved occasional or inconsistent assistance or guidance with reading strategies. Dyads typically peer-edited reading performances but in some instances a reader would self-edit without input from their tutor. The two readers whose dyads were most consistent in demonstrating moderate interactions were Kanishah (R1) and Jamal (R3).

Kanishah was the one reader who consistently avoided reading and navigating TARI and it was opportune that her tutor (T1) was dogmatic in her prescriptive directions when she was distracted or unresponsive. An example of this was when Kanishah was having difficulty understanding a story therefore T1 asked, "What do you think if it was his own mother?" When Kanishah did not reply T1 persisted and, using the eraser-end of her pencil, pointed to a section of text, and said, "Right here. What do you think?" This was not a solitary occurrence and whenever Kanishah was unresponsive or had difficulty reading or comprehending text T1 summarized the contents and critiqued her pronunciation of vocabulary or misread sentences. In one case T1 pointed to a sentence

where a word had been misstated and said, “You should have said, ‘the’ right here, but you said ‘a.’”

Kanishah consistently relied on T1 to advance slides and navigate TARI which was done without argument or reluctance although Kanishah was able to perform these tasks herself. The few times Kanishah was either absent, tardy, or asked to be excused to use the restroom, upon her return T1 routinely redirected her to reading activities. She repeatedly read the same book, *Clifford the Small Red Puppy,* but as her confidence grew she expanded her repertoire to other easy readers.

Jamal had a high self-perception of his reading ability and because of this he was often overheard reading confidently, loudly and with prosody. Similar to Rashawn’s use of visual images Jamal and his tutor frequently referred to the illustrations in hardcopy books to further understanding. They were intent on comparing the number of slides in the presentations to the number of pages in hardcopy books and frequently collaborated about this at the end of each presentation. Due to Jamal’s proficiency neither his first nor second tutor provided an extensive amount of assistance or guidance. They did however provide feedback and have discussions about the content of stories and the speed of his reading which was impairing comprehension.

Unlike some of the other relationships Jamal and his first tutor (T3) appeared to be friends, shared the same gender, and were similar in ethnicity. This may have influenced how they interacted since Jamal was comfortable when directing his tutor to “catch up” on the Reading Frequency Log or find a particular page or illustration in hardcopy books. In one instance Jamal read from *Fox on the Job* where, in the beginning of the story “Fox” crashed his bicycle. Jamal wanted to see what the bike looked like so T3 quickly

found the corresponding page in the hardcopy book. Jamal's association with his first tutor substantiates Valenzuela-Smith's (1984) assertion that tutors and tutees who shared a personally relevant connection (e.g. language or culture) were emotionally invested in more than academic achievement.

Their relationship was more interactive after the first few days as T3 followed along while Jamal read/recorded and made encouraging statements such as "Good job" or "Keeping going." Occasionally he navigated TARI or demonstrated how to set the microphone level for Jamal and when this occurred Jamal listened attentively. During the second week Jamal was assigned a new tutor: an Asian female with skills more aligned to his reading ability. The synergy that was seen with his first tutor was not evident with his new tutor nor was he as likely to seek her input. This did not negate her willingness to offer guidance or corrections.

One time Jamal's reading performance had not been recorded properly therefore T3 assisted in peer-editing and asked him if he wanted to rerecord or listen to another story. Jamal elected to improve his performance and T3 navigated to the digital tools which enabled him to rerecord several slides. Jamal did not read the entire book at one time but, with the assistance of T3, recorded a few slides and then played them back to check for accuracy and ensure the fidelity was appropriate. At one point after Jamal reread/rerecorded a slide, T3 stopped him and stated he had read well but that he should have said some words louder. She modeled the correct volume by reading the same sentence aloud. Jamal practiced rereading the sentence and mirrored how T3 had emphasized selected words. Together they listened to and peer-edited his reading performance and when they had finished Jamal stated that he thought *his* reading was

better than T3's to which she used her hand to sweep Jamal's Reading Frequency Logs onto the floor and walked away. Jamal repeated the process of alternating reading tasks independently. He self-edited and evaluated two or three slides then read two or three more slides until he had finished the entire story.

In Jamal's final interview he stated that his first tutor helped him sound out words but that his second tutor did not assist him as much. Continuing her authoritative behavior his second tutor corrected Jamal and stated,

> He was reading too fast and so he couldn't understand. I had him slow down just a little and it was enough to have him understand what he was reading. He was reading so fast he was skipping words that were important. He needed those words so that he would know the meaning. I had to tell him, 'SLOW DOWN.' He needed to stop the rushing.

Low (distal) level interactions.

Dyads with a low (distal) level of interactions may have had tutors who served as passive observers rather than active participants. Tutors in this level infrequently

- tracked text;
- followed text as readers pronounced words or read aloud;
- offered decoding strategies, context clues, demonstrations, or visual representations; or
- peer-edited reading performances.

Tutors who were considered passive observers may have filled in the reader's Reading Frequency Log but did so sporadically rather than marking a square when each slide was completed or at the end of stories. They were often uncommunicative unless asked a direct question and neither initiated discussions nor proactively prompted readers

consistently. At times they looked around the room and ignored their reader which forced the reader to continue on their own devices or stop completely.

The three readers who were designated as having low (distal) level interactions were Bailey (R4), Juan (R6), and Toquanda (R7). Bailey was placed in this category because of her tutor's (T4) absenteeism: T4 missed the sessions over 50 percent of the time following the first week of the study. Her absences limited the opportunities for interaction and required Bailey to work independently. There was an exception to Bailey's daily independent work: Once T2 assisted by peer-editing Bailey's reading performances.

In lieu of a tutor Bailey supplemented this lack of interaction with TARI activities which provided her with opportunities to explore and practice reading without critique or expectations dictated by others. Her developing independence was unexpected and she extended the concept of a tutor by the self-sufficient use of digital tools to continually engage in TARI activities. At no point did Bailey exhibit the avoidance behaviors that were seen in other dyads when tutors were not present and it is argued that Bailey's increases were due to her interaction with TARI activities, coupled with some interventions by tutors. One caveat to this finding however is that Bailey practiced using TARI with her tutor during the first week of the study and there may have been a different result had she not developed navigation skills.

The instances when Bailey had opportunities to work with T4 or T2 were meaningful and assistive. Text was tracked, words were decoded, and demonstrations or context clues were given. Strategies such as *wait-time* enabled Bailey to attempt difficult words on her own before guidance was provided. Bailey was repeatedly praised by T4 and T2

when they were present. This was a benefit not available through TARI but this limitation did not impede Bailey's actualization or self-confidence. It is noteworthy that Bailey's self-perception scores increased in *every* dimension, particularly in Observational Comparison and Physiological States.

There is an important distinction between T4's unintended lack of interaction which was a result of absenteeism and the poor interactions observed in Juan and Toquanda's dyads. In Juan's case it took several days before he and his first tutor began to develop a collaborative relationship. Juan was often inattentive during this time, stalled, or avoided reading tasks which caused T6 to redirect him to TARI activities. She often navigated and, as they peer-edited, provided feedback, encouragement, and pronunciations. Juan typically did not repeat words that were offered but had T6 advance to the next slide because he was anxious to hear his own recorded voice. Referencing Juan's abilities during a peer-editing process T6 said, "I thought he was messing up on a lot of words." She then looked at Juan and added, "This was good for the first time. You were really good but I think you can do better." Juan responded, "That was AWESOME!"

Juan received a new tutor (T6) on the second day of the second week and neither Juan nor T6 were pleased with the change. Over the remaining weeks of the study it was anticipated that the dyad would develop a bond or assistive relationship but this did not happen. The dyad was uncommunicative for the last three days of the second week and while Juan used TARI, T6 only watched but did not track words on the monitor or offer feedback. Their relationship did not improve in the weeks that followed.

Juan was one of the readers who typically arrived early to each session and this pattern continued throughout the remainder of the study. He rapidly and proficiently

accessed TARI activities and routinely read/recorded stories with minimal guidance from T6. The only observed interaction between this dyad was when T6 offered Juan a book and stated, "This one should be relaxing." On a few occasions T6 made encouraging comments but Juan did not engage with him and would inhibit any interactions by saying, "I don't know how to read" which was categorically untrue. Another instance where they disagreed was during an exchange regarding the word *spangled.* Juan needed help to decode the word but T6 refused assistance because Juan had not followed the standard TARI process of listening to narrations before reading/recording. Their disengagement was more likely due to a personality conflict than incongruence in ability level. Similar to Bailey (R4), Juan relied on digital tools which served as a *more capable other* in lieu of T6. However, different from Bailey was *how* he used TARI: Juan routinely skipped listening to narrations and simply read/recorded stories.

Juan marked his Reading Frequency Log without T6's assistance and as a result the artifact did not always reflect the entire number of times he listened to himself or read/recorded. This was one more indication of their lack of interaction and disengagement. While verbal rejection was not overheard, T6 routinely turned his chair away from Juan and would not communicate. Juan's experience would have, most likely been much different if his first tutor had remained to assist and guide him but this was not possible since it was imperative that changes be made on Maria's (R5) behalf. During her final interview Juan's first tutor said that she helped him by offering "hard words" and "finding words." She elaborated and stated, "[Juan] would sound out the words with me. I helped him with the words. I helped him to sound them out. I would point with my finger so he wouldn't skip the words."

Toquanda was the one reader whose self-perception scores declined in three of four dimensions and it is important to consider the circumstances which may have contributed to the changes. Two conditions stand out. First, Toquanda was partnered with a tutor (T7) who had broken her elbow one day before the beginning of the study. It was unknown whether discomfort, disinterest, or her mercurial, emotionally distant state caused T7 to behave erratically. Tutor seven seldom offered assistance when Toquanda made pronunciation or other errors. One time she directed Toquanda to "Wait. Can you start off right here?" but that was the extent of her verbal involvement with the exception of the few times she offered encouragement.

Peer-editing was infrequent which relegated Toquanda to edit independently. On one occasion during the self-editing process Toquanda could not remember how to navigate back to the Record Narration application and without guidance from T7 simply continued to read unaided. When this occurred T7 briefly followed the text and stated, "You are really doing good. You are trying to sound out the words and that's a good thing." More common however, T7 would turn her back towards Toquanda and appeared indifferent or disinterested. Phonemic cues were rarely offered and text tracking was noted only once. When T7 was uncommunicative, undaunted Toquanda routinely read/recorded independently. Her attention to reading tasks was intermittently interrupted when Toquanda took time to attend to the physical needs of T7 such as providing her with a more comfortable chair, re-braiding her hair, or asking how T7 felt. Other times Toquanda ignored T7 as she (T7) cried or sat sullenly.

An example of their variable interactions was during the third week when Toquanda listened to her reading performance while T7 kept her head on the back of the chair and,

initially, did not move forward to hear or peer-edit. I asked, "How did [Toquanda] do?" and there was no reply from T7 but Toquanda reported, "[T7's] not feeling well." To answer my question Toquanda added that she had read "really, really good." Five minutes later I returned to the dyad and observed Toquanda loudly singing a tune which she felt went well with the story. At first I thought the dyad was simply singing a song rather than the text from a book but I was incorrect in this assumption. They repeatedly sang the words to *Just Grandpa and Me* and shared the microphone headset to record their singing performances together. Another isolated and atypical interaction occurred when on two occasions they made up tunes and sang/recorded stories together. Editing was mainly accomplished by Toquanda with little input from T7.

The second condition which stood out was similar to Juan's use of TARI: Toquanda did not listen to narrations before reading/recording. As a result of systematically skipping this part of the iterative process, Toquanda struggled with decoding and may have had limited her ability to comprehend text. Due to her engagement with TARI and lack of assistance by T7 she routinely forgot to mark her Reading Frequency Log and had to return to the presentations to count slides.

Low (distal) interactions and self-perception.

An important finding that applied *only* to the three readers who had low (distal) interactions was that they declined on one or more items referencing their classmates in the Social Feedback dimension. While *all* other readers remained static or increased on the three items related to classmates, Bailey declined on one item and increased on two others but most importantly, Juan and Toquanda declined on all three items, Toquanda's substantially (Table 15; Appendix N). Their overall gains and losses were influenced by

other items related to teachers and family members but this finding illustrates the importance of peer tutoring relationships and quality of interaction.

An example of Juan's unsuccessful or low (distal) interactions was evidenced by his behavior after completing each story. In the absence of collaboration and peer-editing, Juan continued to reread/rerecord stories without input or self-editing and, although his RSPS pretest indicated a high self-perception of his reading abilities, he continuously struggled with vocabulary. This was seen more often with his second tutor who was moved to his dyad during the second week of the study.

Table 15

Low Interactions and Social Feedback Dimension: Classmates

Social Feedback: Items are related to subjects' classmates, teachers, and family.			
Item Description	Bailey	Juan	Toquanda
Classmates: Ability (Item 9)	**1**	*-1*	*-2*
Classmates: Ability (Item 30)	*-1*	*-1*	*-4*
Classmates: Listen (Item 7)	**2**	*-1*	*-2*
Gains/Losses (Items Referencing Classmates Only)	**2**	*-3*	*-8*
Overall Gains/Losses (Items Referencing Classmates, Teachers, Family)	**2**	*-1*	*-10*

The most sizeable loss of all of the readers was Toquanda's ten-point decline in Social Feedback which should not have been as surprising considering the variable conditions of her dyad. As aforementioned her declines referenced her perceptions as

they related to her classmates, but it is also notable that she remained static on items referencing her family members and declined on two of the three items regarding her teacher.

In analyzing the variable circumstances of the dyad it was notable that T7's interactions were distal, mercurial, and erratic, requiring Toquanda to resiliently use the digital tools unaided. When assistance or guidance was provided it was not in the form of reading strategies but, rather, a repetition of words or sentences, encouragement, body language, or compliments. As documented by observations, field notes, and Reading Frequency Log data, she infrequently listened to story narrations before reading/recording herself. She read/recorded 18 times but only listened to modeled reading on six occasions. While she had the flexibility to sequence TARI to fit her needs and interests, it was expected that readers would use the narrations as a tool to build confidence and proficiency and her neglect of using TARI as an electronic more capable other may have been a factor in her resulting lower self-perception as a reader. Nevertheless, she reported in her final interview that she enjoyed using TARI and working with T7. She stated:

> It helped me become a better reader. I can fix my mistakes without people yelling at me. I can rerecord the words I messed up. When I get a word wrong [T7] helps me figure that word out and she—when we come to a compound word—she helps me to sound out each side [and] helped me know how to break down some of the really long words.

Her tutor elaborated, "I would split the words up and I could act them out if I couldn't split it." This was a surprising statement since I had never seen T7 act out any words or concepts during the entire study and I had spent a considerable amount of time observing and documenting this dyad's interaction. A possible explanation of T7's perception was

that she was the identical twin of another tutor in the study. Although it is speculative, their home conversations may have involved my study and the twin (T1) could have shared some of the strategies she used with her reader.

A substantiation of, as well as a challenge to the research of Duran and Monereo (2005) were related to the benefits of tutoring programs. I agree that the role of the tutor and tutee should determine the interactive relationship and types of interaction that evolve. However, I challenge the rigid frameworks which they identify as being best in certain situations and offer an explanation. The researchers found that regardless of whether tutoring structures were fixed or reciprocal, the mere act of "having a companion with whom to dialogue and exchange points of views" may enable development (p. 181). In my study it appears that the effectiveness of the dyads was related to the characteristics of both the reader and tutor as well as the readers' zone of proximal development within which they are collaborating. This also substantiates research on sociocultural environments which have shown learner development when tutor characteristics and learner abilities are considered (CCTP, 2010; Cates, 2005; Vygotsky, 1978, 1986; Wells, 2000, and Wink & Putney, 2002).

Furthermore my research substantiates Donalson and Halsey's (2007) findings that negative attitudes and perceptions of readers' ability not only prevented subjects in a remedial reading class from learning, but also reaffirmed their refusal to attempt academic tasks. Such was the relationship of low level (distal) interactions between Juan and Toquanda and their respective tutors. To some degree it may have also influenced Maria but a change in dyads was made early in the study and her subsequent tutor balanced the negative behaviors her first tutor may have demonstrated. I would argue that

there needs to be flexibility in tutoring structures to allow subjects opportunities via digital tools to compensate for tutors who are not assisting or guiding as expected.

Eight overarching findings were related to interactions while using TARI and the influence of tutors on readers (Table 16). Overall, the readers' self-perceptions *as* readers improved for all but one subject, Toquanda; there was no notable relationship between complimentary feedback and self-perception; characteristics of tutors affected readers' independence; and the dyad relationship influenced *tutors'* self-perceptions.

Table 16

Major Findings: Interactions and Influence of Tutors

Self-Perceptions and Developing Independence
1. Three of seven readers (Kanishah, Bailey, and Maria) showed increases in *all* dimensions of the Reader Self-Perception Scale (RSPS). 2. One reader (Rashawn) showed increases in three dimensions of the RSPS but remained static in Physiological States. 3. Two readers (Jamal and Juan) showed increases in two and three dimensions respectively but declined in one dimension each. 4. One reader (Toquanda), the outlier, declined in all but one dimension of the RSPS. 5. Three levels of interaction influenced readers self-perception: • High (Proximal): The reader (Maria) with the highest positive change in self-perception developed independence by the third week of the study and had high levels of interaction. • Moderate: Two readers (Kanishah and Jamal) made overall increases on the RSPS and Jamal demonstrated independence by week three. • Low (Distal): Three readers (Bailey, Juan, and Toquanda) had low interactions, two of which were related to their tutor's lack of interaction or disengagement and one (Bailey) by her tutor's absenteeism. o All three readers designated in the low interaction category showed a decline in self-perception on RSPS items related to their classmates in the Social Feedback dimension. o One reader (Bailey) ameliorated her tutor's absenteeism by independently using digital tools and therefore had an *overall* increase (two points) in the Social Feedback dimension. 6. The characteristics of tutors and the dyads in which they are placed may have a direct relationship to the degree of effort and interaction a reader exhibits. 7. There was no notable relationship between the propensity for, or lack of, complimentary feedback and change in self-perception. 8. Unanticipated findings: • Five of seven *tutors* showed moderate to substantial increases to their own self-perception as indicated on their RSPS posttest. • Self-perception scores of two tutors whose readers were designated as having low (distal) interactions level declined on the RSPS posttest.

Use of Digital Tools

The Technology-Actuated Reading Instruction (TARI) process was created to support readers by leveraging digital tools in an iterative framework (Figure 2). It was anticipated that readers would systematically listen to modeled narrations prior to reading/recording stories themselves and by so doing build content knowledge and activate schema through formulation and reformulation. The digital tools were designed to enable readers to self-regulate their learning (Kalyuga, Chandler, Tuovinen, & Sweller, 2001; Lawless & Brown, 1997; Paas, Renkl, Sweller, 2003; Wink & Putney, 2002) and I would argue that, for some readers, TARI actuated the learning process through the scaffolding of information and the use of differentiated text. Self-regulated learning is related to the independently-generated thoughts, actions, and feelings that an individual plans and systematically adapts to influence their own motivation and learning (Marchand & Skinner, 2007).

The multimedia design was considerate of research which identified effective instructional models. The Four-Component Instructional Design Model posited by van Merriënboer and Kester (2005) and Gagné's (1985) nine conditions of learning were therefore integrated to into meaningful and scaffolded learning tasks, supportive and procedural information, practice, attention gaining, and schema activation. Assistance, guided questioning, and feedback were typically facilitated by tutors but in their absence or disengagement, readers performed these learning strategies independently. While TARI was intended to be flexible, readers and tutors had an understanding of the overall objective and tasks needed to reach the learning goal: a final reading product. My

research did not follow readers into their regular classroom, and knowledge transfer and generalizations to new situations are unknown leaving room for future research.

The use of the TARI model also took into account research on worked examples which scaffolded information (Duran & Monereo, 2005; Morrison & Anglin, 2005) and the expertise reversal effect (Kalyuga, 2007; Kalyuga, Ayres, Chandler, & Sweller, 2003; Paas, Tuovinen, van Merriënboer, & Darabi, 2005). Morrison and Anglin (2005) summarized that in the absence of prior knowledge, learners will not efficiently use exploration practice and need worked examples and practices strategies which "can lead to the development of expertise" (p. 101). Readers who were more challenged by decoding could repeatedly listen to and then imitate narrative examples while others who demonstrated more competence were able to bypass these reading activities. More expert readers, or those who became expert, could move forward towards more meaningful and higher order thinking tasks of analyzing and evaluating reading performances, a strategy for learning not frequently used in many classrooms (Radecki, 2009; Schrader, 2008).

During the first week four of seven readers typically relied on their tutors to navigate TARI and only Jamal (R3), Juan (R6), and Toquanda (R7) showed initial confidence with the digital tools (Table 17). As familiarity and confidence grew, readers were more often observed navigating the program on their own and by the end of the second week all but one reader, Kanishah (R1), did so consistently. This was particularly evident when tutors were absent. In the first week of the study, if a tutor was absent or tardy the reader would raise his or her hand and ask me for help and this behavior became more infrequent to the point that all readers advanced their own slides with intermittent, rather than systematic assistance.

Table 17

Pattern of Using Digital Tools

Readers	Week One	Week Two	Week Three	Week Four
Kanishah (R1)	T	P	P	P
Rashawn (R2)	T/P	I/P/S	S	S
Jamal (R3)	T/I	P/S	S	S
Bailey (R4)	T/P	I/S	S	S
Maria (R5)	T	P/S	S	S
Juan (R6)	T/P/I	S	S	S
Toquanda (R7)	T/I	S	S	S

Note. T = Training on use of digital tools; I = Initial effort; P = Periodic effort; S = Sustained effort.

Audio playback was used during both listening to and editing processes and many readers were motivated by hearing their own voice. This finding applied to all readers with the exception of Kanishah and Rashawn. Juan was the reader who was most interested in the iterative process, but Jamal, Bailey, Maria, and Toquanda also made mention of their enjoyment and use of TARI. The most common finding in the use of digital tools was that readers listened to narrations to improve their own reading performances. The exception to this was Toquanda who rarely used this iterative affordance and whose self-perception declined in three of four dimensions. Two exemplary statements describing their experiences were made by Juan and Jamal. Juan stated in his interview,

> I got to hear the words like [the narrator], then I hear the words, then the words I mess up and I try to remember how [the narrator] said it.

> It's easier to hear it first because every time on the computer I hear it first and then I can pronounce it.

Jamal also reported that interacting with TARI "helped me by first you can listen to the book and get used to the words then you can try reading it by yourself."

Furthermore all readers enjoyed using TARI and of the five readers who showed particular motivation, (Jamal, Bailey, Maria, Juan, and Toquanda), their tutors' lack of interaction or engagement was not an impediment to them in their use of digital tools. Readers may have enjoyed using TARI because labels or ability grouping were not associated with the program (e.g. *Moons).* One reader in particular (Bailey) was extremely cognizant of reading labels in her regular classroom and compared herself repeatedly to the *Shooting Stars* and *Asteroids* who were more proficient readers. In the interview following the RSPS pretest she disagreed with the item referencing that her teacher thought her reading was fine and stated, "I'm in the low level. I'm in *Moons"* but in the follow-up posttest interview she agreed with the item, indicating a change in self-perception and actualization.

Additionally, readers may have enjoyed TARI because they could self-select, pace, evaluate, and correct their reading performances in a safer environment than found in some instructional settings which use whole group practice for reading activities. Toquanda explained that in her classroom they take turns reading and that she liked having the ability to read an entire book. "In our regular class we only get to read a paragraph, in here we read a whole book." She stated that her classmates often illuminated and discussed her errors in the whole group setting and that it was "not very nice. Sometimes the people who are mad at me or don't hang out with me might cover their ears or read ahead of me." Over the course of the four weeks the freedom to self-

select learning tasks motivated readers to attempt more challenging books and spend more time practicing reading (Appendices D, E, F, G, H, I, J, and K).

While Kanishah stated that she liked using a laptop she did not appear to become involved with TARI to the degree as other readers. An explanation of her behavior may be found in her well-seeded propensity to avoid reading regardless of its format. Rashawn was not a very demonstrative child and, in the beginning of the study, he was timid, kept the volume of his voice low, and occasionally exhibited off-task or avoidance behaviors. As with several other readers, this changed for him by the end of the second week when he began exhibiting much more initiative with navigating, selecting books, and checking out books overnight.

My findings substantiate research by Pass, et al. (2005), Morrison and Anglin (2005), and Duran and Monereo (2005) regarding the importance of worked examples and exploratory affordances. The iterative TARI process provided a collaborative system for learning with an emphasis on practice and gave readers opportunities to use differentiated text and scaffold information based on their zone of proximal development (Vygotsky, 1986). It also supports findings from Jonassen et al. (2005), Lawless and Brown (1997), and Schrader (2008) regarding the benefits of immersive environments and user-control which enable learners to interact in ways that may not be found in traditional classroom settings. Lastly, in the digital tools category, my research substantiates Gunn's (2009) and Witt's (2009) findings in that interaction with tutors or digital tools contributed in problem solving situations, accelerated confidence, and influenced motivation and self-perception.

Nine major findings were related to the interactions and influence of Technology-Actuated Reading Instruction (TARI) on readers. Readers enjoyed using digital tools and, by the end of the study, all but one demonstrated their use without their tutor's assistance. Six of seven readers showed self-confidence and motivation and used the digital tools as an iterative process (Table 18).

Table 18

Major Findings: Interactions and Influence of TARI

Digital Tool Use and Developing Independence
1. Six of seven readers demonstrated independence in their use of digital tools, the one exception being Kanishah. 2. Six of seven readers' self-confidence or motivation was improved by scaffolding information and leveraging affordances (self-selection, sequencing, pacing, repeatability, and recording/playback) within their zone of proximal development. 3. Technology-Actuated Reading Instruction (TARI) served as a more capable other in lieu of low interactions for two of three readers. 4. Six of seven readers used modeled narrations routinely before attempting to read/record. 5. The reader (Toquanda) who did not use modeled narrations scored the lowest on the Reader Self-Perception Scale (RSPS) and had low level interactions with her tutor. 6. Readers self-regulated and self-edited when tutors were absent or disengaged: the fact that TARI did not provide feedback was not a limitation. 7. Four of seven readers (Rashawn, Jamal, Maria, and Juan) began to consistently arrive early to study sessions to access TARI before their tutors. 8. TARI increased the self-confidence and independence of one reader (Bailey) partially because it did not label or group by ability. 9. TARI opened unexpected avenues for creativity for four dyads: Kanishah (shadow reading); Jamal (burp); Juan (singing *Star Spangled Banner*, *Happy Birthday* and creating a "beat song);" and Toquanda (creating tunes to fit story text).

The one outlier, Toquanda, did not use TARI as designed and her self-perceptions were the lowest of the subjects. In two instances TARI served as a *more capable other* in the absence of tutor assistance or guidance. Readers and tutors were motivated by TARI and arrived early to study sessions to use the digital tools. An unanticipated outcome of the TARI process was that it opened avenues for creativity for four dyads. Kanishah

shadow read while following along as her tutor read from the computer monitor. Jamal recorded a burp, laughed, and then returned to reading activities. Juan whistled or sang the *Star Spangled Banner* and *Happy Birthday* when he saw them referenced in the books he was reading. He also recorded his own "beat song" and, after he discovered that he could quit at any time, chose to read/record an entire, 40-page story. Toquanda created music to text (lyrics) while she read from stories transcribed onto TARI.

Developing Independence

Technology-Actuated Reading Instruction (TARI) was designed to be an actuator of learning through the use of interaction in a pseudo-social environment. In a more traditional setting the actuator would be language which flowed between individuals (Vygotsky, 1978, 1986; Wertsch & Tulviste, 1992). Wink and Putney (2002) extended this concept and added that in a reciprocal sense the use of language changes thinking and actions and thinking and actions change language. It was interesting therefore to design and implement a study which enabled readers the opportunity to use digital tools that attempted to replicate an environment driven by Vygotsky's Sociocultural Theory and allowed students differentiated text and learning activities which provided scaffolding of information as they worked within their own unique zone of proximal development. In order to adequately analyze this type of setting my study took a microgenetic approach to identify if and when changes occurred in readers. This enabled me to document at what point readers demonstrated attributes that could be interpreted as a difference in their self-perception as a reader. Considering learning is cognitively demanding and many variables influence a learners ability and willingness to read, what my study could not do was to make a clear distinction between who or what was the

catalyst and actuator of learning for each reader. This warrants further investigation into the "idea that computers [can] be a catalyst to some new and exciting approaches to education" (Strudler, 2010, p. 222).

For most readers their developing independence was made in incremental steps. First they began navigating TARI until, during the last two weeks, all but two readers had sustained use of program navigation. Second, the election of what books to read was highly dependent on tutors' recommendations at first and many readers would not indicate a preference, forcing the tutor to select a book without reader input or feedback. This changed for all of the readers by the end of the second week.

Third, one of the most important findings was that six of seven readers demonstrated independence, initiative, and self-motivation when they began checking out books to share with their families at the end of the second week and during the third and fourth weeks (Table 19).

Table 19

Developing Independence

Reader	Navigated TARI				Self-Selected Books				Checked out Books			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Kanishah	P	P	P	P	P/I	P	I	S				
Rashawn	P	I	S	S	I	S	S	S		I	S	S
Jamal	I	P	S	S	I	S	S	S			I	S
Bailey	P	I	S	S	P	I	S	S			I	S
Maria	P/I	P	P	P	P/I	P	S	S		I	S	S
Juan	I	S	S	S	I	S	S	S			I	S
Toquanda	I	S	S	S	I	S	S	S		I	S	S

Note. I = Initial effort; P = Periodic effort; S = Sustained effort.

I had asked readers and tutors if they wanted to borrow books overnight and without exception they declined until the second day of the second week. It was at this point that Toquanda decided to take home the book she had been practicing. Another reader overheard and also asked if she could take home a book. This continued with more readers adopting the same behavior and exhibiting self-confidence in selecting typically challenging books to share at home or read in class. Some books included the stories that had been purchased and incorporated into TARI and other books came from the library located in the research study classroom. Tutors also began taking books home overnight.

Eight major findings related to changes in readers were documented although their source is undetermined (Table 20). Most importantly six of seven readers' self-perceptions improved as a consequence of their tutors' interaction, TARI, or an integration of both. All readers selected and read more challenging stories after the first week and all but one reader began taking typically difficult stories home overnight to share with their families. In several instances the volume of readers voices while recording increased from their initially timid beginnings. Another important finding was that five of seven readers switched roles and served as a more capable other to their tutor. The two readers (Juan and Toquanda) who did not change were categorized as having low (distal) interactions.

In lieu of their tutors disengagement or absence, readers self-edited their reading performances. Additionally, most readers began coming early to the study session to access TARI before their tutor arrived and this may have been influenced by either their enjoyment of TARI, their dislike of their tutor, or some other condition. The last finding was that a readers' developing independence did not necessarily correlate to improved

self-perception as a reader and further research is warranted to study the phenomena of tutoring relationships, interaction, and use of digital tools.

Table 20

Major Findings: Changes Related to Undetermined Source

Behaviors and Developing Independence
1. Tutors and/or Technology-Actuated Reading Instruction were actuators of learning for six of seven readers. 2. Following the first week, of their own accord seven out of seven readers increased the level of difficulty in reading by selecting more challenging books following the first week of the study. 3. All but one reader (Kanishah) began taking risks by selecting challenging books to check out overnight to share with their family and the lack of TARI narration did not inhibit this behavior. 4. Four of seven readers (Rashawn, Jamal, Maria, and Juan) were motivated to increase their reading practice time via TARI as evidenced by their early arrival to study sessions. 5. Five of seven readers (Kanishah, Rashawn, Jamal, Maria, and Bailey) either switched roles with their tutor and served as a *more capable other* or re-taught their (Bailey's) tutor how to use digital tools. 6. Two of seven readers (Juan and Toquanda) who did not change roles with their tutors also had low (distal) level interactions. 7. The volume of readers' voices during reading/recording activities increased as confidence developed. 8. Developing independence did not always relate to self-perception.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The topic of my study was to investigate the interactions and self-perceptions of seven underperforming readers as they worked with same-age peer tutors during the Technology-Actuated Reading Instruction process. Technology-Actuated Reading Instruction (TARI) was defined as a multimedia, text and sound program which presented readers with opportunities to utilize digital tools to listen to adult-modeled narrations, read and record all or part of stories, playback and peer- or self-edit reading performances, and save their best reading products in an electronic portfolio.

The threefold purpose also explored the influence TARI and peer tutoring had on these fragile readers. The multiple case study documented behaviors, interactions, and assessments and answered three guiding research questions:

1. How do underperforming, third-grade readers interact with their peer tutor while using Technology-Actuated Reading Instruction?
2. How does the Technology-Actuated Reading Instruction process influence underperforming readers' self-perceptions as readers?
3. How does the process of same-age, peer tutoring influence underperforming readers?

Discussion of Results

Three themes emerged from the investigation and analysis of triangulated multiple data sources which included daily observations and field notes, semi-structured

interviews, pre- and posttest Reader Self-Perception Scale scores, artifacts, and readers' Reading Frequency Logs. The first theme, types of interactions, answered the first and third questions of how underperforming readers interacted with their tutors during TARI and how the process influenced underperforming readers. Explicit examples are detailed in individual case studies but exemplars warrant reiteration.

As expected, tutors relied on their own background knowledge when providing assistance. They typically tracked text by using the eraser-end of a pencil and either sounded out words by offering letter/sound enunciation or provided entire words without pronunciation guidance. In some instances tutors gave context clues, drew pictures, and/or demonstrated actions to illustrate words or concepts. Dyads which collaborated in this way were categorized as having high (proximal) interaction and it is noteworthy that the reader who had the lowest reading skills (Maria) also had the highest interaction which correlated to her improved self-perception and self-efficacy as evidenced by her posttest Reader Self-Perception Scale score and new enthusiasm for reading.

All but one outlier (Toquanda), or 86 percent, showed improved self-perception and all but one other reader (Kanishah) routinely checked out more complex books. Data analyzed from their Reading Frequency Logs indicated that the book Lexile levels increased in difficulty following the first week which suggests increased self-confidence, willingness to take risks, and actualization: readers' perceptions that they would be successful reading more challenging text (Figure 21). The story selections referenced in the Reading Frequency Log exclude the increasingly difficult books readers checked out overnight to share with their families. Had they been included, the data would have shown more sizeable growth in readers' attempts with books at higher Lexile levels.

Figure 21. Reading Frequency Log: Increase in Challenging Books

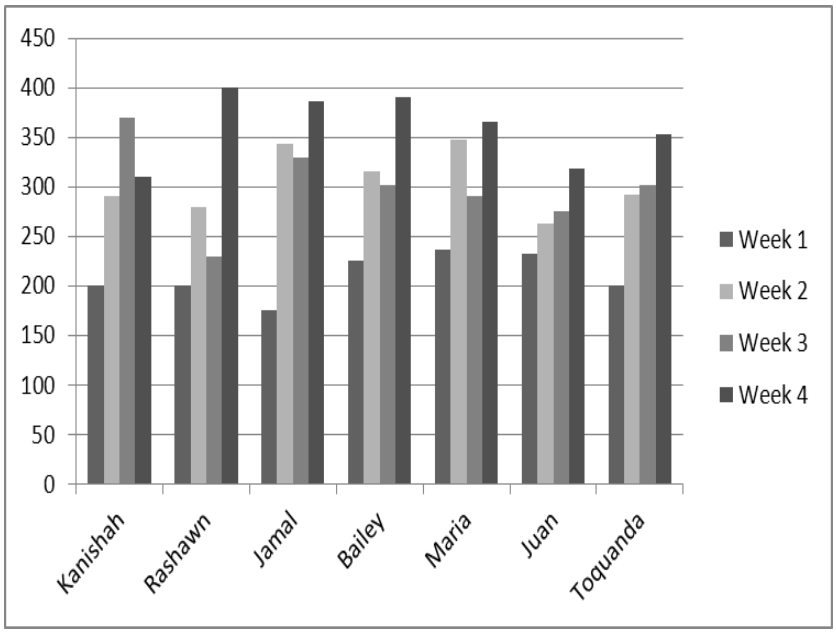


Figure 21. The Lexile level is indicated on the x-axis and shows an increase in the difficulty of books readers selected following week one.

Two readers had moderate levels of interactions with their tutors and had improved self-perception on their overall RSPS score. Three readers (Bailey, Juan, and Toquanda) were classified as being with tutors where low (distal) interactions were the norm but only one of the three showed a considerable decrease in self-perception (Toquanda). Nevertheless all three readers with distal interactions demonstrated characteristics of actualization: they self-regulated their reading efforts, self-edited reading performances, and/or checked out challenging books overnight. It is important to remember that Bailey's lack of interaction was due to her tutor's absenteeism and, in her tutor's absence she relied heavily on the TARI process to substitute for a more capable other. It is also

noteworthy that in spite of poor interaction, Bailey's self-perception at the end of the research study registered some of the highest scores of all other readers.

The second and third themes, use of digital tools and developing independence, answered the second and third research questions. As aforementioned, regardless of the level of interaction with their tutor, TARI became a tool which motivated most readers to practice more often, differentiated instruction, and scaffolded reading activities to increase confidence. Four of seven readers routinely reported that they enjoyed listening to their own recorded stories and would regularly arrive early to the study session to begin working independently with TARI prior to their tutor's arrival. An important finding therefore was that these underperforming readers increased their practice time of their own volition.

There are several other reasons to which we may attribute changes in self-perception, actualization, and self-confidence to TARI and readers' developing independence. First, TARI was fun as evidenced by four readers (Kanishah, Jamal, Juan, and Toquanda) who used TARI creatively (shadow reading, "beat songs," and unique tunes to match text). Second, most readers reported that hearing the modeled narrations helped them with the vocabulary and prosody of stories. The leveraged affordances available through TARI (e.g. pace, repeatability, and playback) were key features and had a positive influence on readers. One example of this is Juan's statement:

> I got to hear the words like [the narrator], then I hear the words, then the words I mess up and I try to remember how [the narrator] said it. It's easier to hear it first because every time on the computer I hear it first and then I can pronounce it.

Third, TARI allowed readers opportunities to self-select books and an important finding was that readers inherently began selecting more challenging text without being

prompted. Fourth, TARI is non-judgmental and none of the readers in the study were categorized or treated as poor readers. Bailey specifically referenced the fact that in her regular classroom she was in *Moons*: the lowest of all reading groups. Readers did make periodic comparisons with each other, but labels which may have affected their self-perceptions of their reading ability were never used. Readers had the freedom to select and pace instruction as it applied to their personal zone of proximal development.

Readers began to demonstrate their developing independence after the first week when they typically navigated TARI with minor assistance or guidance from their tutors. The one exception to this statement was Kanishah who did not show sustained independence in this area and it is interesting that she was the only reader who, also, never checked out a book. Additionally, it is notable that the one outlier (Toquanda) whose self-perception fell extensively had very low interaction with her tutor and rarely used the modeled narrations prior to reading/recording herself.

Implications and Limitations

Implications derived from this research may be far reaching given that a change in self-perception can influence underperforming readers to take risks in learning that they may not otherwise attempt. The subjects of my study were inherently aware of their reading abilities and, of their own volition, differentiated and scaffolded reading activities in a progressively challenging way without prompts or directives.

Potentially, my research study may also have an impact on instructional practices. Children need opportunities to become empowered in their own learning. This can be accomplished when they are given a variety of learning tasks from which they can

choose, and by giving them multiple chances to self-regulate and improve their work (e.g. reading performances) in a semi-private, safe environment. One-hundred percent of the readers pursued more complex texts over the four weeks of the study. Four of seven spent more time practicing their reading outside of the study session and it is suggested that their behaviors changed because of their enjoyment of TARI and the iterative processes found therein. According to Marchand and Skinner (2007), children who perceive themselves as competent are more likely to seek help when needed and less-likely to conceal their inadequacies. An ongoing concern with children who feel inadequate is that the division in ability level becomes exacerbated as they grow into adolescence which is another justification for interceding early in elementary school (Ismail & Alexander, 2005; Marchand & Skinner, 2007). Smith (1990) describes attitudes in reading as a "state of mind, accompanied by feelings and emotions that makes reading more or less probable" (p. 215). It therefore is argued that increased time and motivation to learn is related to learners' self-perceptions, time on learning tasks and, as a byproduct, student achievement.

A sub-theme found in the data was the relationship between low levels of interaction and the items referencing readers' classmates in the Social Feedback dimension of the Reader Self-Perception Scale. Of those who were designated as having low (distal) interactions (Bailey, Juan, and Toquanda), all declined on one or more of their item selections while other readers either remained static or increased in this area. It is hypothesized that the declines for two of these three were minimal because of their engagement with TARI. This implication is important considering tutoring frameworks may not be consistently implemented due to variable circumstances, conditions, or

personalities of the participants. In lieu of low level or poor tutoring dynamics, TARI may serve underperforming readers as a more capable other and empower them where human assistance may not. My research found, however, that a fundamental caveat preceding independent TARI usage is that readers should be adept at navigating digital tools.

With reference to the two readers (Bailey and Juan) who had low interactions but improved on their Reader Self-perception Scale, their experiences may be used as *telling cases*. In her ethnographic exploration of a community of fifth-grade learners *(Tower Community)*, Putney (1997) describes how one subject's experiences were interpreted as a telling case. A telling case does not require empirical, contrastive comparison or measurement but rather serves as an *indication* of change. While dissimilar in context, the concept applies to Bailey (R4) and Juan (R6) since, in both research studies, subjects used available *resources* to mediate and improve conditions of learning. In my study the resource was TARI but Putney's subject, Areli, accessed *human resources* to assimilate back into the learning community after an absence of four months. Putney writes, Areli used the "social and academic practices of the collective [as] cultural resources . . . in re-establishing her position as a member of the community" (pp. xiv-xv).

In the case of Bailey and Juan, their social network (tutors) were neither providing adequate support nor helping them to progress. Consequently, they accessed the digital tools (TARI) to compensate and accomplish the tasks at hand. The results from their Reader Self-Perception Scale showed an overall improvement in self-perception and, coupled with a backdrop of Putney's research, indicates that changes may have been due

to TARI. This further illustrates the importance of providing individuals with opportunities and resources (digital *or* human).

An extension of low level interactions and items in the Social Feedback dimension referencing classmates were the findings of one outlier (Toquanda). Her self-perception scores declined substantially and it is notable that, in addition to her distal interactions she rarely used TARI as an iterative tool to listen to modeled narrations prior to reading/recording stories herself. It is recommended that, rather than implementing TARI with complete flexibility where subjects are allowed to self-select, sequence, and self-pace *all* activities, some children may benefit by having more structured, progressive steps to their learning tasks.

My study had a few limitations. The first involved the Reader Self-Perception Scale (RSPS) which was normed for fourth grade students. This issue was moderated by selecting subjects who were near in age to the normed population and conducting the research in the second semester of the third grade. When administering the scale I discussed and provided examples regarding the meanings of each level of rating (strongly agree, agree, neutral, disagree, strongly disagree) and allowed ample wait-time for participants to complete each item. In an effort to increase the validity of their answers, posters of emoticons giving a visual representation of each level were posted around the room for easy viewing and on several occasions participants were observed looking at the images before marking selections.

The second limitation was that my study may not be easily generalizable to other, similar populations. While I maintained a moderate participant-observer role, the synergy that developed because of the uniqueness of the participants and surroundings may not be

easily reproduced. Given that learning is cognitively demanding many variables influence a learner's ability and willingness to read. What my study could not do was to make a clear distinction between who or what was the catalyst and actuator of learning for each reader. The subjects' races and ethnicities were varied and this may also be a factor in changes in self-perceptions based on the racial/ethnic make-up of the dyads which would be difficult to replicate in a larger study or generalize to a larger population.

Third, the sample size in my study was relatively low, seven readers and seven tutors. This criterion opens the door to a possible Type II error in that my findings may not have detected a result when it was actually present (false negative). To rectify this limitation larger sample sizes are suggested although it would prove difficult for one researcher to attend to and accumulate *daily* observations and field notes needed to adequately describe more sizeable case studies in detail.

Fourth, TARI activities were also created with the target population and situation in mind and replication may not be possible in its purest form. Designing a program which allows learners the same opportunities to use digital tools with the guidance of a mediating tutor is, nevertheless, doable. It is important to remember that participants were trained to use TARI which increased the likelihood of having authentic data and it is not recommended that subjects engage in TARI without initial training on navigation and use of digital tools.

Recommendations for Further Study

As aforementioned it has neither been determined, nor was it a research question, as to the igniting catalyst for change in six of seven underperforming readers: peer tutoring,

Technology-Actuated Reading Instruction, or a synthesis of both. Therefore a comparative study extending my research study and/or a follow-up study investigating sustained changes in self-perception are warranted. Additionally, a study which follows the Vygotsky/TARI model may want to intentionally consider an environment in which subjects could readily check out books. It was a fortunate, yet an unanticipated consequence of my study's location that readers were able to check out library books when self-perceptions of their reading ability began to change.

Considering the majority of tutors also showed improvement in the self-perceptions of their own reading abilities, it is suggested that a qualitative exploration regarding the most-effective characteristics of tutoring relationships be investigated. This would expand research which focuses primarily on the tutee rather than the tutor and would add to the body of knowledge regarding the benefits of peer tutoring on the *more capable other* (tutor) rather than the tutee.

My research study substantiates John-Steiner's argument that both students *and* teachers are learners (Wink & Putney, 2002). It incorporates the concept of, *complementarity*, in that readers and tutors in my study may have developed a "mutual internalization, a making into one's own some aspect of one's partner's knowledge" (John-Steiner & Meehan, 2000, p. 45). As an active method of restructuring knowledge from their collaborative relationships, the internalization of several of my participants particularly involved shared meanings and co-construction, "leading to creative contributions" (Wink & Putney, 2002, p. 151). In the words of John-Steiner (1997),

> When these collaborations are successful, novices develop fluency, and learn how experienced artists and scientists think. At the same time, such collaborations offer renewal for the experienced individual and the use of shared knowledge for the novice's development of self. (p. xxiii)

There appears to be a dearth of qualitative literature regarding underperforming minor-age readers and much of the reading research examines quantitative data of elementary school children possibly because empirical data is easily obtained. More challenging is a mixed methods effort to obtain a global view which considers qualitative aspects of learning (*how* children learn) synthesized with quantitative (results of *what* children have learned). A follow-up study to my research may encompass *what goes beyond* peer tutoring and TARI. For instance, will students who are motivated by digital tools practice more and therefore become more capable readers? Will self-perceptions of underperforming readers change if they are given opportunities to: (a) self-select a variety of text based on their interests; (b) self-regulate; and/or (c) refine their reading performances? An additional follow-up could include these same questions in relation to classroom use of TARI as an integral instructional practice.

Lastly, the items referencing readers' classmates in the Social Feedback dimension of the Reader Self-Perception Scale may merit further exploration. To what degree do classmates influence their peers? Can types of interaction have a deleterious influence on those who struggle with reading? How can negative influences of peers be ameliorated by the use of digital tools?

Conclusion

Tutoring frameworks and the implementation of digital tools into curricular strategies are pervasive yet many have undefined outcomes. Part of the problem has been in understanding the influence these dynamic systems have on underperforming readers. In my study the interaction dyads experienced was a social act, and it was found that six of

seven underperforming readers showed an increase in their self-perception related to their involvement with either a peer-tutor, TARI, or both.

Technology-Actuated Reading Instruction provided a safe environment and served as a more capable other when tutors were unresponsive or unavailable. Progress towards more challenging books was determined primarily by each subject and, while one reader continued to reread the same story using it as a touchstone over and over again, most subjects varied their selections and attempted more difficult texts over time. Even Kanishah, who continued to reread the same low-level book, attempted more complex stories. There was one outlier who experienced a decline in her self-perception in three dimensions of her Reader Self-Perception Scale (RSPS) posttest. However, it is important to note that she also showed ownership and independence when manipulating and using the digital tools afforded through TARI. Explanations as to the reasons behind her losses have been offered but are mainly attributed to her tutor's lack of interaction and the subjects practice of skipping one key component of the iterative TARI process: listening to narrations prior to reading/recording.

The three-tiered approach to determining the levels of interaction was helpful as I compared RSPS scores to the amount, type, and quality of interactions between readers and tutors. While making distinctions between levels and their correspondence to quantitative data a sub-theme was revealed, the relationship between low (distal) interactions and Social Feedback items regarding readers' classmates. In all three cases students who had low levels of interactions declined on one or all of these items, some considerably. Conversely, subjects with high or moderate levels of interactions showed overall gains and improvement in their self-perceptions as readers. They also

demonstrated behaviors that inferred actualization specifically with their increased time on task, willingness to attempt more challenging books, self-regulation, and self-efficacy. Lastly, Technology-Actuated Reading Instruction served to reduce or minimize limitations of tutors and, overall, benefited subjects by increasing their self-confidence and independence. It is anticipated that immersive environments such as TARI coupled with highly interactive peer tutoring frameworks will enable underperforming readers to become empowered in their own learning.

APPENDIX A

PERMISSION TO USE READER SELF-PERCEPTION SCALE

January 2, 2011

William Henk, Ed.D.
Dean, College of Education
Schroeder Health Complex, 124
Marquette University
P.O. Box 1881
Milwaukee, WI 53201-1881

Dear Dr. Henk,

I am a doctoral candidate at the University of Nevada, Las Vegas and am currently preparing the research proposal for my study. The area of interest is a multiple case study investigating the interactions and self-perceptions of struggling, third-grade readers before, during, and after reading interventions. To that end, I am requesting your permission to use the *Reader Self-Perception Scale* (RSPS). The use will be for noncommercial educational purposes only and will not be used for profit. Also, the RSPS will *not* be included in the appendices of my dissertation. Please let me know if this meets with your approval and how you prefer to be credited.

Thank you for your consideration. I look forward to hearing from you at your earliest convenience. My contact information is listed below, but I can also be reached electronically at bldaw@interact.ccsd.net.

Thank you,

Brenda Daw

Brenda Daw
7932 Tern Court
North Las Vegas, NV
89084
(702) 353-7076

As confirmed via e-mail correspondence, Dr. Melnick and I give our permission to use the RSPS for the purposes you cite under the conditions you stipulate. William A. Henk 1/10/11

APPENDIX B

STORY TITLES AND NUMBER OF SLIDES

Title	# of Slides	Title	# of Slides
A to Z Mysteries: The Goose's Gold, Chapter 1	18	*Just Grandpa and Me*	11
A to Z Mysteries: The Goose's Gold, Chapter 2	20	*Magic Tree House: Dingoes at Dinnertime,* Chapter 1	23
A to Z Mysteries: The Goose's Gold, Chapter 3	16	*Magic Tree House: Dingoes at Dinnertime,* Chapter 2	25
A to Z Mysteries: The Goose's Gold, Chapter 4	18	*Magic Tree House: Dingoes at Dinnertime,* Chapter 3	19
A to Z Mysteries: The Goose's Gold, Chapter 5	13	*Magic Tree House: Dingoes at Dinnertime,* Chapter 4	19
A to Z Mysteries: The Goose's Gold, Chapter 6	13	*Magic Tree House: Dingoes at Dinnertime,* Chapter 5	15
A to Z Mysteries: The Goose's Gold, Chapter 7	15	*Magic Tree House: Dingoes at Dinnertime,* Chapter 6	14
A to Z Mysteries: The Goose's Gold, Chapter 8	18	*Magic Tree House: Dingoes at Dinnertime,* Chapter 7	20
A to Z Mysteries: The Goose's Gold, Chapter 9	16	*Magic Tree House: Dingoes at Dinnertime,* Chapter 8	22
A to Z Mysteries: The Goose's Gold, Chapter 10	13	*Magic Tree House: Dingoes at Dinnertime,* Chapter 9	14
A to Z Mysteries: The Goose's Gold, Chapter 11	18	*Magic Tree House: Dingoes at Dinnertime,* Chapter 10	17
Amelia Bedelia and the Surprise Shower	54	*Mr. Putter and Tabby Stir the Soup*	41
Arthur and the Cootie Catcher	53	*Nate the Great and the Pillowcase*	87
Berenstain Bears and the Missing Honey	27	*Watch Out! Man Eating Snake!* Chapter 1	12
Clifford the Small Red Puppy	20	*Watch Out! Man Eating Snake!* Chapter 2	13
Curious George Takes a Train	28	*Watch Out! Man Eating Snake!* Chapter 3	13
Danny and the Dinosaur	43	*Watch Out! Man Eating Snake!* Chapter 4	14
Fox on the Job	55	*Watch Out! Man Eating Snake*! Chapter 5	12
Henry and Mudge and the Wild Wind	31	*Watch Out! Man Eating Snake!* Chapter 6	11
Horrible Harry and the Ant Invasion, Chapter 1	60	*Watch Out! Man Eating Snake!* Chapter 7	12
Horrible Harry and the Ant Invasion, Chapter 2	35	*Watch Out! Man Eating Snake!* Chapter 8	12
Horrible Harry and the Ant Invasion, Chapter 3	29	*Young Cam Jensen and the Zoo Note Mystery*	36
Horrible Harry and the Ant Invasion, Chapter 4	27	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 1	28
Junie B. Jones is Not a Crook, Chapter 1	17	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 2	8
Junie B. Jones is Not a Crook, Chapter 2	12	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 3	28
Junie B. Jones is Not a Crook, Chapter 3	19	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 4	26
Junie B. Jones is Not a Crook, Chapter 4	30	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 5	21
Junie B. Jones is Not a Crook, Chapter 5	14	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 6	13
Junie B. Jones is Not a Crook, Chapter 6	25	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 7	34
Junie B. Jones is Not a Crook, Chapter 7	23	*Zack Files Evil: Queen Tut and the Great Ant Pyramids,* Chapter 8	22
Junie B. Jones is Not a Crook, Chapter 8	13		

APPENDIX C

STORY TITLES, AUTHORS, LEXILES, NUMBER OF PAGES

Title and (Author)	Lexile	Pages
A to Z Mysteries: The Goose's Gold (Ron Roy)	380	87
Amelia Bedelia and the Surprise Shower (Peggy Parish)	270	64
Arthur and the Cootie Catcher (Marc Brown)	400	44
Berenstain Bears and the Missing Honey (Stan and Jan Berenstain)	340	32
Clifford the Small Red Puppy (Norman Bridwell)	300	33
Curious George Takes a Train (Margret & H. A. Rey)	360	27
Danny and the Dinosaur (Syd Hoff)	200	64
Fox on the Job (James Marshall)	150	48
Henry and Mudge and the Wild Wind (Cynthia Rylant and Sucie Stevenson)	400	35
Horrible Harry and the Ant Invasion (Suzy Kline)	440	56
Junie B. Jones is Not a Crook (Barbara Park)	400	67
Just Grandpa and Me (Mercer Mayer)	410	24
Magic Tree House: Dingoes at Dinnertime (Mary Pope Osborn)	310	75
Mr. Putter and Tabby Stir the Soup (Cynthia Rylant and Arthur Howard)	270	39
Nate the Great and the Pillowcase (Marjorie Weinman Sharmat and Rosalind Weinman)	330	32
Watch Out! Man Eating Snake! (Patricia Reily Giff)	100	55
Young Cam Jensen and the Zoo Note Mystery (David A. Adler)	260	32
*Zack Files: Evil Queen Tut and the Great Ant Pyramids (*Dan Greenburg)	420	58

APPENDIX D

READING FREQUENCY LOG

Reading Frequency Log Date: _____

Reader: _____ Tutor: _____

Title of the book/books: _____

LISTEN: Circle a number every time you listen to one page (slide).

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

READ/RECORD: Circle a number every time you read one page (slide).

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

APPENDIX E

READING FREQUENCY LOG DATA TABLE: KANISHAH

Listen	Read/Record	Book Title	Lexile
46	0	None Listed	
0	20	*Clifford the Small Red Puppy*	300
0	56	*Fox on the Job*	150
		Absent	
0	56	*Fox on the Job*	150
8	56	*Fox on the Job*	150
5	20	*Clifford the Small Red Puppy*	300
0	5	*The Berenstain Bears and the Missing Honey*	340
27	27	*The Berenstain Bears and the Missing Honey*	340
10	10	*Just Grandpa and Me*	410
43	43	*Danny and the Dinosaur*	200
26	26	*The Berenstain Bears and the Missing Honey*	340
63	0	*Amelia Bedelia and the Surprise Shower*	270
0	34	*Just Grandpa and Me*	410
20	20	*Clifford and the Small Red Puppy*	300
10	10	*Just Grandpa and Me*	410
NA	7*	*Clifford's First Valentine's Day*	490
28	0	*Curious George Takes a Train*	360
		Did not submit a Reading Frequency Log	
85	41	*Mr. Putter and Tabby Stir the Soup*	270
20	20	*Clifford the Small Red Puppy*	300

NA = Not Applicable

*PowerPoint presentation was not available for recording this book.

APPENDIX F

READING FREQUENCY LOG DATA TABLE: RASHAWN

Listen	Read/Record	Book Title	Lexile
40	0	None Listed	
0	29	*Clifford the Small Red Puppy*	300
0	51	*Fox on the Job*	150
36	36	*Fox on the Job*	150
49	0	*Fox on the Job*	150
		Absent	
41	41	*Henry and Mudge and the Wild Wind*	400
29	29	*Clifford the Small Red Puppy*	300
0	40	*Mr. Putter and Tabby Stir the Soup*	270
NA	67*	*Goosebumps: Night/Werewolf Woods* (Home)	540
		Did not submit a Reading Frequency Log	
53	57	*Fox on the Job*	150
0	4	*Just Grandpa and Me*	410
		Absent	
28	28	*The Berenstain Bears and the Missing Honey*	340
NA	21*	*Goosebumps: Night/Werewolf Woods* (Home)	540
50	0	*Danny and the Dinosaur*	200
NA	33*	*Goosebumps: Night/Werewolf Woods* (Home)	540
48	0	*Fox on the Job*	150
1	3	*Magic Tree House: Dingoes at Dinnertime*	310
NA	83*	*Legend of Sleepy Hollow* (Home)	
		Absent	
0	51	*Junie B. Jones is Not a Crook*	400
NA	72*	*Legend of Sleepy Hollow* (Home)	
		Did not submit a Reading Frequency Log	

NA = Not Applicable

*PowerPoint presentation was not available for recording this book.

APPENDIX G

READING FREQUENCY LOG DATA TABLE: JAMAL

Listen	Read/Record	Book Title	Lexile
46	0	None Listed	
43	21	*Danny and the Dinosaur*	200
50	50	*Fox on the Job*	150
		Absent	
48	50	None Listed	
41	41	None Listed	
0	20	*Clifford the Small Red Puppy*	300
26	26	*The Berenstain Bears and the Missing Honey*	340
		Absent	
30	30	*Henry and Mudge and the Wild Wind*	400
10	10	*Just Grandpa and Me*	410
20	20	*Amelia Bedelia and the Surprise Shower*	270
NA	0	*Star Wars: Phantom Menace* (Home)	730
10	10	*Henry and Mudge and the Wild Wind*	400
50	50	*Just Grandpa and Me*	410
10	10	*Just Grandpa and Me*	410
64	64	*Amelia Bedelia and the Surprise Shower*	270
NA	57*	*Star Wars: Phantom Menace* (Home)	730
26	26	*The Berenstain Bears and the Missing Honey*	340
50	50	*Fox on the Job*	150
NA	66*	*Star Wars: Phantom Menace* (Home)	730
13	13	*Magic Tree House: Dingoes at Dinnertime*	310
27	27	*Curious George Takes a Train*	360
NA	70*	*Star Wars: Phantom Menace* (Home)	730
20	20	*Horrible Harry and the Ant Invasion*	440
10	10	*A to Z Mysteries: The Goose's Gold*	380
7	7	*Horrible Harry and the Ant Invasion*	440
152	100	*Horrible Harry and the Ant Invasion*	440
100	100	*Nate the Great and the Pillowcase*	330

NA = Not Applicable

*PowerPoint presentation was not available for recording this book.

APPENDIX H

READING FREQUENCY LOG DATA TABLE: BAILEY

Listen	Read/Record	Book Title	Lexile
60	0	None Listed	
18	18	*Clifford the Small Red Puppy*	300
0	54	*Fox on the Job*	150
52	0	None Listed	
44	44	*Danny and the Dinosaur*	200
26	0	*The Berenstain Bears and the Missing Honey*	340
		Did not submit a Reading Frequency Log	
41	0	None Listed	
0	19	*Just Grandpa and Me*	410
29	29	*Danny and the Dinosaur*	200
0	25	*Henry and Mudge and the Wild Wind*	400
51	15	None Listed	
NA	0	*Awesome Knock Knock Jokes/Kids* (Home)	
15	3	*Danny and the Dinosaur*	200
		Did not submit a Reading Frequency Log	
9	0	*Just Grandpa and Me*	410
29	29	*Curious George Takes a Train*	360
0	34	*Junie B. Jones is Not a Crook*	400
		Did not submit a Reading Frequency Log	
48	0	None Listed	
0	39	*Junie B. Jones is Not a Crook*	400
0	36	*Junie B. Jones is Not a Crook*	400

NA = Not Applicable

APPENDIX I

READING FREQUENCY LOG DATA TABLE: MARIA

Listen	Read/Record	Book Title	Lexile
		Did not submit a Reading Frequency Log	
0	0	*Clifford the Small Red Puppy*	300
2	3	*Clifford the Small Red Puppy*	300
0	24	*Danny and the Dinosaur*	200
0	18	*Fox on the Job*	150
12	0	*Clifford the Small Red Puppy*	300
23	0	*Just Grandpa and Me*	410
28	9	*The Berenstain Bears and the Missing Honey*	340
26	24	*The Berenstain Bears and the Missing Honey*	340
NA	103*	*The Babysitters Club* (Home)	
58	0	*Amelia Bedelia and the Surprise Shower*	270
0	6	*Mr. Putter and Tabby Stir the Soup*	270
11	33	*Mr. Putter and Tabby Stir the Soup*	270
		Did not submit a Reading Frequency Log	
29	25	*The Berenstain Bears and the Missing Honey*	340
0	32	*Clifford the Small Red Puppy*	300
NA	75*	*Junie B. Jones is Not a Crook* (Home)	400
27	29	*Curious George Takes a Train*	360
NA	0	*Junie B. Jones is Not a Crook* (Home)	400
87	0	*Junie B. Jones is Not a Crook*	400
NA	0	*Junie B. Jones is Not a Crook* (Home)	400
0	53	*Junie B. Jones is Not a Crook*	400
NA	0	*Junie B. Jones is Not a Crook* (Home)	400
0	44	*Junie B. Jones is Not a Crook*	400
0	22	*Amelia Bedelia and the Surprise Shower*	270

NA = Not Applicable

*PowerPoint presentation was not available for recording this book.

APPENDIX J

READING FREQUENCY LOG DATA TABLE: JUAN

Listen	Read/Record	Book Title	Lexile
		Did not submit a Reading Frequency Log	
54	0	None Listed	
4	0	None Listed	
10	10	*Clifford the Small Red Puppy*	300
7	7	*Danny and the Dinosaur*	200
0	50	*Danny and the Dinosaur*	200
0	43	None Listed	
55	55	*Fox on the Job*	150
26	26	*The Berenstain Bears and the Missing Honey*	340
10	10	*Clifford the Small Red Puppy*	300
76	37	*Danny and the Dinosaur*	200
7	40	*Henry and Mudge and the Wild Wind*	400
NA	0	*Goosebumps: Night/Werewolf Woods* (Home)	540
64	64	*Danny and the Dinosaur*	200
20	20	*Clifford the Small Red Puppy*	300
NA	0	*Captain Underpants* (Home)	720
NA	0	*Star Wars: Phantom Menace* (Home)	730
27	27	*Curious George Takes a Train*	360
NA	0	*Goosebumps* (Home)	450
0	27	*Curious George Takes a Train*	360
0	27	*Clifford the Small Red Puppy*	300
NA	0	*Goosebumps* (Home)	450
0	24	*Just Grandpa and Me*	410
NA	0	*Goosebumps* (Home)	450
44	44	*Danny and the Dinosaur*	200
10	10	*Just Grandpa and Me*	410
NA	0	*Goosebumps* (Home)	450
65	65	*Fox on the Job*	150

NA = Not Applicable

APPENDIX K

READING FREQUENCY LOG DATA TABLE: TOQUANDA

Listen	Read/Record	Book Title	Lexile
50	0	None Listed	
40	0	*Fox on the Job*	150
19	20	*Clifford the Small Red Puppy*	300
0	44	*Danny and the Dinosaur*	200
41	100	*Fox on the Job*	150
0	51	*Fox on the Job*	150
0	29	*Clifford the Small Red Puppy*	300
NA	0	*Mr. Putter and Tabby Stir the Soup* (Home)	270
NA	0	*Danny and the Dinosaur* (Home)	200
NA	0	*Friends Forever* (Home)	
NA	0	*Kristy's Big Day* (Home)	
0	26	*The Berenstain Bears and the Missing Honey*	340
NA	0	*Friends Forever* (Home)	
NA	0	*Kristy's Big Day* (Home)	
0	50	*Amelia Bedelia and the Surprise Shower*	270
NA	0	*Kristy's Big Day* (Home)	
30	30	*Henry and Mudge and the Wild Wind*	400
0	44	*Mr. Putter and Tabby Stir the Soup*	270
NA	0	*Danny and the Dinosaur* (Home)	200
0	44	*Just Grandpa and Me*	410
11	44	*Just Grandpa and Me*	410
NA	0	*Friends Forever* (Home)	
0	100	*Fox on the Job*	150
0	39	*Mr. Putter and Tabby Stir the Soup*	270
0	8	*Just Grandpa and Me*	410
NA	100*	*None Listed* (Home)	
NA	40*	*None Listed* (Home)	
0	20	*None Listed*	
0	60	*Junie B. Jones is Not a Crook*	400
NA	0	*Babysitter's Club Adventure* (Home)	
0	90	*Young Cam Jansen and the Zoo Note Mystery*	260
NA	25*	*None Listed* (Home)	
0	30	*Junie B. Jones is Not a Crook*	400

NA = Not Applicable

*PowerPoint presentation was not available for recording this book.

APPENDIX L

RSPS GAINS/LOSSES DATA TABLE: PROGRESS

Progress: Items are related to the progress subjects perceive they are making.

Item Description	Kanishah	Rashawn	Jamal	Bailey	Maria	Juan	Toquanda
Assistance Needed (Item 15)	0	0	0	**3**	**3**	**1**	*-1*
Comprehension (Item 23)	**2**	0	**1**	*-2*	**2**	0	**1**
Decoding Skills (Item 24)	0	0	0	0	**4**	0	0
Effort (Item 10)	0	0	0	**3**	**2**	**2**	**3**
Effort (Item 18)	**2**	0	0	**1**	*-3*	0	0
Improvement (Item 13)	0	0	0	*-1*	**4**	0	*-1*
Improvement (Item 27)	0	0	0	0	0	*-1*	0
Speed (Item 19)	*-1*	**1**	0	*-2*	**4**	0	*-4*
Word Knowledge (Item 28)	0	0	0	0	0	0	**1**
Gains/Losses	**3**	**1**	**1**	**2**	**16**	**2**	*-1*

APPENDIX M

RSPS GAINS/LOSSES DATA TABLE: OBSERVATIONAL COMPARISON

Observational Comparison: Items compare the subjects to their peers.							
Item Description	Kanishah	Rashawn	Jamal	Bailey	Maria	Juan	Toquanda
Ability (Item 20)	0	**1**	0	**3**	0	**1**	*-1*
Comprehension (Item 14)	0	**1**	**1**	**1**	*-2*	*-1*	*-1*
Decoding Skills (Item 6)	0	**1**	**1**	**2**	0	**1**	*-1*
Reading Quantity (Item 22)	**1**	0	0	**2**	**2**	**1**	**2**
Speed (Item 4)	0	**2**	**2**	**1**	**1**	0	**1**
Word Knowledge (Item 11)	0	0	**1**	**2**	**1**	0	**2**
Gains/Losses	**1**	**5**	**5**	**11**	**2**	**2**	**2**

APPENDIX N

RSPS GAINS/LOSSES DATA TABLE: SOCIAL FEEDBACK

Social Feedback: Items are related to subjects' classmates, teachers, and family.							
Item Description	Kanishah	Rashawn	Jamal	Bailey	Maria	Juan	Toquanda
Classmates: Ability (Item 9)	0	**1**	**1**	**1**	0	*-1*	*-2*
Classmates: Ability (Item 30)	0	0	0	*-1*	**2**	*-1*	*-4*
Classmates: Listen (Item 7)	**1**	0	**1**	**2**	**2**	*-1*	*-2*
Family: Ability (Item 12)	0	0	0	**1**	**1**	0	0
Family: Ability (Item 31)	0	**1**	*-1*	0	0	**1**	0
Family: Listen (Item 33)	0	0	0	*-1*	**4**	**1**	0
Teacher: Ability (Item 3)	**1**	**1**	*-1*	**2**	**1**	0	*-1*
Teacher: Ability (Item 17)	*-1*	0	0	0	*-1*	0	*-1*
Teacher: Listen (Item 2)	0	0	0	*-2*	*-2*	0	0
Gains/Losses	**1**	**3**	0	**2**	**7**	*-1*	*-10*

APPENDIX O

RSPS GAINS/LOSSES DATA TABLE: PHYSIOLOGICAL STATES

Physiological States: Items are related to subjects' emotions and feelings.							
Item Description	Kanishah	Rashawn	Jamal	Bailey	Maria	Juan	Toquanda
Calmness (Item 21)	**2**	0	0	*-1*	**3**	**1**	0
Comfort (Item 25)	**2**	*-1*	*-1*	*-1*	*-1*	0	0
Enjoyment: Reading (Item 32)	*-3*	*-1*	**1**	**2**	**4**	*-1*	0
Enjoyment: Reading Aloud (Item 5)	0	0	0	**1**	0	0	*-4*
Inner Feelings (Item 8)	0	0	*-1*	**1**	*-1*	**1**	*-1*
Inner Feelings (Item 16)	0	0	0	**1**	**2**	0	0
Inner Feelings (Item 29)	0	0	*-1*	**3**	**2**	**1**	0
Relaxation (Item 26)	0	**2**	0	**1**	**4**	**1**	0
Gains/Losses	**1**	0	*-2*	**7**	**13**	**3**	*-5*

APPENDIX P

RSPS DATA TABLE: RAW SCORES/INTERPRETATION

Reader (R) Tutor (T)		Progress (45)			Observational Comparison (30)			Social Feedback (45)			Physiological States (40)		
		RSPS 1	RSPS 2	Change	RSPS 1	RSPS 2	Change	RSPS 1	RSPS 2	Change	RSPS 1	RSPS 2	Change
R1	Raw Scores	33	36	**+3**	9	10	**+1**	38	39	**+1**	30	31	**+1**
	Score Interpretation	l	l/a		l	l		h	h		l/a	a	
R2	Raw Scores	44	45	**+1**	24	29	**+5**	42	45	**+3**	36	36	0
	Score Interpretation	h	h		a/h	h		h	h		a/h	a/h	
R3	Raw Scores	43	44	**+1**	23	28	**+5**	42	42	0	38	*36*	*-2*
	Score Interpretation	a/h	h		a/h	h		h	h		h	a/h	
R4	Raw Scores	34	36	**+2**	10	21	**+11**	33	35	**+2**	24	31	**+7**
	Score Interpretation	l	l/a		l	a		a	a/h		l	a	
R5	Raw Scores	26	42	**+16**	10	12	**+2**	19	26	**+7**	11	24	**+13**
	Score Interpretation	l	a/h		l	l		l	l		l	l	
R6	Raw Scores	38	40	**+2**	24	26	**+2**	40	*39*	*-1*	33	36	**+3**
	Score Interpretation	l/a	a/h		a/h	h		h	h		a/h	a/h	
R7	Raw Scores	35	*34*	*-1*	12	14	**+2**	40	*30*	*-10*	40	*35*	*-5*
	Score Interpretation	l/a	l		l	l		h	l/a		h	a/h	
T1	Raw Scores	41	45	**+4**	24	26	**+2**	42	43	**+1**	36	*35*	*-1*
	Score Interpretation	a/h	h		a/h	h		h	h		a/h	a/h	
T2	Raw Scores	40	40	0	23	26	**+3**	33	34	**+1**	22	27	**+5**
	Score Interpretation	a/h	a/h		a/h	h		a	a/h		l	l/a	
T3	Raw Scores	45	45	0	26	30	**+4**	44	45	**+1**	40	*36*	*-4*
	Score Interpretation	h	h		h	h		h	h		h	a/h	
T4	Raw Scores	43	45	**+2**	25	28	**+3**	38	41	**+3**	39	40	**+1**
	Score Interpretation	a/h	h		a/h	h		h	h		h	h	
T5	Raw Scores	25	42	**+17**	9	26	**+17**	26	35	**+9**	20	28	**+8**
	Score Interpretation	l	a/h		l	h		l	a/h		l	l/a	
T6	Raw Scores	40	40	0	22	23	**+1**	42	*32*	*-10*	39	*33*	*-6*
	Score Interpretation	a/h	a/h		a/h	a/h		h	l/a		h	a/h	
T7	Raw Scores	39	*37*	*-2*	19	19	0	38	*32*	*-6*	36	*24*	*-12*
	Score Interpretation	a	l/a		l/a	l/a		h	l/a		a/h	l	

APPENDIX Q

INTERVIEW QUESTIONS: PERCEPTIONS

Interview questions were constructed to further explore the dimensions of the *Reader Self-Perception Scale* (Henk & Melnick, 1995): Progress; Observational Comparison; Social Feedback; and Physiological States.

Progress

1. Think about when you were in first or second grade and how you were reading then. Can you tell me how you are reading now that you're in third grade?
    - Follow-up interview: A few weeks ago you told me . . . . Do you think what you told me has changed at all? If it has changed, *how* has it changed?

Observational Comparison

1. Can you tell me how your reading is the same as other kids? How is your reading different?
    - Follow-up interview: A few weeks ago you told me . . . . Do you think what you told me has changed at all? If it has changed, *how* has it changed?

Social Feedback

1. What do you think your parents think about your reading?
    - How can you tell they feel that way? What do they do or say?
2. What do you think your teacher thinks about your reading?
    - How can you tell they feel that way? What do they do or say?
3. What would other kids say about your reading?
    - Why would they say that?

Physiological Status

1. Can you describe how you feel when you read?
    - Follow-up interview: A few weeks ago you told me . . . . Do you think what you told me has changed at all? If it has changed, *how* has it changed?

APPENDIX R

INTERVIEW QUESTIONS: DIGITAL TOOLS AND TUTORING

Interview questions were constructed to further investigate readers' perceptions as related to using digital tools via Technology-Actuated Reading Instruction (TARI).

1. Tell me about using digital tools (the computer) when you read.
    - What did you like? What didn't you like?

2. How do you feel when you work with a tutor during our study sessions?
    - What did you like? What didn't you like?

3. What would your partner say about working together?

APPENDIX S

GLOSSARY

Actualized: Subject's realization that his or her potential as a reader has changed.

Case Study: Seven readers were partnered with tutors in *dyads.* Their interactions and use of digital tools were explored and findings reported the influence these had on their self-perception of their reading ability.

Digital Tools: Affordances found in Technology-Actuated Reading Instruction (TARI) which subjects used to navigate between Listen and Read/Record folders, play/listen to narrations, record, and playback reading performances repeatedly as needed. Digital tools allowed subjects to scaffold their learning in an iterative, non-judgmental process.

Distal Tutoring Interactions (Low Level Interactions): Ability levels may be distal; infrequent conversations or assistance with reading strategies or guidance due to tutor absenteeism, disinterest, or disengagement; readers may self-edit reading performances; tutors may act as passive observers.

High Level Interactions: See Proximal Tutoring Interactions.

Lexile: The level of difficulty of text in a book in the study. A Lexile is indicated by a number ranging from 100 to 1700 with an "L" following the number, e.g. *Harry Potter* measured 880L for the first book in the series. Text are analyzed by MetaMetrics and assigned Lexile numbers based on two predictors of "how difficult a text is to comprehend: word frequency and sentence length" (Lexile.com, August 19, 2011). Educators use this as a tool to correlate readers' abilities with text difficulty. A Lexile does not have a consistent grade level equivalency.

Low Level Interactions: See Distal Tutoring Interactions.

Microgenetic Research: The conditions and mechanisms that are fundamental in promoting the emergence of change (Lavelli, Pantoja, Hsu, Messinger, & Fogel, 2004). It is a process-oriented approach to study subjects during shorter periods of time and offers copious details on *how* the process of change occurred for seven readers.

Mediate: Assist, guide, or intercede in an effort to explain or help readers learn.

Moderate Interactions: Ability levels may be proximal; occasional assistance or guidance with reading strategies; dyads occasionally or intermittently peer-edit or readers may self-edit reading performances.

More Capable Other: The tutor who serves as a mediating guide to assist the subject during reading activities. Extended, the term may apply to the digital tools accessed via Technology-Actuated Reading Instruction.
Navigation: The ability to access and leverage digital tools. These included but were not limited to using the specific PowerPoint applications of play, replay, record, rerecord, and save functions and TARI functions. All participants were trained on the use of TARI and demonstrated proficiency by the end of the first day of the study.

Participant: Either a reader or tutor.

Performance: See Reading Performance.

PowerPoint: See Presentations.

Presentations: For the purpose of this study the TARI activities which were created by using the Microsoft Office PowerPoint 2007 program are referred to as presentations.

Prosody: "The rhythmic and tonal aspects of speech: the 'music' of spoken language (Hudson et al. 2005)" (Honig, Diamond, Gutlohn, 2008); inflection; variation; accent; intonation; tone; timbre.

Proximal Tutoring Interactions (High Level Interactions): Ability levels are proximal; consistent assistance or guidance using reading strategies; peer-editing of reading performances; reader and tutor are typically attentive and routinely engaged in TARI activities.

Reader: Subject; an underperforming, third grade student on whom the study was conducted.

Reading Performance: A subject's recording of a story prior to peer-editing.

Reading Product: The finalized, peer- or self-edited reading performance which has been saved to the reader's electronic portfolio. Reading products typically demonstrate the subject's best work.

Subject: An underperforming, third grade reader on whom the study was conducted.

Technology-Actuated Reading Instruction (TARI): TARI is an iterative process for scaffolding information; creating authentic oral reading performances; peer- or self-editing through analysis, evaluation; and refinement of oral reading products.

Unit of Analysis: The changing subject (reader) is the unit of analysis in the dynamic assessment.

Zone of Proximal Development: Vygotsky (1978) describes this theoretical area as "the distance between the actual developmental level . . . and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (p. 86).

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